### **BSc**

### Syllabuses and Regulations

2021-2022

**Faculty of Science**The University of Hong Kong

### **General Information**

This booklet includes information on:

### BSc Degree curriculum and graduation requirements

### > List of courses and descriptions

A full list of Science courses and descriptions include information on course code, title, credit value, contents, semester offered, teaching and learning activities, assessment methods and grade descriptors.

### Majors & Minors

Details of the Science Majors and Minors available for students.

### > Degree regulations

Rules that cover curriculum requirements and progression in curriculum, selection of courses, assessment, advanced standing, grading system and degree honours classification.

### > Teaching weeks

Teaching weeks show the dates of semesters, University holidays, revision and examination periods.

Further Information detailing instructions on the selection of courses, grading, graduation requirements, honours classification, application for advanced standing and exemption, etc, can be found in the *Handbook for BSc Students* available at http://www.scifac.hku.hk/ug/current

Updates on BSc Syllabuses and Regulations can be found at http://webapp.science.hku.hk/sr4/servlet/enquiry

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### BSc Degree Curriculum and

**Graduation Requirements** 

### SECTION I BSc Degree Curriculum and Graduation Requirements

### 1. A BSc Degree Curriculum

The Faculty of Science offers a number of Science majors leading to the award of a BSc degree.

All students admitted to the first year of the 6901 BSc programme in the academic year of 2021-2022 and thereafter are required to complete at least one Science major out of the 14 regular or 7 intensive Science majors as your primary major for the award of the BSc degree. In addition to the primary Science major, students may take a second major or a minor in a Science or non-Science discipline. Students should note that some non-Science majors and minors may require students to have achieved a minimum academic result before they are allowed to enroll in them.

### (a) A typical BSc curriculum

To complete the BSc degree curriculum, you have to pass at least 240 credits, equivalent to 40 6-credit courses, normally spread over 4-years of full-time study. A BSc curriculum typically comprises:

### (i) <u>UG5</u>:

- 2 English courses and 1 Chinese course for university language requirements (18 credits)
- 6 common core courses in 4 Areas of Inquiry (36 credits)

### (ii) For regular Science major:

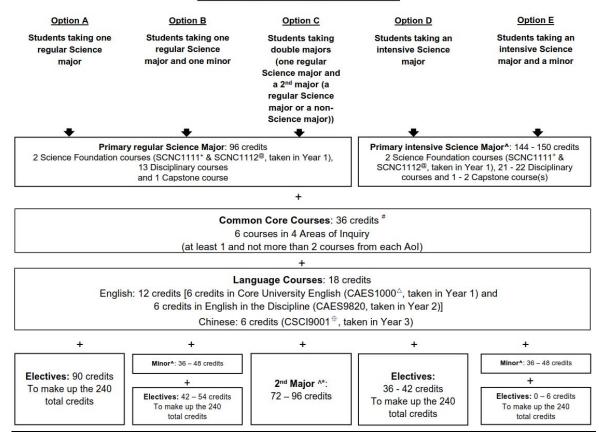
- 16 courses for the regular Science major including 2 Science Foundation courses, Disciplinary courses and capstone course (96 credits)
- A choice of 15 courses as elective courses, or to fulfill the requirements of a minor or a second major (90 credits)

### OR

For intensive Science major (applicable to 2015-16 intake and thereafter):

- 24 25 courses for the intensive Science major including 2 Science Foundation courses,
   Disciplinary courses and capstone course(s) (144 150 credits)
- A choice of 6 7 courses as elective courses, or to fulfill the requirements of a minor (36 42 credits)

### Curriculum requirements (240 credits)



### Notes:

Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111:

- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis

It is optional for them to take the course SCNC1111. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.

- @ Candidates who have been admitted to Year 1 in 2021-22 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1112:
  - Level 4 or above in Biology, Chemistry, and Physics in the Hong Kong Diploma of Secondary Education (HKDSE)
  - Level 5 or above in Biology, Chemistry, and Physics Higher Level in International Baccalaureate (IB)
  - Grade B or above in Biology, Chemistry, and Physics in General Certificate of Education Advanced Level (GCEAL)
  - Biology, Chemistry, and Physics qualification in Gao Kao will be considered on a case-by-case basis

It is optional for them to take the course SCNC1112. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.

# Student must select at least one and not more than two courses from each Area of Inquiry with not more than 24 credits of courses being selected within one academic year except where candidates are required to make up for failed credits. Common Core courses should be completed normally within the first three years of study.

△Students who have been admitted to Year 1 in 2018-19 (and thereafter) and have achieved any one of the following qualifications are exempted from this requirement, and Core University English is optional. Those who do not take this course should take a 6-credit elective course in lieu:

- Level 5 or above in English Language in the HKDSE
- holder of a Bachelor's degree from an English-medium university
- achieved Grade A or above in English Language GCE Advanced Level (AL) / Advanced Subsidiary Level (ASL)
- achieved an overall **IELTS** score of no less than 7 <u>AND</u> with all sub-scores no less than 6.5 on the Reading, Speaking, Listening and Writing Tests
- achieved an overall **TOEFL Internet-based test** score of no less than 94 <u>AND</u> no less than a 24 on the writing, a 20 on the speaking, a 20 on the listening, AND a 19 on the reading sections
- achieved in **International Baccalaureate (IB)** Grade 4 or above in English A1/ English Language A/ English A: Literature/ English A: Language and Literature (HL); or Grade 5 or above in English B/ English Language B (HL); or Grade 5 or above in English A1/ English Language A/ English A: Literature/ English A: Language and Literature (SL)
- achieved Grade 4 or above on the Advanced Placement (AP) English Language/ English Language and Composition/ English Literature and Composition Test
- achieved a **NEW Scholastic Aptitude Test (SAT)** score of 35 or above on <u>both</u> the Writing & Language Test <u>and</u> Reading Test (from 2016)
- achieved Grade B or above in H1 General Paper at the Singapore GCE A-level
- achieved Grade A or better in English language at Malaysia SPM examination
- achieved Grade A2 or better in Malaysia UEC-Senior English Language
- attained merit (3 points) or above in each set of credits in **New Zealand NCEA Literacy** (10 credits made up of 5 credits in reading and 5 credits in writing)
- achieved a score of 95% or better in English at All India Senior School Certificate Examination / Higher School Certificate
- achieved a final score of 90% or better in English at Grade 12 Canadian high school curriculum
- achieved Grade B or better in English Language at Sri Lanka Ordinary examination
- achieved a score of 90 or better in English in the **Russian Unified State Exam** (Единый государственный экзамен, ЕГЭ, Yediniy gosudarstvenniy ekzamen, EGE)
- Academic Speaking and Writing test conducted by CAES for students who have not taken any of the above tests
- When applying to take the Academic Speaking and Writing Test, students should provide evidence to the home Faculty and the CAES1000 Course Coordinator that they were admitted to HKU using qualifications other than those included in the above list.
- > Applicants are required to show the evidence of those other qualifications to the assessor on the day of the Academic Speaking and Writing Test.
- If any applicants failed to provide any evidence that they were admitted to HKU using qualifications other than those included in the above list provided by CAES, the CAES assessor has the rights not to allow the applicant to take the test.
- To satisfy the Chinese language enhancement requirement, students are required to successfully complete the 6-credit Faculty-specific Chinese language enhancement course, except for:
  - (a) Putonghua-speaking students who should take CUND9002 (Practical Chinese and Hong Kong Society) or CUND9003 (Cantonese for Non-Cantonese Speaking Students). They may take the course in Year 1 or 2 if they so wish; and

- (b) students who have not studied Chinese language during their secondary education or who have not attained the requisite level of competence in the Chinese language to take the Chinese language enhancement course should write to the Board of the Faculty to apply to be exempted from the Chinese language requirement, and
  - (i) take a 6-credit Cantonese or Putonghua language course offered by the School of Chinese especially for international and exchange students; OR
  - (ii) take an elective course in lieu.
- ^ Credit requirement for different majors or minors may vary.
- \* Students having a second major in Science are allowed to double-count the two Science Foundation Courses. The 12 credits can be made up by selecting any courses.

### (b) Common Core Curriculum

The Common Core Curriculum is designed to provide key common learning experience for all HKU students and to broaden their horizons beyond their chosen disciplinary fields of study. It focuses on issues that have been, and continue to be, of deeply profound significance to mankind, the core intellectual skills that all HKU undergraduates should acquire and the core values that they should uphold. The Common Core Curriculum is divided into four Areas of Inquiry (AoIs): (1) Scientific and Technological and Big Data; (2) Arts and Humanities; (3) Global Issues; (4) China: Culture, State and Society. Students have to pass 36 credits of courses in the Common Core Curriculum, comprising at least one and not more than two courses from each Area of Inquiry with not more than 24 credits of courses being selected within one academic year except where candidates are required to make up for failed credits. Common Core courses should be completed normally within the first three years of the BSc study and cannot be extra taken as free electives.

### 2. BSc Graduation Requirements and Honours Classification

### (a) Award of a BSc degree

For students admitted to the first year in 2014-15 or before, and students admitted directly in the third year in 2016-17 or before:

To be eligible for the award of the degree of Bachelor of Science, students must fulfill the following requirements:

- (i) Satisfied the requirements in UG5 of the Regulations for First Degree Curricula#;
- (ii) Passed not fewer than 240 credits, comprising 96 credits of the required courses as prescribed in the major programme of the BSc degree curriculum.
- \* UG5 specifies that students have to successfully complete:
  - (a) 12 credits in English language enhancement, including 6 credits in Core University English<sup>1</sup> (i.e. CAES1000) and 6 credits in an English in the Discipline course<sup>2</sup> (i.e. CAES9820 Academic English for Science Students);
  - (b) 6 credits in Chinese language enhancement<sup>3</sup> (i.e. CSCl9001 Practical Chinese for Science Students);
  - (c) 36 credits of courses in the Common Core Curriculum, comprising at least one and not more than two courses from each Area of Inquiry<sup>4</sup> with not more than 24 credits of courses being selected within one academic year except where candidates are required to make up for failed credits; and
  - (d) a capstone experience as specified in the syllabuses of the degree curriculum.

For students admitted to the first year in 2015-16, 2016-17 and 2017-18, students admitted directly to the second year in 2017-18 and 2018-19, and students admitted directly to the third year in 2017-18, 2018-19 and 2019-2020:

To be eligible for the award of the degree of Bachelor of Science, students must fulfill the following requirements:

- (i) Satisfied the requirements in UG5 of the Regulations for First Degree Curricula#;
- (ii) Passed not fewer than 240 credits, comprising 96 credits of the required courses as prescribed in the regular major programme, or 144 credits (or a higher credit requirement by the accredited bodies) of the prescribed course in the intensive major programme, of the BSc degree curriculum.

- UG5 specifies that students have to successfully complete:
  - (a) 12 credits in English language enhancement, including 6 credits in Core University English¹ (i.e. CAES1000) and 6 credits in an English in the Discipline course² (i.e. CAES9820 Academic English for Science Students);
  - (b) 6 credits in Chinese language enhancement<sup>3</sup> (i.e. CSCI9001 Practical Chinese for Science Students);
  - (c) 36 credits of courses in the Common Core Curriculum, comprising at least one and not more than two courses from each Area of Inquiry<sup>4</sup> with not more than 24 credits of courses being selected within one academic year except where candidates are required to make up for failed credits; and
  - (d) a capstone experience as specified in the syllabuses of the degree curriculum.

For students admitted to the first year in 2018-19 and thereafter, and students admitted directly to the second year in 2019-20 and thereafter:

To be eligible for the award of the degree of Bachelor of Science, students must fulfill the following requirements:

- (i) Satisfied the requirements in UG5 of the Regulations for First Degree Curricula#;
- (ii) Passed not fewer than 240 credits, comprising 96 credits of the required courses as prescribed in the regular major programme, or 144 credits (or a higher credit requirement by the accredited bodies) of the prescribed course in the intensive major programme, of the BSc degree curriculum.
- <sup>#</sup> UG5 specifies that students have to successfully complete:
  - (a) 12 credits in English language enhancement, including 6 credits in Core University English<sup>1</sup> (i.e. CAES1000) and 6 credits in an English in the Discipline course<sup>2</sup> (i.e. CAES9820 Academic English for Science Students OR CAES9821 Professional and Technical Communication for Mathematical Sciences);
  - (b) 6 credits in Chinese language enhancement<sup>3</sup> (i.e. CSCI9001 Practical Chinese for Science Students);
  - (c) 36 credits of courses in the Common Core Curriculum, comprising at least one and not more than two courses from each Area of Inquiry<sup>4</sup> with not more than 24 credits of courses being selected within one academic year except where candidates are required to make up for failed credits; and
  - (d) a capstone experience as specified in the syllabuses of the degree curriculum.

### (b) Honours Classification

<u>For students admitted to the first year in 2016-17 or before, students admitted directly to the second year in 2017-18, and students admitted directly to the third year in 2018-19 or before:</u>

Classification of honours are calculated using the cumulative grade point average CGPA as below:

	<u>CGPA range</u>
First Class Honours	3.60 - 4.30
Second Class Honours Division I	3.00 - 3.59
Second Class Honours Division II	2.40 - 2.99
Third Class Honours	1.70 - 2.39
Pass	1.00 - 1.69

For students admitted to the first year in 2017-18 and thereafter, students admitted directly to the second year in 2018-19 and thereafter, and students admitted directly to the third year in 2019-2020 and thereafter:

Classification of honours are calculated using the graduation grade point average GGPA\* as below:

	CGPA range
First Class Honours	3.60 - 4.30
Second Class Honours Division I	3.00 - 3.59
Second Class Honours Division II	2.40 - 2.99
Third Class Honours	1.70 – 2.39
Pass	1.00 - 1.69

\* For students in the 2017-18 intake and thereafter who have successfully completed six Common Core courses, the calculation of Graduation GPA is subject to the proviso that either five Common Core courses with the highest grades (covering all four Areas of Inquiry), or all six courses will be counted towards Graduation GPA, depending on which generates the higher Graduation GPA.

Credits granted for advanced standing in recognition of studies completed successfully before admission to the curriculum and credits transfer in recognition of studies completed on exchange during candidature at HKU are not included in the calculation of GPA.

<sup>1</sup> Candidates who have been admitted to Year 1 in 2018-19 (and thereafter) and have achieved any one of the following qualifications are exempted from this requirement, and Core University English is optional. Those who do not take this course should take a 6-credit elective course in lieu, see *Regulation UG6*:

- Level 5 or above in English Language in the HKDSE
- holder of a Bachelor's degree from an English-medium university
- achieved Grade A or above in English Language GCE Advanced Level (AL) / Advanced Subsidiary Level (ASL)
- achieved an overall **IELTS** score of no less than 7 <u>AND</u> with all sub-scores no less than 6.5 on the Reading, Speaking, Listening and Writing Tests
- achieved an overall TOEFL Internet-based test score of no less than 94 AND no less than a 24 on the writing, a 20 on the speaking, a 20 on the listening, AND a 19 on the reading sections
- achieved in **International Baccalaureate (IB)** Grade 4 or above in English A1/ English Language A/ English A: Literature/ English A: Language and Literature (HL); or Grade 5 or above in English B/ English Language B (HL); or Grade 5 or above in English A1/ English Language A/ English A: Literature/ English A: Language and Literature (SL)
- achieved Grade 4 or above on the Advanced Placement (AP) English Language/ English Language and Composition/ English Literature and Composition Test
- achieved a NEW Scholastic Aptitude Test (SAT) score of 35 or above on <u>both</u> the Writing & Language Test <u>and</u> Reading Test (from 2016)
- achieved Grade B or above in H1 General Paper at the Singapore GCE A-level
- achieved Grade A or better in English language at Malaysia SPM examination
- achieved Grade A2 or better in Malaysia UEC-Senior English Language
- attained merit (3 points) or above in each set of credits in **New Zealand NCEA Literacy** (10 credits made up of 5 credits in reading and 5 credits in writing)
- achieved a score of 95% or better in English at All India Senior School Certificate Examination / Higher School Certificate
- achieved a final score of 90% or better in English at Grade 12 Canadian high school curriculum
- achieved Grade B or better in English Language at **Sri Lanka Ordinary examination**
- achieved a score of 90 or better in English in the **Russian Unified State Exam** (Единый государственный экзамен, ЕГЭ, Yediniy gosudarstvenniy ekzamen, EGE)
- Academic Speaking and Writing test conducted by CAES for students who have not taken any of the above tests
  - When applying to take the Academic Speaking and Writing Test, students should provide evidence to the home Faculty and the CAES1000 Course Coordinator that they were admitted to HKU using qualifications other than those included in the above list.
  - > Applicants are required to show the evidence of those other qualifications to the assessor on the day of the Academic Speaking and Writing Test.
  - > If any applicants failed to provide any evidence that they were admitted to HKU using qualifications other than those included in the above list provided by CAES, the CAES assessor has the rights not to allow the applicant to take the
- <sup>2</sup> (a) To satisfy the English in the Discipline (ED) requirement, candidates who have passed the ED course for a Major but subsequently change that Major are required to pass the ED course for the new Major, or either of the double Majors finally declared upon graduation irrespective of whether the second Major is offered within or outside of the candidates' home Faculty.
  - (b) Candidates declaring double Majors can, if they fail in the ED course for one of the Majors, either (i) re-take and successfully complete that failed ED course, or (ii) successfully complete the ED course for the other Major, irrespective of whether the Major is offered within or outside of the candidates' home Faculty.
  - (c) Candidates who undertake studies in double Majors or double degrees are not required to take a second ED course but may be advised by the Faculty to do so.

<sup>&</sup>lt;sup>3</sup> Candidates who have not studied Chinese language during their secondary education may be exempted from this requirement and should take a 6-credit elective course in lieu, see *Regulation UG6*.

**Capstone Requirement for** 

**Science Students** 

### SECTION II Capstone Requirement for Science Students

Capstone experience is an integral part of the major programme which focuses on integration and application of knowledge and skills gained in the early years of study. The capstone course carries a minimum of 6 credits and students must complete this for fulfillment of the graduation requirements. Capstone course is normally taken in the senior years (year 3 or 4) of study. The earliest that a student is allowed to take a capstone course is their year 3 study. The capstone courses in each Science major may be different but a range of courses (e.g. research project, seminar, field work, internship and capstone project) is offered to suit individual student's needs and interests. The following courses are currently recognized as capstone courses in the different majors:

BSc - Major	Recognized Capstone Courses
1. Biochemistry	1. BIOC3999 Directed studies in biochemistry (6)
	2. BIOC4966 Biochemistry internship (6)
	3. BIOC4999 Biochemistry project (12)
2a. Biological Sciences	1. BIOL3994 Directed studies in biological sciences (6)
	2. BIOL4964 Biological sciences internship (6)
	3. BIOL4994 Biological sciences project (12)
2b. Biological Sciences (Intensive)	1. BIOL4994 Biological sciences project (12)
3a. Chemistry	1. CHEM3999 Directed studies in chemistry (6)
	2. CHEM4910 Chemistry literacy and research (6)
	3. CHEM4911 Capstone experience for chemistry undergraduates: HKUtopia (6)
	4. CHEM4966 Chemistry internship (6)
2h Chamistay (Intensive)	5. CHEM4999 Chemistry project (12) 1. CHEM3999 Directed studies in chemistry (6)
3b. Chemistry (Intensive)	2. CHEM4966 Chemistry internship (6)
	3. CHEM4999 Chemistry project (12)
4. Decision Analytics	1. STAT3799 Directed studies in statistics (6)
5. Risk Management	2. STAT4710 Capstone experience for statistics undergraduates (6)
6. Statistics	3. STAT4766 Statistics internship (6)
	4. STAT4799 Statistics project (12)
7. Earth System Science	1. EASC4911 Earth system: contemporary issues (6)
8a. Ecology & Biodiversity	1. BIOL4991 Ecology & biodiversity project (12)
8b. Ecology & Biodiversity	1. BIOL3991 Directed studies in ecology & biodiversity (6)
oci zeeregy ee zieen ereny	2. BIOL4911 Conservation science in practice (6)
	3. BIOL4991 Ecology & biodiversity project (12)
9. Environmental Science	1. ENVS3999 Directed studies in environmental science (6)
	2. ENVS4966 Environmental science internship (6)
	3. ENVS4999 Environmental science project (12)
10. Food & Nutritional Science	1. BIOL3992 Directed studies in food & nutritional science (6)
	2. BIOL4922 Food product development and evaluation (6)
	3. BIOL4962 Food & nutritional science internship (6)
	4. BIOL4992 Food & nutritional science project (12)
11. Geology Geology (Intensive)	1. EASC4955 Integrated field studies (6)
12. Mathematics	1. MATH3999 Directed studies in mathematics (6)
Mathematics (Intensive)	2. MATH4910 Senior mathematics seminar (6)
,	3. MATH4911 Mathematics capstone project (6)
	4. MATH4966 Mathematics internship (6)
	5. MATH4999 Mathematics project (12)
13. Mathematics / Physics	1. MATH3999 Directed studies in mathematics (6)
	2. MATH4910 Senior mathematics seminar (6)
	3. MATH4911 Mathematics capstone project (6)
	4. MATH4966 Mathematics internship (6)
	5. MATH4999 Mathematics project (12)
	6. PHYS3999 Directed studies in physics (6) 7. PHYS4966 Physics internship (6)
	8. PHYS4999 Physics project (12)
14. Molecular Biology & Biotechnology	1. BIOL3993 Directed studies in molecular biology & biotechnology (6)
1 1. Molecular Biology & Blottermology	2. BIOL4963 Molecular biology & biotechnology internship (6)
	3. BIOL4993 Molecular biology & biotechnology miterinsing (b)
15. Astronomy	1. PHYS3999 Directed studies in physics (6)
16. Physics	2. PHYS4966 Physics internship (6)
Physics (Intensive)	3. PHYS4999 Physics project (12)
· ` '	

**Credit Unit Statement of** 

**BSc Degree Curriculum** 

### SECTION III Credit Unit Statement of the BSc Degree Curriculum

### 1. General guideline for contact hours requirement in the BSc Degree Curriculum

- (a) A 6-credit course has around 120-180 total study hours, including contact hours, study time, assignment and assessment.
- (b) About 30% of the total study hours are actual contact hours in the form of a class, e.g. lecture hours.
- (c) A 6-credit course has around 36 to 45 lecture hours.
- (d) For lecture-based courses, normally there will be tutorial/discussion sessions.
- (e) For courses employing a non-lecture or lab-based approach, e.g. field camp, IT-based or project-based courses, students are expected to devote about 120-180 hours for a 6-credit course and 240-360 hours for a 12-credit course.

### 2. Credit Unit Statement of the BSc Degree Curriculum

The BSc degree curriculum consists of six major types of courses based on the learning activities. The majority of courses in the programmes are 6 credits. Examples of the contact hours requirements for the six categories of courses are described as follows.

### (a) Lecture-based courses (6 credits)

Contact hours for 6-credit course: 36 hours of lectures and 12 hours of tutorial/discussion These courses are taught predominantly by lectures and tutorials. Assessment is by a combination of examination (0-80%) and continuous assessment (20-100%). Continuous assessment tasks include written assignments (totaling no more than 8,000 words) such as essays and project reports, and oral presentations. Details of the assessment tasks can be found in the description of individual courses.

### (b) Lecture with laboratory component courses (6 credits)

Contact hours for 6-credit course: 24 hours of lectures, 24 hours of laboratory and 6 hours of tutorial

These courses are taught by a combination of lectures and laboratory/practical sessions. Assessment is by a combination of examination (0-70%) and continuous assessment (30-100%). Continuous assessment tasks include written assignments (totaling no more than 8,000 words) such as essays, laboratory reports, and project reports, and oral presentations. Details of the assessment tasks can be found in the description of individual courses.

### (c) Laboratory and Workshop courses (6 credits)

Contact hours: 48 hours of laboratory or workshop and 12 hours of tutorial

These courses aim at enriching the student's research skills and encourage group work through hands-on activities in which science research is introduced. Students are expected to spend an additional 100 hours on self-study, preparation work for the laboratory, and writing reports. Continuous assessment tasks (100%) include written assignments (totaling no more than 8,000 words) such as laboratory report for each experiment (normally no more than 10 experiments) and essays. Details of the assessment tasks can be found in the description of individual courses.

### (d) Project-based courses (6 and 12 credits)

These courses aim at providing students with an opportunity to pursue their own research interest under the supervision of a teacher. The teacher normally meets with the student weekly to discuss project progress. Assessment task is normally through research reports or a dissertation (totaling no more than 10,000 words for a 6-credit course and 20,000 words for a 12-credit course). Oral presentation will form part of the assessment. Details of the assessment tasks can be found in the description of individual courses.

### (e) Field camps (6 credits)

Contact hours: at least 72 hours in the field

These courses aim at giving practical experience in a variety of contexts. Fieldwork may be conducted locally or overseas during reading week or summer. Fieldwork courses have a small number of lecture hours but are predominately practical in nature. Assessment tasks (100%) normally include the following outputs (totaling no more than 8,000 words): field

assignments and reports (normally no more than 10 field assignments). Details of the assessment tasks can be found in the description of individual courses.

### (f) Internship (6 credits)

Students have to undertake at least 160 hours of internship work Internships aim to offer students the opportunity to gain work experience related to their major of study. The teacher meets with the student regularly to discuss work progress. Students have to undertake at least 160 hours of internship work arranged formally. Assessment tasks (100%) normally include the following outputs: a written report of no more than 2000 words and feedback from the internship supervisor and an oral presentation on students' internship experience. Details of the assessment tasks can be found in the description of individual courses.

### 3. The types of courses in the 14 Science Majors and 18 Science Minors are as follows:

			Type of Cour	ses		
Majors/Minors	Lecture- based	Lecture with laboratory component	Laboratory & Workshop	Project- based	Field camps	Internship
Actuarial Studies (Minor)	✓	✓	✓	✓		✓
Astronomy (Minor)	✓	✓	✓	✓		✓
Biochemistry (Major & Minor)	✓	✓	✓	✓		✓
Biological Sciences (Intensive Major & Major)	<b>✓</b>	<b>√</b>	<b>✓</b>	✓		<b>✓</b>
Chemistry (Intensive Major, Major & Minor)	✓	✓	✓	✓		✓
Computational & Financial Mathematics (Minor)	✓	✓	✓	✓		✓
Decision Analytics (Major)	✓	✓	✓	✓		✓
Earth Sciences (Minor)	✓	✓	✓	✓	✓	✓
Earth System Science (Major)	✓	✓	✓	✓	✓	✓
Ecology & Biodiversity (Intensive Major, Major & Minor)	<b>√</b>	✓	✓	✓	<b>✓</b>	✓
Environmental Science (Major & Minor)	<b>✓</b>	✓	<b>✓</b>	<b>√</b>	✓	<b>✓</b>
Food & Nutritional Science (Major & Minor)	✓	✓	✓	✓		✓
Geology (Intensive Major & Major)	✓	✓	✓	✓	✓	✓
Marine Biology (Minor)	✓	✓	✓	✓	✓	✓
Mathematics (Intensive Major, Major & Minor)	✓	✓	<b>✓</b>	<b>√</b>		<b>✓</b>
Molecular Biology & Biotechnology (Intensive Major, Major & Minor)	✓	✓	✓	✓		✓
Operations Research & Mathematical Programming (Minor)	✓	✓	✓	✓		✓
Physics (Intensive Major, Major & Minor)	✓	✓	✓	✓		✓
Plant Science (Minor)	✓	✓	✓	✓		✓
Risk Management (Major & Minor)	✓	✓	✓	✓		✓
Science Entrepreneurship (Minor)	✓			✓		✓
Statistics (Major & Minor)	✓	✓	✓	✓		✓

The above different categories of courses follow the unified Credit Unit Statement of the BSc curriculum.

List of BSc Courses and English and

Chinese language courses on offer in 2021-2022 and 2022-2023

### SECTION IV List of BSc Courses on offer in 2021/2022 and 2022/2023

Course Code	Title	Credit	Pre-requisite	Availa	able in	Semester offered in 2021 - 2022	Exam. held in 2021 - 2022	Quota	Course Coordinator	Major / Minor (The Major/Minor that this course appears as.)			
				2021 - 2022	2022 - 2023	0=year long 1=1st sem 2=2nd sem S=Summer				Disciplinary Core Course	Disciplinary Elective	Capstone - Disciplinary Core Course	Capstone - Disciplinary Elective
School of Bi	omedical Sciences						ı		1				
BIOC1600	Perspectives in biochemistry	6	Level 3 or above in HKDSE Biology, Chemistry, or Combined Science with Biology or Chemistry component, or equivalent Not for students who have passed in BIOL1110, or have already enrolled in this course	Y	Y	1	Dec		Prof J Tanner, Biomedical Sciences	Major in Biochemistry (2014)	Major in Biochemistry (2021,2020,2019,2018, 2017,2016,2015); Minor in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014)		
BIOC2600	Basic biochemistry	6	Pass in BIOC1600 or BIOL1110 or ENGG1207 or BMED1207; and Not for students who have passed in BIOL2220 or MEDE2301 or BMED2301, or have already enrolled in these courses.	Y	Y	1	Dec	300	Dr. M Kotaka, Biomedical Sciences	Major in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Biological Sciences (2021,2020,2019,2018, 2017,2016,2015); Major in Biological Sciences (Intensive) (2021,2020,2019,2018, 2017); Major in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Molecular Biology & Biotechnology (1012,2020,2019,2018, 2017,2016,2015,2014); Major in Molecular Biology & Biotechnology (1012,2020,2019,2018, 2017,2016,2015)	Minor in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014)		
BIOC3601	Basic metabolism	6	Pass in BIOC2600 or BIOL2220 or MEDE2301 or BMED2301	Y	Y	1	Dec	80	Dr N S Wong, Biomedical Sciences	Major in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014)	Minor in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014)		
BIOC3604	Essential techniques in biochemistry and molecular biology	6	Pass in BIOC2600 or BIOL2220 or BMED2301 or MEDE2301	Y	Y	2	May	70	Dr K M Yao, Biomedical Sciences	Major in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014)	Minor in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014)		
BIOC3605	Sequence bioinformatics	6	Pass in BIOC2600 or BIOL2220 or BBMS2003 or BBMS2007 or MEDE2301 or BMED2301	Y	Y	2	May	80	Dr B C W Wong, Biomedical Sciences		Major in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014)		
BIOC3606	Molecular medicine	6	Pass in BIOC2600 or BIOL2220 or MEDE2301 or BMED2301	Y	Y	2	May	50	Prof D Y Jin, Biomedical Sciences		Major in Biochemistry (2021,2020,2019,2018, 2017,2016,2014); Major in Food & Nutritional Science (2021,2020,2019); Minor in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014)		
BIOC3999	Directed studies in biochemistry	6	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary	Y	Y	1, 2, S	No exam	36	Dr A C Koon (Sem 1); Dr B H B Yuen (Sem 2				Major in Biochemistry (2021,2020,2019,201

<sup>^</sup> Availability of courses in 2022-2023 is subject to change.

			core/elective courses in Biochemistry Major including BIOC2600 or BIOL2220 and BIOL3401. This capstone course is for Biochemistry Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.						& Summer), Biomedical Sciences			2017,2016,2015,2014)
BIOC4610	Advanced biochemistry	6	Pass in BIOC3601 or BIOL3401 or BIOL3402 or BIOL3404	Y	Y	1	Dec	70	Dr K M Yao, Biomedical Sciences	Major in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014)	Minor in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOC4611	Advanced biochemistry II	6	Pass in BIOC3601; and BIOL3404 or CHEM2441; and Pass in BIOC4610, or already enrolled in this course	N	N			50	Prof D Chan, Biomedical Sciences			
BIOC4612	Molecular biology of the gene	6	Pass in BIOC3601 or BIOL3401 or BIOL3402 or BIOL3404 or BBMS2007	Y	Y	2	May	50	Prof K S E Cheah, Biomedical Sciences		Major in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOC4613	Advanced techniques in biochemistry & molecular biology	6	Pass in BIOC3604	Y	Y	1	Dec	70	Prof D Chan, Biomedical Sciences	Major in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014)	Minor in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOC4966	Biochemistry internship	6	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in Biochemistry Major including BIOC3604. This capstone course is for Biochemistry Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	1, 2, S	No exam	20	Dr A C Koon (Sem 1); Dr Dr B H B Yuen (Sem 2 & Summer), Biomedical Sciences			Major in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014)
BIOC4999	Biochemistry project	12	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in Biochemistry Major including 4 of the following 5 courses: BIOL3401, BIOC3601, BIOC3604, BIOC4610 and BIOC4613. BIOC4610 and BIOC4613 can be taken concurrently with this course. This capstone course is for Biochemistry Major students only. This capstone course is ONLY opened to students who are in year 3 or above in the Biochemistry Major program.	Y	Y	0	No exam	25	Dr N S Wong, Biomedical Sciences			Major in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014)
School of Bi	ological Sciences	•			•	•						
BIOL1110	From molecules to cells	6	Not for students who have passed in BIOC1600, or have already enrolled in this course.  Students who wish to take this course are expected to have taken HKDSE Biology and/or Chemistry or equivalent. For students without HKDSE Chemistry, they are encouraged to take CHEM1041 concurrently or before.  Not for students having taken any level 2 (or above) Biomedical Sciences (BBMS) or Biochemistry (BIOC) or Bachelor of Medicine and Bachelor of Surgery (MBBS) course. Students	Y	Y	1, 2	Dec, May	382	Dr G Y W Chan, Biological Sciences	Major in Biochemistry (2014); Major in Biological Sciences (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Biological Sciences (Intensive) (2021,2020,2019,2018, 2017); Major in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Ecology & Biodiversity (1015,2014); Major in Ecology & Biodiversity (1015,2014); Major in Foology & Biodiversity (1015,2015); Major in Food &	Major in Biochemistry (2021,2020,2019,2018, 2017,2016,2015); Minor in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Plant Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Plant Science (2021,2020,2019,2018,	

			having taken level 2 BBMS/BIOC/MBBS course should take the replacement course for BIOL1110 in any regular major offered by the School of Biological Sciences.							Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Molecular Biology & Biotechnology (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	2017,2016,2015,2014)	
BIOL1111	Introductory microbiology	6	NIL	N	N			80	, Biological Sciences	Major in Biological Sciences (2014)		
BIOL1201	Introduction to food and nutrition	6	NIL	Y	Y	1	Dec	150	Dr L Zhang, Biological Sciences	Major in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014)	Minor in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL1309	Evolutionary diversity	6	NIL	Y	Y	2	May	250	Dr M Yasuhara, Biological Sciences	Major in Biological Sciences (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Biological Sciences (Intensive) (2021,2020,2019,2018, 2017); Major in Earth System Science (2014); Major in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Ecology & Biodiversity (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Major in Food & Nutritional Science (2016,2015,2014); Minor in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014)	Major in Earth System Science (2016,2015); Major in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Molecular Biology & Biotechnology (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Marine Biology (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Molecular Biology & Biotechnology & Biotechnology & Biotechnology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Plant Science (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL1501	Bioethics	6	NIL	N	N			40	, Biological Sciences		2017,2010,2010,2014)	
BIOL1502	The gene	6	NIL Not for students with level 3 or above in HKDSE Biology or Combined Science with Biology component or equivalent.	N	N			50	, Biological Sciences			
BIOL2101	Principles of food chemistry	6	Pass in BIOL1201; and NOT for students who have passed in BIOL3201. The course is only for students admitted in 2017-2018 or thereafter.	Y	Y	1	Dec	100	Dr J C Y Lee, Biological Sciences	Major in Food & Nutritional Science (2021,2020,2019,2018, 2017)	Minor in Food & Nutritional Science (2021,2020,2019,2018, 2017)	
BIOL2102	Biostatistics	6	Pass in BIOC1600 or BIOL1110 or BIOL2306 or ENVS1301 or ENVS2002 or SCNC1111	Y	Y	1	No exam	169	Dr E Pickett, Faculty	Major in Biological Sciences (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Biological Sciences (Intensive) (2021,2020,2019,2018, 2017); Major in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014);	Major in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014)	

										Major in Ecology & Biodiversity (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Major in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Molecular Biology & Biotechnology (1021,2020,2019,2018, 2017,2016,2015,2014); Major in Molecular Biology & Biotechnology (1021,2020,2019,2018, 2017,2016,2015)		
BIOL2103	Biological sciences laboratory course	6	Pass in BIOL1110. Not for students having taken any level 3 (or above) Biochemistry (BIOC) course or BBMS2001.	Y	Y	1, 2	Dec, May	210	Dr W Y Lui, Biological Sciences	Major in Biological Sciences (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Biological Sciences (Intensive) (2021,2020,2019,2018, 2017); Major in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Ecology & Biodiversity (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Major in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Molecular Biology & Biotechnology (12021,2020,2019,2018, 2017,2016,2015,2014); Major in Molecular Biology & Biotechnology (12021,2020,2019,2018, 2017,2016,2015,2014); Major in Molecular Biology & Biotechnology (12021,2020,2019,2018, 2017,2016,2015)	Minor in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Plant Science (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL2220	Principles of biochemistry	6	Pass in BIOL1110; and Not for students who have passed in BIOC2600, or have already enrolled in this course.	Y	Y	1	Dec	100	Dr C S C Lo, Biological Sciences	Major in Biochemistry (2021,2020,2019,2018, 2017,2016,2015); Major in Biological Sciences (2021,2020,2019,2018, 2017,2016,2015); Major in Biological Sciences (Intensive) (2021,2020,2019,2018, 2017); Major in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014);	Minor in Biochemistry (2021,2020,2019,2018, 2017,2016,2015); Minor in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Plant Science (2021,2020,2019,2018, 2017,2016,2015,2014)	

										Major in Molecular Biology & Biotechnology (Intensive) (2021,2020,2019,2018, 2017,2016,2015)		
BIOL2306	Ecology and evolution	6	Pass in BIOL1110 or BIOL1309 or ENVS1301 or ENVS1401	Y	Y	1	Dec	80	Dr A L Ashton, Biological Sciences	Major in Biological Sciences (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Biological Sciences (Intensive) (2021,2020,2019,2018, 2017); Major in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Ecology & Biodiversity (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Ecology & Biodiversity (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014)	Major in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Molecular Biology & Biotechnology (2020,2019,2018,2017, 2016,2015,2014); Major in Molecular Biology & Biotechnology (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Marine Biology (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Molecular Biology (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL2408	Green earth-plants and mankind	6	Pass in BIOL1110 and BIOL2103	N	N			30	Prof. M L Chye, Biological Sciences		Major in Molecular Biology & Biotechnology (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	
BIOL2409	Biotechnology industry and entrepreneurship	6	Pass in 1110 NOT for students who have passed in BIOL3409.	Y	Y	2	No exam	40	Dr W B L Lim, Biological Sciences	Major in Molecular Biology & Biotechnology (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	Major in Molecular Biology & Biotechnology (2021)	
BIOL3101	Animal behaviour	6	Pass in BIOL2306	Y	Y	1	Dec	32	Dr S W Y Sin, Biological Sciences	Major in Ecology & Biodiversity (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	Major in Biological Sciences (Intensive) (2021,2020,2019,2018, 2017); Major in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL3105	Animal physiology and environmental adaptation	6	Pass in BIOL2103 or BIOL2220 or BIOC2600 or MEDE2301	Y	Y	2	May	35	Prof A O L Wong, Biological Sciences		Major in Biological Sciences (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Biological Sciences (Intensive) (2021,2020,2019,2018, 2017)	
BIOL3107	Plant physiology	6	Pass in BIOL2103 NOT for students who have passed in ENVS3202	N	N			30	TBC, Biological Sciences		Major in Biological Sciences (2019,2018,2017,2016, 2015,2014); Major in	

											Biological Sciences (Intensive) (2019,2018,2017); Major in Molecular Biology & Biotechnology (Intensive) (2019,2018,2017,2016, 2015); Minor in Plant Science (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL3108	Microbial physiology	6	Pass in BIOC2600 or BIOL2103 or BIOC3604	N	N			50	Dr A Yan, Biological Sciences		Major in Biological Sciences (2015,2014)	
BIOL3109	Environmental microbiology	6	Pass in BIOL2103	N	z	<del></del>		40	TCB, Biological Sciences		Major in Biological Sciences (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Biological Sciences (Intensive) (2021,2020,2019,2018, 2017); Major in Ecology & Biodiversity (2016,2015,2014); Major in Environmental Science (2021,2020,2019,2018, 2017,2016,2015)	
BIOL3110	Environmental toxicology	6	Pass in BIOL2103 or CHEM3141 or ENVS3042	N	N			60	TBC, Biological Sciences		Major in Biological Sciences (2015,2014); Major in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL3201	Food chemistry	6	Pass in BIOC2600 or BIOL2103 or BIOL2220 or MEDE2301; and NOT for students who have passed in BIOL2101. This course is only for students admitted in 2016-2017 or before.	N	N			60	Dr J C Y Lee, Biological Sciences	Major in Food & Nutritional Science (2016,2015,2014)	Minor in Food & Nutritional Science (2016,2015,2014)	
BIOL3202	Nutritional biochemistry	6	Pass in BIOC2600 or BIOL2220 or MEDE2301	Y	Y	1	Dec	100	Dr C B Chan, Biological Sciences	Major in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014)	Major in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL3203	Food microbiology	6	Pass in BIOC2600 or BIOL2220 or MEDE2301	Y	Y	2	No exam	140	Dr H S El-Nezami, Biological Sciences	Major in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014)	Major in Biological Sciences (2021,2020,2019,2018, 2017,2016): Major in Biological Sciences (Intensive) (2021,2020,2019,2018, 2017): Minor in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL3204	Nutrition and the life cycle	6	Pass in BIOL2220 or BIOC2600	Υ	Y	2	No exam	50	Dr J C Y Louie,		Major in Food &	

			or BIOL3202						Biological Sciences		Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL3205	Human physiology	6	Pass in BIOC2600 or BIOL2103 or BIOL2220 or MEDE2301	Y	Y	1	Dec	135	Dr W Y Lui, Biological Sciences		Major in Biological Sciences (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Biological Sciences (Intensive) (2021,2020,2019,2018, 2017); Major in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Molecular Biology & Biotechnology (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL3206	Clinical nutrition	6	Pass in BIOL3202 or BIOL3203 or BIOL3204 or BIOL3205	N	N			70	Dr J M F Wan, Biological Sciences		Major in Food & Nutritional Science (2018,2017,2016,2015, 2014); Minor in Food & Nutritional Science (2018,2017,2016,2015, 2014)	
BIOL3207	Principles of toxicology	6	Pass in BIOC2600 or BIOL2220 or BIOL3205 or MEDE2301	Y	Y	2	No exam	80	Dr H S El-Nezami, Biological Sciences		Major in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL3208	Food safety and quality management	6	Pass in BIOL3201 or BIOL3203	N	N			45	Dr O Habimana, Biological Sciences		Major in Food & Nutritional Science (2016,2015,2014); Minor in Food & Nutritional Science (2016,2015,2014)	
BIOL3209	Food and nutrient analysis	6	Pass in BIOL2101 Not for students who have passed in CHEM3242	Y	Y	1	No exam	80	Dr J C Y Lee, Biological Sciences	Major in Food & Nutritional Science (2018,2017)	Major in Food & Nutritional Science (2021,2020,2019,2016, 2015,2014); Minor in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL3210	Grain production and utilization	6	Pass in any level 2 BIOL course	N	N			40	Prof H Corke, Biological Sciences		Major in Food & Nutritional Science (2016,2015,2014); Minor in Food & Nutritional Science (2016,2015,2014); Minor in Plant Science (2021,2020,2019,2018,	

		1		1	1	I	1	[			2017,2016,2015,2014)		
BIOL3211	Nutrigenomics	6	Pass in BIOC2600 or BIOL2220 or MEDE2301	Y	Y	1	Dec	40	Dr K C Tan-Un, Biological Sciences		Major in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014)		
BIOL3215	Principles of dietary assessment	6	Pass in BIOL2102	N	N			30	Dr J C Y Louie, Biological Sciences		Major in Food & Nutritional Science (2018,2017,2016,2015, 2014)		
BIOL3216	Food waste management	6	Pass in BIOL2101	Y	Y	2	May	30	Dr O Habimana, Biological Sciences		Major in Environmental Science (2021,2020,2019,2018, 2017,2016); Major in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014)		
BIOL3217	Food, environment and health	6	Pass in BIOL 2101 or ENVS2001 or ENVS2002	Y	Y	2	No exam	50	Dr T C S Lam, Biological Sciences		Major in Environmental Science (2021,2020,2019,2018, 2017,2016,2015); Major in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014)		
BIOL3218	Food hygiene and quality control	6	Pass in BIOL2101 or BIOL3203 Not for students who have passed in BIOL3208	Y	Y	1	Dec	30	Dr O Habimana, Biological Sciences		Major in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014)		
BIOL3301	Marine biology	6	Pass in BIOL2306 or ENVS2002	Y	Y	1	Dec	40	Dr M Yasuhara, Biological Sciences	Major in Ecology & Biodiversity (2021,2020,2019,2018, 2017); Major in Ecology & Biodiversity (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Marine Biology (2021,2020,2019,2018, 2017,2016,2015,2014)	Major in Biological Sciences (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Biological Sciences (Intensive) (2021,2020,2019,2018, 2017); Major in Ecology & Biodiversity (2016,2015,2014); Minor in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014)		
BIOL3302	Systematics and phylogenetics	6	Pass in BIOL1309; and Any level 2 BIOL course	Y	Y	1	Dec	60	Prof R M K Saunders, Biological Sciences	Major in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Ecology & Biodiversity (Intensive)	Major in Biological Sciences (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Biological Sciences (Intensive)		

										(2021,2020,2019,2018, 2017,2016,2015)	(2021,2020,2019,2018, 2017); Minor in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL3303	Conservation biology	6	Pass in BIOL2306	Y	Y	2	May	100	Dr T C Bonebrake, Biological Sciences	Major in Ecology & Biodiversity (2016,2015,2014); Major in Ecology & Biodiversity (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	Major in Biological Sciences (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Biological Sciences (Intensive) (2021,2020,2019,2018, 2017); Major in Ecology & Biodiversity (2021,2020,2019,2018, 2017); Major in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Marine Biology (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Marine Biology (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL3305	Tropical and temperate marine ecology field course	6	Pass in "C" or above in BIOL2306 or BIOL3301 or BIOL3303 or ENVS2001	N	Y			22	Dr B Russell, Biological Sciences		Major in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Ecology & Biodiversity (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Marine Biology (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL3313	Freshwater ecology	6	Pass in BIOL2102 and BIOL2306	N	N			30	TBC, Biological Sciences		Major in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Ecology & Biodiversity (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL3314	Plant structure and evolution	6	Pass in BIOL1309; and Any level 2 BIOL course	N	N			30	Prof R M K Saunders, Biological Sciences		Major in Biological Sciences (2021,2020,2019,2018, 2017,2016); Major in Biological Sciences (Intensive) (2021,2020,2019,2018, 2017); Major in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Ecology &	

											Biodiversity (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Plant Science (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL3318	Experimental intertidal ecology	6	Pass in BIOL2102 or BIOL3301	Y	N	2	May	20	Prof G A Williams, Biological Sciences		Major in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Ecology & Biodiversity (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Marine Biology (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Marine Biology (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL3319	Tropical terrestrial ecology	6	Pass in BIOL1309 and BIOL2306	Y	Y	2	May	30	Dr B Guenard, Biological Sciences	Major in Ecology & Biodiversity (2021;2020;2019;2018, 2017); Major in Ecology & Biodiversity (Intensive) (2021;2020;2019;2018, 2017;2016;2015)	Major in Biological Sciences (2021,2020,2019); Major in Biological Sciences (Intensive) (2021,2020,2019,2018, 2017); Major in Ecology & Biodiversity (2016,2015,2014); Minor in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL3320	The biology of marine mammals	6	Pass in BIOL2306	N	N			30	, Biological Sciences		Major in Ecology & Biodiversity (2016,2015,2014); Minor in Ecology & Biodiversity (2016,2015,2014); Minor in Marine Biology (2016,2015,2014)	
BIOL3322	Marine invertebrate zoology	6	Pass in BIOL2306	N	N			30	Dr S Cannicci, Biological Sciences		Major in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Ecology & Biodiversity (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Marine Biology (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL3328	Nearshore marine and estuarine ecology	6	Pass in BIOL2306 or BIOL3301	N	Y			10	Prof. G.A. Williams, Biological Sciences		Major in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Ecology & Biodiversity (Intensive)	

											(2021,2020,2019,2018, 2017,2016,2015); Minor in Marine Biology (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL3401	Molecular biology	6	Pass in BIOC2600 or BIOL2103 or BIOL2220 or MEDE2301 or BMED2301	Y	Y	1	Dec	130	Dr Y L Zhai, Biological Sciences	Major in Biochemistry (2021,2020,2019,2014); Major in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Molecular Biology & Biotechnology (10221,2020,2019,2018, 2017,2016,2015); Major in Molecular Biology & Biotechnology (10121,2020,2019,2018, 2017,2016,2015); Minor in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014)	Major in Biological Sciences (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Biological Sciences (Intensive) (2021,2020,2019,2018, 2017); Minor in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL3402	Cell biology and cell technology	6	Pass in BIOC2600 or BIOL2103 or BIOL2220 or MEDE2301	Y	Y	1	Dec	120	Prof A S T Wong, Biological Sciences	Major in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Molecular Biology & Biotechnology (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	Major in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Biological Sciences (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Biological Sciences (Intensive) (2021,2020,2019,2018, 2017); Minor in Biological Sciences (Intensive) (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL3403	Immunology	6	Pass in BIOC2600 or BIOL2103 or BIOL2220 or MEDE2301 or BMED2301	Y	Y	2	May	100	Dr Chaogu Zheng, Biological Sciences		Major in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Biological Sciences (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Biological Sciences (Intensive) (2021,2020,2019,2018, 2017); Major in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Molecular Biology & Biotechnology (1012,020,2019,2018, 2017,2016,2015,2014); Major in Molecular Biology & Biotechnology (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Biochemistry (2021,2020,2019,2018, 2017,2020,2019,2018, 2011,2020,2019,2018, 2011,2020,2019,2018, 2011,2020,2019,2018, 2011,2012,2020,2019,2018, 2017,2012,2020,2019,2018, 2017,2012,2020,2019,2018, 2017,2012,2020,2019,2018, 2017,2012,2020,2019,2018, 2017,2012,2020,2019,2018, 2017,2012,2020,2019,2018, 2017,2012,2020,2019,2018, 2017,2012,2020,2019,2018, 2017,2012,2020,2019,2018, 2017,2012,2020,2019,2018, 2017,2012,2012,2020,2019,2018, 2017,2012,2012,2020,2019,2018, 2017,2012,2012,2012,2012,2012,2012,2012,	

										2017,2016,2015,2014); Minor in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL3404	Protein structure and function	6	Pass in BIOC2600 or BIOL2220 or MEDE2301 or BMED2301	Y	Y	2	May	70	Dr Y L Zhai, Biological Sciences	Major in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Biological Sciences (2021,2020,2019,2018, 2017,2016); Major in Biological Sciences (Intensive) (2021,2020,2019,2018, 2017); Major in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Molecular Biology & Biotechnology (1021,2020,2019,2018, 2017,2016,2015,2014); Major in Molecular Biology & Biotechnology (1021,2020,2019,2018, 2017,2016,2015); Minor in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL3405	Molecular microbiology	6	Pass in BIOL2103	N	N			30	, Biological Sciences	Major in Molecular Biology & Biotechnology (2015,2014)	
BIOL3406	Reproduction and reproductive biotechnology	6	Pass in BIOL2103 or BIOL2220 or BIOC2600 or MEDE2301	Y	Y	1	Dec	35	Prof A O L Wong, Biological Sciences	Major in Biological Sciences (2021,2020,2019,2018, 2017,2016); Major in Biological Sciences (Intensive) (2021,2020,2019,2018, 2017); Major in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Molecular Biology & Biotechnology (101,2016,2015,2014); Major in Molecular Biology & Biotechnology (101,2016,2015)	
BIOL3408	Genetics	6	Pass in BIOL1110 or BIOC1600; and BIOL2102 or BIOL2103.	Y	Y	1	Dec	50	Dr G Y W Chan, Biological Sciences	Major in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Biological Sciences (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Biological Sciences (Intensive) (2021,2020,2019,2018, 2017); Major in Ecology & Biodiversity (Intensive) (2021,2020,2019,2018, 2017,2016); Major in	

										Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Molecular Biology & Biotechnology (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Plant Science (2021,2020,2019,2018, 2017,2016,2015,2014)
BIOL3409	Business aspects of biotechnology	6	Pass in any level 3 BIOL or BIOC or BBMS course; NOT for students who have passed in BIOL2409. This course is only for students admitted in 2017-2018 or before.	N	N			40	Dr W B L Lim, Biological Sciences	Major in Biological Sciences (2015,2014); Major in Molecular Biology & Biotechnology (2017,2016,2015,2014) ; Minor in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014)
BIOL3419	Insect ecology: the little things that run the world	6	Pass in BIOL1309 and BIOL2306	N	Y			25	Dr B Guenard, Biological Sciences	Major in Biological Sciences (2018,2017,2016); Major in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Ecology & Biodiversity (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015); Minor in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014)
BIOL3501	Evolution	6	Pass in BIOL2306	N	N			50	Dr M Sun, Biological Sciences	Major in Biological Sciences (2018,2017,2016)
BIOL3502	Conservation genetics	6	Pass in BIOL2306 or BIOL3303 or BIOL3408	N	N			50	Dr M Sun, Biological Sciences	
BIOL3503	Endocrinology: human physiology II	6	Pass in BIOL2103	Y	Y	2	May	60	Dr C B Chan, Biological Sciences	Major in Biological Sciences (2021,2020,2019,2018, 2017,2016); Major in Biological Sciences (Intensive) (2021,2020,2019,2018, 2017)
BIOL3505	Oyster aquaculture and restoration	6	Pass in BIOL2103 or BIOL2306 or BIOL3301 or BIOL3303	N	N			20	Dr T Vengatesen, Biological Sciences	Major in Ecology & Biodiversity (2016,2015,2014)
BIOL3506	Evolutionary biology	6	Pass in BIOL2306 Not for students who have passed in BIOL3501	Y	Y	1	Dec	50	C Schunter, Biological Sciences	Major in Biological Sciences (2021,2020,2019,2018, 2017,2016); Major in Biological Sciences (Intensive) (2021,2020,2019,2018, 2017); Major in Ecology & Biodiversity (2021,2020,2019,2018,

											2017,2016,2015); Major in Ecology & Biodiversity (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015)	
BIOL3508	Microbial physiology and biotechnology	6	Pass in BIOL2103 or BIOL2220 or BIOC2600 or BIOC3604; Not for students who have passed in BIOL3108; and Not for students who have passed in BIOL4402.	Y	Y	2	May	60	Dr A Yan, Biological Sciences	Major in Molecular Biology & Biotechnology (2017,2016,2015,2014)	Major in Biological Sciences (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Biological Sciences (Intensive) (2021,2020,2019,2018, 2017); Major in Molecular Biology & Biotechnology (2021,2020,2019,2018); Major in Molecular Biology & Biotechnology (1021,2020,2019,2018); Major in Molecular Biology & Biotechnology (1021,2020,2019,2018, 2017,2016,2015); Minor in Molecular Biology & Biotechnology (1021,2020,2019,2018, 2017,2016,2015); Minor in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL3606	Diet and disease	6	Pass in BIOL2220 or BIOC2600 or BIOL3202 or BIOL3203 or BIOL3204 or BIOL3205 Not for students who have passed in BIOL3206	Y	Y	2	No exam	70	Dr J C Y Lee, Biological Sciences		Major in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL3608	Food commodities	6	Pass in BIOL2101 Not for students who have passed in BIOL3210; Not for students who have passed in BIOL4207; and Not for students who have passed in BIOL4208.	Y	Y	2	May	30	Dr L Zhang, Biological Sciences		Major in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL3951	Ecology & biodiversity field course	6	Pass in at least 24 credits of advanced level disciplinary core/elective biological sciences courses (BIOL3XXX or BIOL4XXX) in the Ecology & Biodiversity Major. This capstone course is for Ecology & Biodiversity Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Z	N			20	Dr L Karczmarski, Biological Sciences			Major in Ecology & Biodiversity (2015,2014)
BIOL3991	Directed studies in ecology & biodiversity	6	Pass in at least 24 credits of advanced level disciplinary core / elective courses in the Ecology & Biodiversity (Intensive) Major / Ecology & Biodiversity (Intensive) Major. This capstone course is for Ecology & Biodiversity Major / Ecology & Biodiversity (Intensive) Major students only.  The earliest that a student is allowed to	Y	Y	1, 2	No exam		Dr S W Y Sin, Biological Sciences			Major in Ecology & Biodiversity (2018,2017,2016,2015, 2014); Major in Ecology & Biodiversity (Intensive) (2021,2020,2019,2018, 2017,2016,2015)

			take this capstone course is their year 3 study.								
BIOL3992	Directed studies in food & nutritional science	6	Pass in at least 24 credits of advanced level disciplinary core/elective biological sciences courses (BIOL3XXX or BIOL4XXX) in the Food & Nutritional Science Major.  This capstone course is for Food & Nutritional Science Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	1, 2	No exam		Dr J C Y Louie, Biological Sciences		Major in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014)
BIOL3993	Directed studies in Molecular biology & biotechnology	6	Pass in at least 24 credits of advanced level disciplinary core / elective courses in the Molecular Biology & Biotechnology Major. This capstone course is for Molecular Biology & Biotechnology Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	1, 2	No exam		Dr A Yan, Biological Sciences		Major in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014)
BIOL3994	Directed studies in biological sciences	6	Pass in at least 24 credits of advanced level disciplinary core/elective biological sciences courses (BIOL3XXX or BIOL4XXX) in the Biological Sciences Major.  This capstone course is for Biological Sciences Major students only.  The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	1, 2	No exam		Dr J Wu, Biological Sciences		Major in Biological Sciences (2021,2020,2019,2018, 2017,2016,2015,2014)
BIOL4201	Public health nutrition	6	PASS in BIOL3202	Y	Y	2	No exam	90	Dr J C Y Louie, Biological Sciences	Major in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL4202	Nutrition and sports performance	6	Pass in BIOL3202	N	Y			20	TBC, Biological Sciences	Major in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL4204	Diet, brain function and behavior	6	Pass in BIOL3204, or already enrolled in this course	N	N			30	Dr E T S Li, Biological Sciences	Major in Food & Nutritional Science (2016,2015,2014); Minor in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014)	
BIOL4205	Food technology	6	Pass in BIOL3209	Y	Y	2	No exam	30	Dr J C Y Lee, Biological Sciences	Major in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL4207	Meat and dairy sciences	6	Pass in BIOL3201	N	N			50	Prof N P Shah,	Major in Food &	

DIOL 1000								4.5	Biological Sciences	Nutritional Science (2016,2015,2014); Minor in Food & Nutritional Science (2016,2015,2014)	
BIOL4208	Meat, dairy and grain sciences	6	Pass in BIOL 3201 or (BIOL2101 and any level 3 BIOL course); and Not for students who have passed in BIOL3210; and Not for students who have passed in BIOL4207	N	N			15	Prof N P Shah, Biological Sciences	Major in Food & Nutritional Science (2018,2017,2016,2015, 2014); Minor in Food & Nutritional Science (2018,2017,2016,2015, 2014)	
BIOL4209	Functional foods	6	Pass in BIOL3202	Y	Y	1	Dec	40	Dr L Zhang, Biological Sciences	Major in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Plant Science (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL4210	Food product development	6	Pass in BIOL3203 or BIOL4205	N	N			40	Dr M F Wang, Biological Sciences	Major in Food & Nutritional Science (2015,2014); Minor in Food & Nutritional Science (2016,2015,2014)	
BIOL4301	Fish and fisheries	6	Pass in BIOL3301 or BIOL3303	N	N			40	TBC, Biological Sciences	Major in Biological Sciences (2015,2014); Major in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Ecology & Biodiversity (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Marine Biology (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Marine Biology (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL4302	Environmental impact assessment	6	Pass in (BIOL2103 or BIOL2306); and (ENVS3004 or any BIOL3XXX course)	Y	Y	2	No exam	30	Dr J Wu, Biological Sciences	Major in Biological Sciences (Intensive) (2021,2020,2019,2018, 2017); Major in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Ecology & Biodiversity (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Major in Environmental Science (2021,2020,2019,2018, 2017,2016,2015); Minor in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015); Minor in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014);	

											Minor in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL4303	Animal behaviour	6	Pass in BIOL2306; and Pass in one of the following courses: BIOL3301, BIOL3313, BIOL3319, BIOL3320 or BIOL3419 Not for students who have passed in BIOL3101	N	N			30	Dr L Karczmarski, Biological Sciences		Major in Ecology & Biodiversity (2015,2014); Minor in Ecology & Biodiversity (2015,2014)	
BIOL4304	Ecosystem functioning and services	6	Pass in one of the following courses: BIOL3301 or BIOL3303 or BIOL3313 or BIOL3319 or ENVS3019 or ENVS3004 or ENVS3020	Y	N	1	Dec	30	Dr B Russell, Biological Sciences		Major in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Ecology & Biodiversity (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	
BIOL4401	Medical microbiology and applied immunology	6	Pass in BIOL3401	Y	N	2	May	40	Dr W Y Lui, Biological Sciences		Major in Biological Sciences (2020,2019,2018,2017, 2016,2015,2014); Major in Biological Sciences (Intensive) (2020,2019,2018,2017); Major in Molecular Biology & Biotechnology (2020,2019,2018,2017, 2016,2015,2014); Major in Molecular Biology & Biotechnology (Intensive) (2020,2019,2018,2017, 2016,2015); Minor in Molecular Biology & Biotechnology (2020,2019,2018,2017, 2016,2015); Minor in Molecular Biology & Biotechnology (2020,2019,2018,2017, 2016,2015,2014)	
BIOL4402	Microbial biotechnology	6	Pass in BIOL3401	N	N			30	, Biological Sciences	Major in Molecular Biology & Biotechnology (2015,2014)	Minor in Molecular Biology & Biotechnology (2015,2014)	
BIOL4409	General virology	6	Pass in BIOL3401 or BIOL3403	N	Y			30	Dr W B L Lim, Biological Sciences		Major in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Molecular Biology & Biotechnology (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	
BIOL4411	Plant and food biotechnology	6	Pass in BIOL3211 or BIOL3401	Y	Y	1	Dec	50	Prof M L Chye, Biological Sciences	Major in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Molecular Biology & Biotechnology (Intensive) (2021,2020,2019,2018,	(Intensive) (2021,2020,2019,2018, 2017); Major in Food & Nutritional Science	

										2017,2016,2015)	2017,2016,2015,2014); Minor in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Plant Science (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL4415	Healthcare biotechnology	6	Pass in BIOL3401	Y	Y	2	May	70	Dr G Y W Chan, Biological Sciences	Major in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Molecular Biology & Biotechnology (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	Minor in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL4416	Stem cells and regenerative biology	6	Pass in BIOC3601 or BIOC3604 or BIOL3211 or BIOL3401 or BIOL3402 or BIOL3403 or BIOL3404 or BIOL3408	N	Y		-	40	Dr K W Y Yuen, Biological Sciences		Major in Biological Sciences (Intensive) (2021,2020,2019,2018, 2017); Major in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Molecular Biology & Biotechnology (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Molecular Biology & Biotechnology (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL4417	'Omics' and systems biology	6	Pass in BIOC3601 or BIOC3604 or BIOL3211 or BIOL3401 or BIOL3402 or BIOL3403 or BIOL3404 or BIOL3408	Y	Y	2	May	40	Dr J W Zhang, Biological Sciences	Major in Molecular Biology & Biotechnology (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	Major in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Biological Sciences (Intensive) (2021,2020,2019,2018, 2017); Major in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL4451	Cetacean behaviour, ecology and conservation: field research experience	6	Pass in at least one of the following courses: BIOL3101, BIOL3301, BIOL3313 or BIOL3320. This experiential field course is primarily for Ecology & Biodiversity Major	N	N			12	, Biological Sciences		Major in Ecology & Biodiversity (2016,2015,2014)	

			students. The earliest that a student is allowed to take this experiential course is their year 3 study; and because it is conducted in early June, this course is best suited for year 3 students.								
BIOL4501	Molecular phylogenetics and evolution	6	Pass in BIOL3401 or BIOL3408	N	N			25	TBC, Biological Sciences		
BIOL4505	Oyster aquaculture: business and technology	6	Pass in BIOL3109 or BIOL3203 or BIOL3301 or BIOL3303 or ENVS3004 or ENVS3313; and Pass in at least 24 credits of advanced level disciplinary core/elective courses in the Ecology and Biodiversity Major or Environmental Science Major or Biological Science Major. Not for students who have passed in BIOL3505	N	Y			20	Dr T Vengatesen, Biological Sciences	Major in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Ecology & Biodiversity (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	
BIOL4861	Ecology & biodiversity internship	6	Pass in at least 24 credits of advanced level disciplinary core / elective courses in the Ecology and Biodiversity Major. This course is for Ecology & Biodiversity Major students only.  The earliest that a student is allowed to take this course is their Year 3.	Y	Y	1, 2, S	No exam		Dr T Vengatesen, Biological Sciences	Major in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014)	
BIOL4911	Conservation science in practice	6	Pass in at least 24 credits of advanced level disciplinary core/elective biological sciences courses (BIOL3XXX or BIOL4XXX) in the Ecology & Biodiversity Major / Ecology & Biodiversity (Intensive) Major including BIOL3303.  This capstone course is for Ecology & Biodiversity Major / Ecology & Biodiversity Major / Ecology & Biodiversity (Intensive) Major students only.  The earliest that a student is allowed to take this capstone course is their year 3 study.	N	N			9	TBC, Biological Sciences		Major in Ecology & Biodiversity (2018,2017,2016,201 2014); Major in Ecology & Biodiversit (Intensive) (2021,2020,2019,201 2017,2016,2015)
BIOL4912	Sensory evaluation of food	6	Pass in BIOL3201; and Pass in at least 24 credits of advanced level disciplinary core/elective biological sciences courses (BIOL3XXX or BIOL4XXX) in the Food & Nutrional Science Major. This capstone course is for Food & Nutrional Science Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	N	N			15	Dr J C Y Lee, Biological Sciences		Major in Food & Nutritional Science (2016,2015,2014)
BIOL4913	Advanced practicum on food and nutrient analysis	6	Pass in at least 24 credits of advanced level disciplinary core/elective biological sciences courses (BIOL3XXX or BIOL4XXX) included BIOL3207 and / or BIOL3209 in the Food & Nutrional Science Major. This capstone course is for Food & Nutrional Science Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	N	N			8	Dr J C Y Lee, Biological Sciences		Major in Food & Nutritional Science (2018,2017,2016,201 2014)
BIOL4921	Animal behaviour and behavioural ecology: field course	6	Pass in BIOL3101; and Pass in at least 24 credits of advanced level disciplinary core/elective biological sciences courses (BIOL3XXX or	N	N			15	, Biological Sciences		Major in Ecology & Biodiversity (2016,2015,2014)

			BIOL4XXX) in the Ecology & Biodiversity Major. This capstone course is for Ecology & Biodiversity Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.									
BIOL4922	Food product development and evaluation	6	Pass in at least 24 credits of advanced level disciplinary core/elective biological sciences courses (BIOL3XXX) or BIOL42XX) included BIOL3203 and / or BIOL4205 in the Food & Nutritional Science Major.  This capstone course is for Food & Nutritional Science Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.  Not for students who have passed in BIOL4210 Food product development.	N	N			20	TBC, Biological Sciences			Major in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014)
BIOL4962	Food & nutritional science internship	6	Pass in at least 24 credits of advanced level disciplinary core/elective biological sciences courses (BIOL3XXX or BIOL4XXX) in the Food & Nutritional Science Major.  This capstone course is for Food & Nutritional Science Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	1, 2, S	No exam		Dr J C Y Lee, Biological Sciences			Major in Food & Nutritional Science (2021,2020,2019,2018, 2017,2016,2015,2014)
BIOL4963	Molecular biology & biotechnology internship	6	Pass in at least 24 credits of advanced level disciplinary core / elective courses in the Molecular Biology & Biotechnology Major. This capstone course is for Molecular Biology & Biotechnology Major students only.  The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	1, 2, S	No exam		Dr A Yan (1st/2nd), Dr J C Y Lee (Summer), Biological Sciences			Major in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014)
BIOL4964	Biological sciences internship	6	Pass in at least 24 credits of advanced level disciplinary core/elective biological sciences courses (BIOL3XXX) or BIOL4XXX) in the Biological Sciences Major. This captsone course is for Biological Sciences Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	1, 2, S	No exam		Dr Y W Chan, Biological Sciences			Major in Biological Sciences (2021,2020,2019,2018, 2017,2016,2015,2014)
BIOL4991	Ecology & biodiversity project	12	Pass in at least 24 credits of advanced level disciplinary core / elective courses in the Ecology & Biodiversity Major / Ecology & Biodiversity Major (Intensive); and This capstone course is for Ecology & Biodiversity Major (Intensive) students only.  The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	0	No exam		Dr S W Y Sin, Biological Sciences		Major in Ecology & Biodiversity (2021,2020,2019); Major in Ecology & Biodiversity (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	Major in Ecology & Biodiversity (2018,2017,2016,2015, 2014)
BIOL4992	Food & nutritional science project	12	Pass in at least 24 credits of advanced level disciplinary core/elective biological sciences courses (BIOL3XXX or	Y	Y	0	No exam		Dr C B Chan, Biological Sciences			Major in Food & Nutritional Science (2021,2020,2019,2018,

			BIOL4XXX) in the Food & Nutritional Science Major; and Cumulative GPA of 3.0 or above. This capstone course is for Food & Nutritional Science Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.										2017,2016,2015,2014)
BIOL4993	Molecular biology & biotechnology project	12	Pass in at least 24 credits of advanced level disciplinary core / elective courses in the Molecular Biology & Biotechnology Major / Molecular Biology & Biotechnology Major (Intensive); and Cumulative GPA of 3.0 or above. This capstone course is for Molecular Biology & Biotechnology Major / Molecular Biology & Biotechnology Major (Intensive) students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	0	No exam		Dr A Yan, Biological Sciences			Major in Molecular Biology & Biotechnology (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	Major in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014)
BIOL4994	Biological sciences project	12	Pass in at least 24 credits of advanced level disciplinary core/elective biological sciences courses (BIOL3XXX or BIOL4XXX) in the Biological Sciences Major; and Cumulative GPA of 3.0 or above. This capstone course is for Biological Sciences Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	0	No exam		Dr C Schunter, Biological Sciences			Major in Biological Sciences (Intensive) (2021,2020,2019,2018, 2017)	Major in Biological Sciences (2021,2020,2019,2018, 2017,2016,2015,2014)
ENVS1301	Environmental life science	6	NIL	Y	Y	2	May	60	Dr T Vengatesen, Biological Sciences		Major in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Marine Biology (2021,2020,2019,2018, 2017,2016,2015,2014)		
ENVS2001	Methods in environmental science	6	Pass in BIOL1309 or EASC1401 or ENVS1301 or ENVS1401	Y	Y	1	No exam	42	Dr M Yasuhara, Biological Sciences	Major in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014)	Minor in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014)		
ENVS2002	Environmental data analysis	6	Pass in BIOL1309 or EASC1401 or ENVS1301 or ENVS1401	Y	Y	2	May	65	Dr T C Bonebrake, Biological Sciences	Major in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Ecology & Biodiversity (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Major in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014)	Minor in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014)		
ENVS3004	Environment, society and economics	6	Pass in one of the following courses: CHEM2041, EASC2404, ENVS2001 or ENVS2002	Y	Y	1	Dec		Dr C Dingle, Biological Sciences	Major in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Environmental			

		Ì								Science (2021,2020,2019,2018,		
ENV\$3019	Urban ecology	6	Pass in BIOL2306 or ENVS2001 or ENVS2002	Y	N	1	Dec	75	Dr T C Bonebrake, Biological Sciences		Major in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Ecology & Biodiversity (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Major in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014)	
ENV\$3020	Global change ecology	6	Pass in BIOL2306 or ENVS2001 or ENVS2002	N	Y			65	Dr C Dingle, Biological Sciences		Major in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Ecology & Biodiversity (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Major in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014)	
ENVS3022	Environmental science field course	6	Pass in ENVS2001 or Either pass in ENVS2002 or concurrently enrolled in ENVS2002	N	Y			10	Dr M Yasuhara, Biological Sciences		Major in Environmental Science (2021,2020,2019,2018, 2017,2016,2015)	
ENVS3028	Coastal Sustainability	6	Pass in BIOL2306 or BIOL3301 or BIOL3305 or BIOL3318 or ENVS2001 or ENVS2002 or EASC3020	N	Y			8	Dr T Vengatesen, Biological Sciences		Major in Environmental Science (2021,2020,2019,2018, 2017,2016,2015)	
ENV\$3202	Plant physiology and climate change	6	Pass in BIOL2306 or ENVS2001 or ENVS2002 or EASC2404. Priority will be given to students majoring in Environmental Science, Biological Science, and Earth System Science.	Y	Y	1	Dec	40	Dr J Wu, Biological Sciences		Major in Biological Sciences (2021,2020,2019,2018, 2017,2016); Major in Biological Sciences (Intensive) (2021,2020,2019,2018, 2017); Major in Environmental Science (2021,2020,2019,2018, 2017,2016,2015); Major in Molecular Biology & Biotechnology (Intensive) (2021,2020,2019,2018, 2017,2016); Minor in Environmental Science (2021,2020,2019,2018, 2017,2016); Minor in Environmental Science (2021,2020)	
ENVS3401	Understanding tropical ecosystems in a changing world	6	Pass in ENVS2001 or ENVS2002 or BIOL2306	N	Y			20	Dr A L Ashton, Biological Sciences		Major in Environmental Science (2021,2020,2019,2018,	

											2017,2016,2015); Minor in Environmental Science (2021,2020)	
ENVS3402	Qualitative data, social science methods and decision-making in environmental science	6	Pass in ENVS2002	Y	Υ	2	May	30	Dr Hannah Mumby, Biological Sciences		Major in Environmental Science (2021,2020,2019,2018, 2017,2016,2015)	
ENVS4110	Environmental remediation	6	Pass in BIOL3109 or BIOL3110 or BIOL3401 or ENVS3042	N	Y			30	TBC, Biological Sciences		Major in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Molecular Biology & Biotechnology (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014)	
Centre for A	oplied English Studies											
CAES1000	Core University English	6	NIL	Y	Y	1, 2	No exam		Dr P Wong (1st sem); Dr A Yau (2nd sem), English			
CAES9820	Academic English for science students	6	NIL	Y	Y	1, 2	No exam	-	Mr S D Boynton, English			
CAES9821	Professional and technical communication for mathematical sciences	6	NIL	Y	Y	1, 2	No exam		Mr S D Boynton, English			
Department	of Chemistry											
CHEM1041	Foundations of chemistry	6	Level 3 or above in HKDSE Combined Science with Chemistry component or Integrated Science, or equivalent. Students without such background but keen on taking this foundation chemistry course may approach the course coordinator for consideration. Not for students with Level 3 or above in HKDSE Chemistry or having taken any level 1 Chemistry course or above or any equivalent Chemistry course.	Y	Y	1	Dec	70	Dr A P L Tong, Chemistry		Major in Ecology & Biodiversity (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	
CHEM1042	General chemistry I	6	Level 3 or above in HKDSE Chemistry or equivalent or a pass in CHEM1041. Not for students having taken any level 1 Chemistry course (except for CHEM1041) or above or any equivalent Chemistry course.	Y	Y	1, 2	Dec, May	450	Dr A P L Tong, Chemistry	Major in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Biological Sciences (Intensive) (2021,2020,2019,2018, 2017); Major in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Chemistry (Intensive)	Major in Ecology & Biodiversity (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Major in Environmental Science (2017,2016,2015,2014); Major in Food & Nutritional Science (2021,2020,2019); Minor in Environmental Science	

										(2021,2020,2019,2018, 2017,2016,2015); Major in Environmental Science (2021,2020,2019,2018); Major in Molecular Biology & Biotechnology (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014)	(2021,2020,2019,2018, 2017,2016,2015,2014)	
CHEM1043	General chemistry II	6	Pass in CHEM1042; and Not for students in 2014-15 cohort or before having taken CHEM2541.	Y	Y	1, 2	Dec, May	280	Dr A P L Tong, Chemistry	Major in Biochemistry (2021,2020,2019,2018, 2017,2016,2015); Major in Biological Sciences (Intensive) (2021,2020,2019,2018, 2017); Major in Chemistry (2021,2020,2019,2018, 2017,2016,2015); Major in Chemistry (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Major in Molecular Biology & Biotechnology (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Mijor in Chemistry (2021,2020,2019,2018, 2017,2016,2015); Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015)	Major in Biochemistry (2014)	
CHEM1044	Mathematics in chemistry	6	Pass in CHEM1042 or already enrolled in this course; and Level 2 or above in Module 1 or Module 2 of HKDSE Mathematics or equivalent, or Pass in MATH1011 or SCNC1111	Y	Y	2	Мау	80	Dr A M Y Yuen, Chemistry		Major in Chemistry (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	
CHEM2041	Principles of chemistry	6	Pass in CHEM1042; and Not for students who have passed in CHEM2341, or have already enrolled in this course; and Not for students who have passed in CHEM2441, or have already enrolled in this course; and Not for students who have passed in CHEM2541, or have already enrolled in this course; and Not for chemistry major students.	N	N			140	Dr I K Chu, Chemistry		Major in Environmental Science (2017,2016,2015,2014); Minor in Chemistry (2016,2015,2014); Minor in Environmental Science (2017,2016,2015,2014)	
CHEM2241	Analytical chemistry I	6	Pass in CHEM1042 (for students admitted in 2014-15 or before); Pass in CHEM1042; and Pass in CHEM1043, or already enrolled in this course (for students admitted in 2015-16 or thereafter)	Y	Y	1, 2	Dec, May	120	Dr I K Chu (1st sem); Dr E C M Tse (2nd sem);, Chemistry	Major in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Chemistry (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	Major in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Environmental Science (2017,2016,2015,2014)	
CHEM2341	Inorganic chemistry I	6	Pass in CHEM1042; and NOT for students who have passed in	Y	Y	1, 2	Dec, May	120	Dr H Y Au Yeung, Chemistry	Major in Chemistry (2021,2020,2019,2018,	Minor in Chemistry (2021,2020,2019,2018,	

			CHEM2041, or already enrolled in this course (for students admitted in 2014-15 or before); Pass in CHEM1042; and Pass in CHEM1043, or already enrolled in this course; and NOT for students who have passed in CHEM2041, or already enrolled in this course (for students admitted in 2015-16 or thereafter)							2017,2016,2015,2014); Major in Chemistry (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	2017,2016,2015,2014)	
CHEM2441	Organic chemistry I	6	Pass in CHEM1042; and NOT for students who have passed in CHEM2041, or already enrolled in this course (for students admitted in 2014-15 or before); Pass in CHEM1042; and Pass in CHEM1043, or already enrolled in this course; and NOT for students who have passed CHEM2041, or already enrolled in this course (for students admitted in 2015-16 or thereafter)	Y	Y	1, 2	Dec, May	200	Prof P Chiu, Chemistry	Major in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Chemistry (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014)	
CHEM2442	Fundamentals of organic chemistry	6	Pass in CHEM1042; and Not for students who have passed CHEM2441, or have already enrolled in this course.	Y	Y	1	Dec	100	Dr P H Toy, Chemistry		Major in Environmental Science (2017,2016,2015,2014); Major in Food & Nutritional Science (2021,2020,2019); Minor in Chemistry (2021,2020,2019,2018,2017,2016,2015,2014); Minor in Environmental Science (2017,2016,2015,2014)	
CHEM2443	Fundamentals of organic chemistry for pharmacy students	6	Pass in CHEM1042; and Not for students who have passed CHEM2442, or already enrolled in this course. (This course is for BPharm students only)	N	N			60	Dr P H Toy, Chemistry			
CHEM2541	Introductory physical chemistry	6	Pass in CHEM1042; and NOT for students who have passed CHEM2041, or already enrolled in this course (for students admitted in 2014-15 or before); Pass in CHEM1042 and CHEM1043; and NOT for students who have passed CHEM2041, or already enrolled in this course (for students admitted in 2015-16 or thereafter)	Y	Y	2	May	100	Dr J Y Tang, Chemistry	Major in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Chemistry (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	Major in Biochemistry (2014); Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014)	
CHEM3141	Environmental chemistry	6	Pass in CHEM2041 or CHEM2341 or CHEM2441 or CHEM2442 or CHEM2541	Y	Y	2	May	50	Dr Y X Li, Chemistry		Major in Chemistry (2014); Major in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014)	
CHEM3142	Chemical process industries and analysis	6	Pass in CHEM2241 or CHEM2341 or CHEM2441 or CHEM2442 or CHEM2541	Υ	Y	2	May	60	Prof G K Y Chan, Chemistry		Major in Chemistry (2014); Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014)	
CHEM3143	Introduction to materials chemistry	6	Pass in CHEM2441; and Pass in	Υ	Υ	1	Dec	60	Dr Y F Wang,	Major in Chemistry	Major in Chemistry	

			CHEM2541 or CHEM2341						Chemistry	(Intensive) (2021,2020,2019,2018, 2017,2016,2015)	(2014); Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014)	
CHEM3146	Principles and applications of spectroscopic and analytical techniques	6	Pass in any CHEM2XXX level course	N	N			200	Dr X Li, Chemistry	Major in Chemistry (2014)	Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014)	
CHEM3241	Analytical chemistry II: chemical instrumentation	6	Pass in CHEM2241	Y	Y	1	Dec	104	Dr Y Li, Chemistry	Major in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Chemistry (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	Major in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014)	
CHEM3242	Food and water analysis	6	Pass in CHEM2041 or CHEM2241 or CHEM2341 or CHEM2441 or CHEM2541. Please note that School of Biological Sciences stipulates that students who have passed in CHEM3242 are not allowed to take BIOL3209 Food and nutrient analysis.	Y	Y	2	May	50	Dr K K H Ng, Chemistry		Major in Chemistry (2014); Major in Environmental Science (2017,2016,2015,2014); Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Environmental Science (2017,2016,2015,2014)	
CHEM3243	Introductory instrumental chemical analysis	6	Pass in CHEM2041 or CHEM2241; and Not for students who have passed CHEM3241, or have already enrolled in this course.	N	N			30	Dr X Li, Chemistry		Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014)	
CHEM3244	Analytical techniques for pharmacy students	6	Pass in BPHM2136 (This course is for BPharm students only)	N	N			35	Dr X Li, Chemistry		Minor in Chemistry (2020,2019,2018,2017, 2016,2015,2014)	
CHEM3341	Inorganic chemistry II	6	Pass in CHEM2341	Y	<b>Y</b>	1	Dec	90	Prof V W W Yam, Chemistry	Major in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Chemistry (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014)	
CHEM3342	Bioinorganic chemistry	6	Pass in CHEM2341	Y	Y	2	Мау	50	Prof H Z Sun, Chemistry		Major in Chemistry (2014); Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014)	
CHEM3441	Organic chemistry II	6	Pass in CHEM2441 [Remarks: CHEM3441 has been changed to lecture-based course from semester 2, 2015-16. For Chemistry students who admitted in 2014-15 or before, they must enroll also CHEM3443 for enrolling CHEM3441 (new version without lab component) to meet the Chemistry Major requirements.]	Y	Y	1, 2	Dec, May	300	Dr Z X Huang (1st sem); Prof X Y Li (2nd sem), Chemistry	Major in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Chemistry (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	Major in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014)	
CHEM3442	Organic chemistry of biomolecules	6	Pass in CHEM2442 or CHEM3441	Y	Y	1	Dec	50	Dr P H Toy, Chemistry		Major in Chemistry (2014); Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014)	
CHEM3443	Organic chemistry laboratory	6	Pass in CHEM2441; and pass in	Υ	Υ	1, 2	Dec, May	80	Dr A M Y Yuen,	Major in Chemistry	Major in Chemistry	

			CHEM3441, or already enrolled in this course; NOT for students who have passed CHEM3441A in semester 1, 2015-16, or CHEM3441 in or before 2014-2015 (for students admitted in 2014-15 or before) Pass in CHEM2441 or CHEM2442 or CHEM3443; and Pass in CHEM3441 or CHEM3442, or already enrolled in any of these two courses (for students admitted in 2015-16 or thereafter)						Chemistry	(2021,2020,2019,2018, 2017,2016,2015); Major in Chemistry (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	(2014); Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014)	
CHEM3445	Integrated laboratory	6	Pass in CHEM3443 or already enrolled in this course	Y	Υ	S	No exam	20	Dr A M Y Yuen, Chemistry	Major in Chemistry (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	Major in Chemistry (2014); Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014)	
CHEM3541	Physical chemistry: Introduction to quantum chemistry	6	Pass in CHEM2541	Y	Y	1	Dec	100	Dr C Y Yam, Chemistry	Major in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Chemistry (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014)	
CHEM3542	Physical chemistry: statistical thermodynamics and kinetics theory	6	Pass in CHEM2541	Y	Y	2	May	50	Dr. J Yang, Chemistry	Major in Chemistry (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	Major in Chemistry (2014); Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014)	
CHEM3999	Directed studies in chemistry	6	Pass in at least 24 credits of advanced level disciplinary core/elective chemistry courses (CHEM3XXX or CHEM4XXX) in the Chemistry Major including a pass in CHEM2341 or CHEM2441 or CHEM2442 or CHEM2441 or CHEM3146. This capstone course is for Chemistry Major (Intensive) students only. This course is designed for third year students who would like to take an early experience on research. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	1, 2	No exam		Prof D L Phillips, Chemistry		Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014)	Major in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Chemistry (Intensive) (2021,2020,2019,2018, 2017,2016,2015)
CHEM4142	Symmetry, group theory and applications	6	Pass in CHEM3341	Y	Y	1	Dec	60	Dr E C M Tse, Chemistry	Major in Chemistry (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	Major in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014)	
CHEM4143	Interfacial science and technology	6	Pass in CHEM3143 or CHEM3541 or CHEM3542	N	Y	1		50	Prof G K Y Chan, Chemistry		Major in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Chemistry (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014)	
CHEM4144	Advanced materials	6	Pass in CHEM3143	Y	Y	2	May	30	Dr E C M Tse, Chemistry	Major in Chemistry (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	Major in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Chemistry (2021,2020,2019,2018,	

						ĺ		1			2017,2016,2015,2014)	1
CHEM4145	Medicinal chemistry	6	Pass in CHEM3441 or CHEM3442; and Not for students who have passed in BPHM3133, or already enrolled in this course.	Y	Y	2	May	40	Dr Y Li, Chemistry		Major in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Chemistry ((Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Chemistry ((2021,2020,2019,2018, 2017,2016,2015); Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014)	
CHEM4147	Supramolecular chemistry	6	Pass in CHEM3341 and CHEM3441	Y	Y	2	May	40	Dr H Y Au-Yeung, Chemistry		Major in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Chemistry (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014)	
CHEM4148	Frontiers in Modern Chemical Science	6	Pass in CHEM3341 and CHEM3441.	Y	Y	2	May	60	Prof X D Li, Chemistry		Major in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Chemistry (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014)	
CHEM4241	Modern chemical instrumentation and applications	6	Pass in CHEM3241	Y	Y	1	Dec	50	Dr I K Chu, Chemistry	Major in Chemistry (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	Major in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014)	
CHEM4242	Analytical chemistry	6	Pass in CHEM3241 or CHEM3242	Y	Y	2	May	50	Dr K K H Ng, Chemistry		Major in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Chemistry (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014)	
CHEM4341	Advanced inorganic chemistry	6	Pass in CHEM3341	Y	Y	1	Dec	50	Prof C M Che, Chemistry		Major in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Chemistry (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014)	
CHEM4342	Organometallic chemistry	6	Pass in CHEM3341	Y	Y	1	Dec	40	Dr. J Z Liu, Chemistry		Major in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Chemistry (Intensive)	

										(2021,2020,2019,2018, 2017,2016,2015); Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014)
CHEM4441	Advanced organic chemistry	6	Pass in CHEM3441	Y	Y	1	Dec	40	Dr J He, Chemistry	Major in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Chemistry (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015);
CHEM4443	Integrated organic synthesis	6	Pass in CHEM3441; or Pass in CHEM3441 (without lab component) and CHEM3443	Y	Y	2	May	50	Prof P Chiu, Chemistry	Major in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Chemistry (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015);
CHEM4444	Chemical biology	6	Pass in BIOC3601 or CHEM3441	Y	Y	2	May	50	Prof X C Li, Chemistry	Major in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Chemistry (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014)
CHEM4541	Physical chemistry III: statistical thermodynamics and kinetics theory	6	Pass in CHEM3541	N	N			40	, Chemistry	
CHEM4542	Computational chemistry	6	Pass in CHEM3541 or PHYS3351	N	Y			50	Prof G H Chen, Chemistry	Major in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Chemistry (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015)
CHEM4543	Advanced physical chemistry	6	Pass in CHEM3541	Y	Y	2	May	40	Prof G H Chen, Chemistry	Major in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Chemistry (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015);
CHEM4544	Electrochemical science and technology	6	Pass in CHEM3241 or CHEM3541 or CHEM3542	Y	N	2	May	36	Prof G K Y Chan, Chemistry	Major in Chemistry (2021,2020,2019,2018,

										2017,2016,2015,2014); Major in Chemistry (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014)
CHEM4910	Chemistry literacy and research	6	Pass in at least 24 credits of advanced level disciplinary core/elective chemistry courses (CHEM3XXX or CHEM4XXX) in the Chemistry Major including CHEM3241, and CHEM3341, and CHEM3441, and CHEM3441, and CHEM3441. This capstone course is for Chemistry Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	2	No exam		Prof X D Li, Chemistry	Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014)  Major in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014)
CHEM4911	Capstone experience for chemistry undergraduates: HKUtopia	6	Students are expected to have satisfactorily completed all introductory chemistry disciplinary core courses and at least 24 credits of advanced level disciplinary correlective chemistry courses in the Chemistry Major.  Students who are interested in taking the course should contact the course coordinator for application in April - May. Late application may not be considered. This capstone course is for Chemistry Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	<b>Y</b>	Y	Ø	No exam		Dr A P L Tong, Chemistry	Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014)  Major in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014)
CHEM4966	Chemistry internship	6	Pass in at least 24 credits of advanced level disciplinary core/elective chemistry courses (CHEM3XXX or CHEM4XXX) in the Chemistry Major. This capstone course is for Chemistry Major (Intensive) students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	<b>Y</b>	1, 2, S	No exam		Dr H Y Au-Yeung, Chemistry	Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014)  Major in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014)  Major in Chemistry (2021,2020,2019,2018) Major in Chemistry (Intensive) (2021,2020,2019,2018, 2017,2016,2015)
CHEM4999	Chemistry project	12	Pass in at least 24 credits of advanced level disciplinary core/elective chemistry courses (CHEM3XXX or CHEM4XXX) in the Chemistry Major including CHEM3241, and CHEM3341, and CHEM3441, and CHEM3541. This capstone course is for Chemistry Major (Intensive) students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	0	No exam		Dr J Y Tang, Chemistry	Minor in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014)  Major in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014)  Major in Chemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Chemistry (Intensive) (2021,2020,2019,2018, 2017,2016,2015)
School of Ch	inese			1				1	1	
CSCI9001	Practical Chinese for science students	6	NIL	Y	Y	1, 2	Dec, May		Mr K W Wong, Chinese	
Department of	of Earth Sciences						•			
EASC1020	Introduction to climate science	6	NIL	Y	Y	2	May		Prof Z H Liu, Earth Sciences	Major in Environmental Science (2021,2020,2019,2018,

EASC1401	Blue Planet	6	NIL	Y	Y	1	Dec		Dr P Bach, Earth Sciences	Major in Earth System Science (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Ecology & Biodiversity (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Major in Geology (Intensive) (2021,2020,2019,2018,	2017,2016,2015,2014); Minor in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014) Major in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Earth Sciences (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Environmental Science (2021,2020,2019,2018, 2021,2020,2019,2018,	
EASC1402	Principles of geology	6	NIL	Y	Y	1	Dec		Dr M C Cheung, Earth Sciences	2017,2016,2015)  Major in Earth System Science (2016,2015,2014);  Major in Geology (2021,2020,2019,2018, 2017,2016,2015,2014);  Major in Geology (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	2017,2016,2015,2014) Minor in Earth Sciences (2021,2020,2019,2018, 2017,2016,2015,2014)	
EASC1403	Geological heritage of Hong Kong	6	NIL	Y	Y	2	May	35	Dr M C Cheung, Earth Sciences			
EASC1404	Early life on earth	6	NIL	N	N			50	TBC, Earth Sciences			
EASC1405	Peaceful use of nuclear technologies	6	NIL	N	N				Dr S H Li, Earth Sciences			
EASC1406	Introduction to the earth-life system	6	Pass in EASC1401	N	N				Dr S Crowe, Earth Sciences	Major in Earth System Science (2020,2019,2018,2017)	Major in Earth System Science (2016,2015)	
EASC1407	Dinosaur Ecosystems	6	NIL	N	N				TBC, Earth Sciences			
EASC2401	Fluid/solid interactions in earth processes	6	Pass in EASC1401 or EASC1402	Y	Y	2	No exam		Dr K H Lemke, Earth Sciences	Major in Earth System Science (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Geology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Geology (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	Minor in Earth Sciences (2021,2020,2019,2018, 2017,2016,2015,2014)	
EASC2402	Field and laboratory methods	6	Pass in EASC1401 or EASC1402	Y	Y	1	No exam	40	Dr J A King, Earth Sciences	Major in Earth System Science (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Geology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Geology (Intensive) (2021,2020,2019,2018, 2017,2016,2015)		
EASC2404	Introduction to atmosphere and hydrosphere	6	Pass in EASC1401 or EASC1402	Y	Y	1	Dec	50	Dr B Zhang, Earth Sciences	Major in Earth System Science (2021,2020,2019,2018, 2017,2016,2015,2014)	Major in Geology (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Environmental	

											Science (2021,2020,2019,2018, 2017,2016,2015,2014)	
EASC2406	Geochemistry	6	Pass in EASC1402	Y	Y	2	May		Dr S H Li, Earth Sciences	Major in Geology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Geology (Intensive) (2021,2020,2019,2018, 2017,2016,2015)		
EASC2407	Mineralogy	6	Pass in EASC1402	Y	Y	1	Dec	30	Prof M F Zhou, Earth Sciences	Major in Geology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Geology (Intensive) (2021,2020,2019,2018, 2017,2016,2015)		
EASC2408	Planetary geology	6	Pass in EASC1401 or EASC1402 or PHYS1650	Y	Y	2	Мау		Dr M H Lee, Earth Sciences	Major in Astronomy (2017,2016,2015,2014)	Major in Geology (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Astronomy (2021,2020,2019,2018)	
EASC2409	Regional field studies	6	Pass in EASC1401 or EASC1402; and consent of course coordinator	Y	Y	0	No exam	10	Dr J R Ali, Earth Sciences	Major in Geology (Intensive) (2021,2020,2019,2018, 2017,2016,2015)		
EASC2410	Data analysis and modeling in earth sciences	6	Pass in EASC1401	Y	Y	1	No exam		Dr B Zhang, Earth Sciences	Major in Earth System Science (2021,2020,2019,2018, 2017)		
EASC2411	Introduction to the Earth-Life system	6	Pass in EASC1401 Not for students who have passed in EASC1406	Y	Y	2	No exam		Dr Y Li, Earth Sciences	Major in Earth System Science (2021,2020,2019,2018, 2017)	Major in Earth System Science (2016,2015)	
EASC3020	Global change: anthropogenic impacts	6	Pass in EASC2404 or ENVS2001	N	Y				Prof Z H Liu, Earth Sciences		Major in Earth System Science (2021,2020,2019,2018, 2017); Major in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Geology (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Earth Sciences (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014)	
EASC3402	Petrology	6	Pass in EASC2407	Y	Y	2	May		Prof G Zhao, Earth Sciences	Major in Geology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Geology (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	Minor in Earth Sciences (2021,2020,2019,2018, 2017,2016,2015,2014)	
EASC3403	Sedimentary environments	6	Pass in EASC2402 or EASC3402	Y	Y	2	May		Dr N R McKenzie, Earth Sciences	Major in Geology (2021,2020,2019,2018, 2017,2016,2015,2014);	Major in Earth System Science (2021,2020,2019,2018,	

EASC3404	Structural geology	6	Pass in EASC2402 and EASC3402	Y	Y	1	Dec	40	Dr J R Ali, Earth Sciences	Major in Geology (Intensive) (2021,2020,2019,2018, 2017,2016,2015) Major in Geology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Geology (Intensive)		
EASC3405	Environmental remote sensing	6	Pass in EASC2404 or EASC2406 or EASC2407 or ENVS2002	N	Y			54	Dr J Michalski, Earth Sciences	(2021,2020,2019,2018, 2017,2016,2015)	Major in Earth System Science (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Environmental Science (2021,2020,2019,2018, 2017,2016,2015); Minor in Earth Sciences (2021,2020,2019,2018, 2017,2016,2015); Minor in Earth Sciences (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014)	
EASC3406	Reconstruction of past climate	6	Pass in EASC2401	Y	N	2	May		Dr S H Li, Earth Sciences		Major in Earth System Science (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Geology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Geology (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Earth Sciences (2021,2020,2019,2018, 2017,2016,2015,2011, 2016,2015,2014)	
EASC3408	Geophysics	6	Pass in EASC2401 or PHYS2250	Y	Y	1	No exam		Dr B Zhang, Earth Sciences	Major in Geology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Geology (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	Major in Earth System Science (2016,2015,2014); Minor in Earth Sciences (2021,2020,2019,2018, 2017,2016,2015,2014)	
EASC3409	Igneous and metamorphic petrogenesis	6	Pass in EASC3402	Y	Y	2	May	30	Prof G Zhao, Earth Sciences	Major in Geology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Geology (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	Minor in Earth Sciences (2021,2020,2019,2018, 2017,2016,2015,2014)	
EASC3410	Hydrogeology	6	Pass in EASC2402	Y	Y	1	Dec	40	Prof J J Jiao, Earth Sciences		Major in Earth System Science (2021,2020,2019,2018, 2017,2016,2015,2014);	

										Major in Geology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Geology (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Earth Sciences (2021,2020,2019,2018, 2017,2016,2015,2014)	
EASC3412	Earth resources	6	Pass in EASC2402 or EASC3402	Y	Y	1	Dec	40	Prof M F Zhou, Earth Sciences	Major in Earth System Science (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Geology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Geology (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Earth Sciences (2021,2020,2019,2018, 2017,2016,2015);	
EASC3413	Engineering geology	6	Pass in EASC3410 and EASC3414, or already enrolled in these courses This course is only for final year students.	Y	Y	2	May	35	Dr L N Y Wong, Earth Sciences	Major in Geology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Geology (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Earth Sciences (2021,2020,2019,2018, 2017,2016,2015,2014)	
EASC3414	Soil and rock mechanics	6	Pass in EASC3410, or already enrolled in this course	Y	Y	2	May	40	Prof J J Jiao, Earth Sciences	Major in Geology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Geology (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Earth Sciences (2021,2020,2019,2018, 2017,2016,2015,2014)	
EASC3415	Meteorology	6	Pass in EASC2404	Y	Y	1	No exam		Dr Jed Kaplan, Earth Sciences	Major in Earth System Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Earth Sciences (2021,2020,2019,2018, 2017,2016,2015,2014)	
EASC3416	Advanced geochemistry and geochronology	6	Pass in EASC2401 or EASC2406 or EASC2407	N	N			50	Prof M F Zhou, Earth Sciences	Major in Earth System Science (2016,2015,2014); Major in Geology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Geology (Intensive) (2021,2020,2019,2018, 2017,2016,2015);	

											Minor in Earth Sciences (2021,2020,2019,2018, 2017,2016,2015,2014)
EASC3417	Earth through time	6	Pass in EASC3403	Y	Y	1	Dec		Dr S C Chang, Earth Sciences	Major in Geology (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	Major in Earth System Science (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Geology (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Earth Sciences (2021,2020,2019,2018, 2017,2016,2015,2014)
EASC3418	Coasts and coastal change	6	Pass in EASC2401 and EASC2402 OR Pass in ENVS2001	Y	Y	2	May		Dr N Khan, Earth Sciences		Major in Earth System Science (2021,2020,2019,2018, 2017)
EASC3419	Earth System Science Field Studies	6	Pass one of the following 2000-level courses: EASC2402 or ENVS2001 or GEOG2137 Or upon special arrangement with the course coordinator	Y	Y	S	TBC	15	Dr Jed O Kaplan, Earth Sciences		Major in Earth System Science (2021,2020,2019,2018, 2017); Major in Environmental Science (2021,2020,2019,2018, 2017,2016,2015)
EASC3999	Directed studies in earth sciences	6	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in the Geology or Earth System Science Majors; and Cumulative GPA of 2.5 or above. This course is not a capstone course and students cannot use this course to fulfill the capstone requirement of the Earth System Science and Geology Majors. The earliest that a student is allowed to take this course is their year 3 study.	Y	Y	0	No exam	1	Prof Z H Liu, Earth Sciences		Major in Earth System Science (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Geology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Geology (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Earth Sciences (2021,2020,2019,2018, 2017,2016,2015,2014)
EASC4403	Biogeochemical cycles	6	Pass in EASC3403 or EASC3416 or ENVS3313	Y	Y	1	Dec	1	Dr Y Li, Earth Sciences	Major in Earth System Science (2021,2020,2019,2018, 2017,2016,2015,2014)	Major in Geology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Geology (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Earth Sciences (2021,2020,2019,2018, 2017,2016,2015,2014)
EASC4406	Earth dynamics & global tectonics	6	Pass in EASC3403 or EASC3404 or EASC3408 or EASC3409	Y	Y	2	May		Prof G Zhao, Earth Sciences	Major in Geology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Geology (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	Minor in Earth Sciences (2021,2020,2019,2018, 2017,2016,2015,2014)
EASC4407	Regional geology	6	Pass in EASC3402; and (EASC3403 or EASC3404)	Y	Y	1	No exam	40	Dr A A G Webb, Earth Sciences	Major in Geology (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	Major in Geology (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Earth Sciences (2021,2020,2019,2018,

			1								2017,2016,2015,2014)	1	
EASC4408	Special topics in earth sciences	6	Pass in any EASC3XXX or EASC4XXX course	N	N			30	Dr M H Lee, Earth Sciences		Major in Earth System Science (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Geology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Geology (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Earth Sciences (2021,2020,2019,2018, 2017,2016,2015,2014)		
EASC4911	Earth system: contemporary issues	6	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in the Earth System Science Major including at least two of the following courses: EASC3410, EASC3415 or ENVS3313. This capstone course is for Earth System Science Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	2	No exam		Dr S C Chang, Earth Sciences		Major in Geology (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Earth Sciences (2021,2020,2019,2018, 2017,2016,2015,2014)	Major in Earth System Science (2021,2020,2019,2018, 2017,2016,2015,2014)	
EASC4955	Integrated field studies	6	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in the Geology Major / Geology Major (Intensive). This must include either a PASS in, or student must be already enrolled in EASC3403, EASC3404 and EASC3409. This capstone course is for Geology Major/ Geology Major (Intensive) students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	2	No exam	35	Dr J A King, Earth Sciences		Minor in Earth Sciences (2021,2020,2019,2018, 2017,2016,2015,2014)	Major in Geology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Geology (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	
EASC4966	Earth sciences internship	6	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in the Geology or Earth System Science Majors. This course is not a capstone course and students cannot use this course to fulfill the capstone requirement of the Earth System Science and Geology Majors. The earliest that a student is allowed to take this course is their year 3 study.	Y	Y	1, 2, S	No exam		Dr M C Cheung, Earth Sciences		Major in Geology (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Earth Sciences (2021,2020,2019,2018, 2017,2016,2015,2014)		
EASC4999	Earth sciences project	12	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in the Geology or Earth System Science Majors; and Cumulative GPA of 2.7 or above. This course is not a capstone course and students cannot use this course to fulfill the capstone requirement of the Earth System Science and Geology Majors.  The earliest that a student is allowed to take this course is their year 3 study.	Y	Y	0	No exam		Prof Z H Liu, Earth Sciences	Major in Geology (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	Major in Earth System Science (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Geology (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Earth Sciences (2021,2020,2019,2018, 2017,2016,2015,2014)		
ENVS1401	Introduction to environmental science	6	NIL	Y	Y	1	No exam		Dr C Not, Earth Sciences	Major in Environmental Science			

ENVS2020	Biogeochemistry of the environment	6		N	N					(2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014)		
ENV\$3007	Natural hazards and mitigation	6	Pass in EASC2404 or ENVS2001 or ENVS2002	Y	Z	1	Dec		Dr N S KHAN, Earth Sciences		Major in Earth System Science (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Geology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Geology (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014)	
ENVS3042	Pollution	6	Pass in EASC2401 or CHEM2241 or BIOL2103 or ENVS2001	Y	Y	1	Dec	50	Dr X Luo, Earth Sciences		Major in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014)	
ENVS3313	Environmental oceanography	6	Pass in BIOL2306 or EASC2404 or ENVS2001 or ENVS2002	Y	Y	2	No exam	-	Dr C Not, Earth Sciences	Minor in Marine Biology (2021,2020,2019,2018, 2017,2016,2015,2014)	Major in Earth System Science (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Geology (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Minor in Environmental Science (2021,2020,2019,2018, 2017,2016,2015); Minor in Environmental Science (2021,2020,2019,2018, 2017,2016,2015)	
ENVS3999	Directed studies in environmental science	6	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in Environmental Science Major. This capstone course is for Environmental Science Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	1, 2	No exam		Dr C Dingle, Biological Sciences			Major in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014)
ENVS4955	Environmental science in practice	6	Pass in at least 12 credits of advanced level (level 3 or 4) disciplinary core/elective courses in Environmental Science Major.	N	N			8	Dr M Yasuhara, Biological Sciences			Major in Environmental Science (2014)
ENVS4966	Environmental science internship	6	Pass in at least 24 credits of advanced	Υ	Υ	1, 2, S	No exam		Dr C Dingle, Biological			Major in Environmental

			level (level 3 or 4) disciplinary core/elective courses in Environmental Science Major. This capstone course is for Environmental Science Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.						Sciences			Science (2021,2020,2019,2018, 2017,2016,2015,2014)
ENVS4999	Environmental science project	12	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in Environmental Science Major; and This capstone course is for Environmental Science Major students only.  The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	0	No exam		Dr C Dingle, Biological Sciences			Major in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014)
Department of	of Mathematics								T			
MATH1009	Basic mathematics for business and economics	6	NIL The course has no pre-requisite, but students are expected to have already achieved Level 2 or above in HKDSE Mathematics or equivalent. Not for students who have passed MATH1011 or MATH1013, or have already enrolled in these courses. This course is exclusively for non-Science and non-Engineering students (i.e. not for students from the Faculty of Science or Engineering).	Y	Y	1, 2	Dec, May		Dr Y M Chan (1st sem); Dr K H Law (2nd sem), Mathematics			
MATH1011	University mathematics I	6	Not for students: (a) with Level 2 or above in M1 or M2 of HKDSE Math or equivalent; (b) have passed or already enrolled in any of following courses: MATH1009, 1013, 1821, 1851, PHYS1150, CHEM1044, level 2 or above math courses; (c) have passed MATH1853.	Y	Y	1, 2	Dec, May	400	Dr H Y Zhang, Mathematics		Major in Chemistry (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Major in Molecular Biology & Biotechnology (Intensive) (2021,2020,2019,2018, 2017,2016,2015)	
MATH1013	University mathematics II	6	Level 2 or above in Module 1, or Module 2 of HKDSE Mathematics or equivalent, or Pass in MATH1009 or MATH1011; and Not for students who have passed MATH1821, or (MATH1851 and MATH1853), or have already enrolled in this course.	Y	Y	1, 2	Dec, May	500	Dr C W Wong, Mathematics	Bachelor of Arts and Sciences in Applied Artificial Intelligence (2021,2020,2019); Major in Decision Analytics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016); Major in Mathematics/Physics (2017,2016); Major in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014);	Major in Chemistry (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Major in Molecular Biology & Biotechnology (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Major in Physics (Intensive) (2021,2020,2019,2018, 2017,2016); Minor in Actuarial Studies (2021,2020,2019,2018, 2017,2016,2015,2014)	

										Minor in Computational & Financial Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Operations Research & Mathematical Programming (2021,2020,2019,2018, 2017,2016,2015,2014)		
MATH1641	Mathematical laboratory and modeling	6	NIL	Y	N	1	Dec	30	Dr B Kane, Mathematics			
MATH1821	Mathematical methods for actuarial science I	6	Level 4 or above in HKDSE Mathematics plus Module 1, or Level 4 or above in HKDSE Mathematics plus Module 2, or equivalent; and Not for students who have passed MATH1013 or (MATH1851 and MATH1853), or have already enrolled in these courses. For BSc(ActuarSc) students only.	Y	<b>Y</b>	1	Dec		Dr C W Wong, Mathematics	BSc in Actuarial Science (2021,2020,2019,2018, 2017,2016,2015,2014)		
MATH1851	Calculus and ordinary differential equations	6	Level 2 or above in Module 1, or Module 2 of HKDSE Mathematics or equivalent, or Pass in MATH1011. (This course is exclusively for Engineering students.)	Y	Y	1, 2	Dec, May	700	Prof Y K Lau (1st sem); Dr X Zhang (2nd sem), Mathematics			
MATH1853	Linear algebra, probability and statistics	6	Level 2 or above in Module 1, or Module 2 of HKDSE Mathematics or equivalent, or Pass in MATH1011, or take MATH1011 and MATH1853 concurrently in the same semester. (This course is exclusively for Engineering students.)	Y	Y	1, 2	Dec, May	700	Prof G Han, Mathematics			
MATH2012	Fundamental concepts of mathematics	6	Pass in MATH1013 or MATH1821 or (MATH1851 and MATH1853). Students with good grades in HKDSE Math Module 1 or Math Module 2 (or other equivalent qualifications) and have strong interests in math may also apply for taking this course concurrently with its prerequisites courses (subject to the approval from Course Selection Advisors).	Y	Y	1, 2	Dec, May		Dr Y M Chan, Mathematics	Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016)	Minor in Computational & Financial Mathematics (2021,2020,2019,2018, 2017,2016,2015); Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015); Minor in Operations Research & Mathematical Programming (2021,2020,2019,2018, 2017,2016,2015)	
MATH2014	Multivariable calculus and linear algebra	6	Pass in MATH1013 or (MATH1851 and MATH1853).  Not for students who have passed MATH2822 or [(MATH2101 or MATH2102) and MATH2211], or have already enrolled in these courses.	Y	Y	1, 2	Dec, May		Dr H Y Zhang, Mathematics	2017,2016,2015,2014); Major in Risk Management (2021,2020,2019,2018,	Minor in Computational & Financial Mathematics (2021,2020,2019,2018, 2017,2016,2015); Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015); Minor in Operations Research & Mathematical Programming (2021,2020,2019,2018,	

									(2021,2020,2019,2018, 2017,2016,2015,2014)	2017,2016,2015)	
MATH2101	Linear algebra I	6	Pass in MATH1013 or MATH1821 or (MATH1851 and MATH1853)	Y	Y	1, 2	Dec, May	 Dr T W Ching (1st sem); Dr K H Law (2nd sem), Mathematics	Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014); Minor in Computational & Financial Mathematics (2014); Minor in Mathematics (2014); Minor in Operations Research & Mathematical Programming (2014)	Mathematics (2021,2020,2019,2018, 2017,2016,2015); Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015);	
MATH2102	Linear algebra II	6	Pass in MATH2101 or (MATH1821 and MATH2822)	Y	Y	2	May	 Dr T W Ching, Mathematics	Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016)		
MATH2211	Multivariable calculus	6	Pass in MATH1013 or MATH1821 or (MATH1851 and MATH1853)	Y	Y	1, 2	Dec, May	 Dr T W Ching, Mathematics	Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014); Minor in Computational & Financial Mathematics (2014); Minor in Mathematics (2014); Minor in Operations Research & Mathematical Programming (2014)	Minor in Computational & Financial Mathematics (2021,2020,2019,2018, 2017,2016,2015); Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015); Minor in Operations Research & Mathematical Programming (2021,2020,2019,2018, 2017,2016,2015)	
MATH2241	Introduction to mathematical analysis	6	Pass in MATH1013 or (MATH1851 and MATH1853) or MATH2822. Students are strongly recommended to have taken MATH2012 if they wish to take this course.	Y	Y	1, 2	Dec, May	 Dr T W Ching (1st sem); Dr Y M Chan (2nd sem), Mathematics	Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016)		
MATH2822	Mathematical methods for actuarial science II	6	Pass in MATH1821. For BSc(ActuarSc) students only.	Y	Y	2	May	 Dr T W Ching, Mathematics	BSc in Actuarial Science (2021,2020,2019,2018, 2017,2016,2015,2014)		
MATH3001	Development of mathematical ideas	6	Pass in MATH2101, MATH2102, MATH2211 and MATH2241	N	N			 TBC, Mathematics		Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics/Physics (2017,2016,2015,2014); Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014)	

MATH3002	Mathematics seminar	6	Pass in MATH2012, MATH2101, MATH2211 and MATH2241 Subject to approval by the Department.	Y	Y	2	No exam	12	Prof T W Ng; Dr C Y Hui, Mathematics	Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016)	Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics/Physics (2017,2016,2015,2014); Milor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014)	
MATH3301	Algebra I	6	Pass in MATH2101	Y	Y	1	Dec		Prof Y K Lau, Mathematics	Major in Mathematics (2014); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014)	Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015); Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014)	
MATH3303	Matrix theory and its applications	6	Pass in MATH2101 and MATH2102	Z	Ν		1		Dr Y M Chan, Mathematics		Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics/Physics (2017,2016,2015,2014); Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014)	
MATH3304	Introduction to number theory	6	Pass in MATH2101 and MATH2211	Y	Y	2	May		Dr B Kane, Mathematics		Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics/Physics (2017,2016,2015,2014); Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014)	
MATH3401	Analysis I	6	Pass in MATH2211	Y	Y	1	Dec		Prof M K P Ng, Mathematics	Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014)	Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014)	
MATH3403	Functions of a complex variable	6	Pass in MATH2211 and MATH2241	Y	Y	2	May		Dr K K Wong, Mathematics	Major in Mathematics (2014); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016)	Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015); Major in Mathematics/Physics (2017,2016,2015,2014); Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014)	
MATH3405	Differential equations	6	Pass in (MATH2101 and MATH2211) or MATH2014 or (MATH1821 and MATH2822)	Y	Y	2	May		Dr H Y Zhang, Mathematics	Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016)	Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics/Physics (2017,2016,2015,2014); Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Operations Research & Mathematical	

											Programming (2021,2020,2019,2018, 2017,2016,2015,2014)	
MATH3408	Computational methods and differential equations with applications	6	Pass in (MATH2101 and MATH2211) or MATH2014 or (MATH1821 and MATH2822)	Y	Y	2	May		Prof W K Ching, Mathematics		Major in Decision Analytics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Environmental Science (2017,2016,2015,2014) ; Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics/Physics (2017,2016,2015,2014); Mijor in Computational & Financial Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014)	
MATH3541	Introduction to topology	6	Pass in MATH2101, MATH2102 and MATH2241. Students are recommended to have passed or already enrolled in MATH3301 and MATH3401.	Y	N	2	May		Prof J H Lu, Mathematics		Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014) ; Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014)	
MATH3600	Discrete mathematics	6	Pass in (MATH1013 and any 1 of Level 2 MATH courses) or (MATH1851 and MATH1853 and any 1 of level 2 MATH courses) or MATH2014 or (MATH1821 and MATH2822)	<b>Y</b>	<b>Y</b>	1	Dec	-	Dr K H Law, Mathematics	Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016)	Major in Decision Analytics (2021, 2020, 2019, 2018, 2017, 2016, 2015, 2014); Major in Mathematics (2021, 2020, 2019, 2018, 2017, 2016, 2015, 2014); Major in Mathematics/Physics (2017, 2016, 2015, 2014); Minor in Mathematics (2021, 2020, 2019, 2018, 2017, 2016, 2015, 2014); Minor in Operations Research & Mathematical Programming (2021, 2020, 2019, 2018, 2017, 2016, 2015, 2014); Minor in Operations Research & Mathematical Programming (2021, 2020, 2019, 2018, 2017, 2016, 2015, 2014)	
MATH3601	Numerical analysis	6	Pass in (MATH2101 and MATH2211) or MATH2014 or (MATH1821 and MATH2822)	Y	Y	1	Dec		Dr Z Zhang, Mathematics	Minor in Computational & Financial Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014)	Bachelor of Arts and Sciences in Applied Artificial Intelligence (2021,2020,2019); Major in Decision Analytics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics	

										(Intensive) (2021,2020,2019,2018, 2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014) ; Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014)	
MATH3603	Probability theory	6	Pass in (MATH2101 and MATH2211) or MATH2014 or (MATH1821 and MATH2822)	Y	Y	1	Dec	 Dr Z Qu, Mathematics	Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016)	Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics/Physics (2017,2016,2015,2014) ; Minor in Computational & Financial Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014)	
MATH3901	Operations research I	6	Pass in MATH2014 or MATH2101 or MATH2102	<b>Y</b>	<b>Y</b>	1	Dec	 Dr Z Qu, Mathematics	Minor in Operations Research & Mathematical Programming (2021,2020,2019,2018, 2017,2016,2015,2014)	Bachelor of Arts and Sciences in Applied Artificial Intelligence (2021,2020,2019); Major in Decision Analytics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014); Minor in Mathematics/Physics (2021,2020,2019,2018, 2017,2016,2015,2014)	
MATH3904	Introduction to optimization	6	Pass in (MATH2101 and MATH2211) or MATH2014 or (MATH1821 and MATH2822)	Y	Y	1	Dec	 Prof W Zang, Mathematics	Bachelor of Arts and Sciences in Applied Artificial Intelligence (2021,2020,2019); Major in Decision Analytics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016); Minor in Operations Research & Mathematical Programming (2021,2020,2019,2018, 2017,2016,2015,2014)	Financial Mathematics (2021,2020,2019,2018,	
MATH3905	Queueing theory and simulation	6	Pass in (MATH2101 and MATH2211) or MATH2014 or (MATH1821 and MATH2822)	N	Y			 Dr G Han, Mathematics		Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics/Physics (2017,2016,2015,2014) ; Minor in Mathematics (2021,2020,2019,2018,	

MATH3906	Financial calculus		Pass in (MATH2101 and MATH2211) or	Y	Y	2	May	Dr G Li, Mathematics	Minor in Computational	2017,2016,2015,2014); Minor in Operations Research & Mathematical Programming (2021,2020,2019,2018, 2017,2016,2015,2014) Bachelor of Arts and	
MATHS906	Financiai caiculus	6	Pass in (MATHZ101 and MATHZ211) or MATHZ214 or (MATH314 or (MATH314 and MATH2822) or STAT2601	Y	Y	2	мау	 Dr G Li, Mathematics	Iminor in Computational & Financial Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014)	Bacnelor of Arts and Sciences in Applied Artificial Intelligence (2021,2020,2019); Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014); Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Operations Research & Mathematical Programming (2021,2020,2019,2018, 2017,2016,2015,2014)	
MATH3911	Game theory and strategy	6	Pass in (MATH2101 and MATH2211) or (MATH1821 and MATH2822)	Y	Y	2	May	 Dr K H Law, Mathematics		Bachelor of Arts and Sciences in Applied Artificial Intelligence (2021,2020,2019); Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014); Minor in Computational & Financial Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Operations Research & Mathematical Programming (2021,2020,2019,2018, 2017,2016,2015,2014)	
MATH3943	Network models in operations research	6	Pass in (MATH2101 and MATH2211) or MATH2014.	Y	N	1	Dec	 Dr. K H Law, Mathematics		Bachelor of Arts and Sciences in Applied Artificial Intelligence (2021,2020,2019); Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016); Major in	

										Mathematics/Physics (2017,2016,2015,2014); Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Operations Research & Mathematical Programming (2021,2020,2019,2018, 2017,2016,2015,2014)	
MATH3999	Directed studies in mathematics	6	This capstone course is for Mathematics / Mathematics / Mathematics Mathematics, and Mathematics/Physics Majors students only. The earliest that a student is allowed to take this capstone course is their year 3 study. Pass in at least 24 credits of advanced level disciplinary core/elective mathematics courses (MATH3XXX, MATH4XXX or MATH7XXX) in the Mathematics/ Mathematics (Intensive), and Mathematics/Physics Majors; and subject to approval by the Department.	Y	Y	1, 2	No exam	 Prof X Yuan, Mathematics			Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014)
MATH4302	Algebra II	6	Pass in MATH2102 and MATH3301	Y	Y	2	May	 Prof J H Lu, Mathematics		Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014); Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014)	
MATH4402	Analysis II	6	Pass in MATH3401	N	Y			 Dr Y M Chan, Mathematics		Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014); Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014)	
MATH4404	Functional analysis	6	Pass in MATH2101, MATH2102, MATH2211, MATH2241 and MATH3401	Y	Y	2	May	 Dr C W Wong, Mathematics	Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016)	Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics/Physics (2017,2016,2015,2014); Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014)	
MATH4406	Introduction to partial differential equations	6	Pass in MATH2101, MATH2102, MATH2241; and Pass in MATH3405, or already enrolled in this course.	Y	Y	1	Dec	 Dr T K Wong, Mathematics	Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016)	Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics/Physics (2017,2016,2015,2014); Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014)	

MATH4501	Geometry	6	Pass in (MATH2101 and MATH2211); and Pass in (MATH3401 or MATH3403 or MATH3405). Students are strongly recommended to have taken MATH3401.	Y	Y	1	Dec		Dr Z Hua, Mathematics	Major in Mathematics/Physics (2017,2016,2015,2014)	Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016); Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014)	
MATH4511	Introduction to differentiable manifolds	6	Pass in MATH3401 or MATH3541. It would be helpful if students have also taken or are concurrently taking MATH4402.	N	Y	-		1	Prof J H Lu, Mathematics		Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014); Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014)	
MATH4602	Scientific computing	6	Pass in MATH3601	Y	Y	2	May		Prof W K Ching, Mathematics		Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014); Minor in Computational & Financial Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014)	
MATH4902	Operations research II	6	Pass in MATH2101, MATH2211 and MATH3603.	N	N				Dr G Han, Mathematics		Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014); Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Operations Research & Mathematical Programming (2021,2020,2019,2018, 2017,2016,2015,2014)	
MATH4907	Numerical methods for financial calculus	6	Pass in MATH3906 or equivalent.	Y	Y	1	No exam		Dr G Li, Mathematics		Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014) ; Minor in	

										Computational & Financial Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Operations Research & Mathematical Programming (2021,2020,2019,2018, 2017,2016,2015,2014)	
MATH4910	Senior mathematics seminar	6	This capstone course is for Mathematics / Mathematics (Intensive), and Mathematics/Physics Majors students only. The earliest that a student is allowed to take this capstone course is their year 3 study. Pass in at least 24 credits of advanced level disciplinary core/elective mathematics courses (MATH3XXX, MATH4XXX, or MATH7XXX) in the Mathematics/ Mathematics (Intensive), and Mathematics/Physics Majors; and subject to approval by the Department.	Y	N	2	No exam	12	Dr X Zhang; Dr T K Wong, Mathematics		Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014)
MATH4911	Mathematics capstone project	6	This capstone course is for Mathematics / Mathematics (Intensive), and Mathematics/Physics Majors students only. This course is for third and fourth year students only. The earliest that a student is allowed to take this capstone course is their year 3 study. Pass in at least 24 credits of advanced level disciplinary core/elective mathematics courses (MATH3XXX, MATH4XXX, or MATH7XXX) in the Mathematics/ Mathematics (Intensive), and Mathematics/Physics Majors; and subject to approval by the Department.	N	N			-	Prof T W Ng, Mathematics		Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014)
MATH4966	Mathematics internship	6	This capstone course is for Mathematics / Mathematics (Intensive), and Mathematics/Physics Majors students only. The earliest that a student is allowed to take this capstone course is their year 3 study. Pass in at least 24 credits of advanced level disciplinary core/elective mathematics courses (MATH3XXX, MATH4XXX, or MATH7XXX) in the Mathematics/ Mathematics (Intensive), and Mathematics/Physics Majors; and subject to approval by the Department.	Y	Y	1, 2, S	No exam	-	Dr T K Wong, Mathematics		Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014)
MATH4999	Mathematics project	12	This capstone course is for Mathematics / Mathematics (Intensive), and Mathematics/Physics Majors students only. The earliest that a student is allowed to take this capstone course is their year 3 study. Pass in at least 24 credits of advanced level disciplinary core/elective mathematics courses (MATH3XXX, MATH4XXX, or MATH7XXX) in the Mathematics/ Mathematics (Intensive), and Mathematics/Physics Majors; and subject to approval by the Department.	Y	Y	0	No exam		Prof X Yuan, Mathematics		Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014)

MATH7101	Intermediate complex analysis	6	Pass in a first course in Complex Analysis such as MATH3403, and approval by the course coordinator.	Y	Y	1	No exam	 Prof T W Ng; Dr. X Zhang, Mathematics	Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014) ; Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014)
MATH7201	Topics in geometry	6	Pass in (MATH4402 or MATH4501) and (MATH4511 or the approval of the course coordinator)	N	N			 TBC, Mathematics	Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014) ; Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014)
MATH7202	Complex manifolds	6	Pass in MATH3403 or MATH4501 or MATH7101.	Y	Z	2	No exam	 Prof N Mok, Mathematics	Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014) ; Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014)
MATH7217	Topics in financial mathematics	6	Pass in an advanced level mathematics courses (MATH3XXX, MATH4XXX, or MATH7XXX) and subject to the approval of the course coordinator.	Z	Z		-	 TBC, Mathematics	Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014) ; Minor in Computational & Financial Mathematics (2021,2020,2019,2018, 2017,2016); Minor in Mathematics (2021,2020,2019,2018, 2017,2016); Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014)
MATH7219	Topics in applied functional analysis	6	Pass in MATH3401 and MATH4404, or approval of the course coordinator.	N	N			 TBC, Mathematics	Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics/Physics (2017,2016,2015,2014) ; Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014)
MATH7224	Topics in advanced probability theory	6	Pass in MATH3603 and MATH4402, and approval of the course coordinator.	N	N			 TBC, Mathematics	Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics

									(Intensive) (2021,2020,2019,2018, 2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014) ; Minor in Computational & Financial Mathematics (2021,2020,2019,2018, 2017,2016); Minor in Mathematics (2021,2020,2019,2018, 2017,2016); Almor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014)
MATH7501	Topics in algebra	6	Pass in MATH4302	N	Y			 Dr Z Hua, Mathematics	Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014) ; Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014)
MATH7502	Topics in applied discrete mathematics	6	Pass in (MATH3301 or MATH3600), and approval of the course coordinator.	Y	N	2	May	 Prof W Zang, Mathematics	Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014); Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Operations Research & Mathematical Programming (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Operations Research & Mathematical Programming (2021,2020,2019,2018, 2017,2016,2015,2014)
MATH7503	Topics in mathematical programming and optimization	6	Pass in MATH3901, MATH3904 and approval of the course coordinator.	Y	Y	2	No exam	 Prof X Yuan, Mathematics	Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014) ; Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Operations Research & Mathematical Programming (2021,2020,2019,2018, 2017,2016,2015,2014)
MATH7504	Geometric topology	6	Pass in MATH3301 and MATH3401	N	N			 TBC, Mathematics	Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics/Physics (2017,2016,2015,2014)

										; Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014)	
MATH7505	Real analysis	6	A good grade in MATH3401 and approval by the course coordinator	Y	Y	1	Dec	 Dr C Y Hui, Mathematics		Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (Intensive) (2021,2020,2019,2018, 2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014); Minor in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014)	
Department of	f Physics										 
PHYS1000	Introduction to astronomy	6	Nil	N	N			 Dr J C S Pun, Physics			
PHYS1001	University physics	6	NIL	N	N			 Dr F K Chow, Physics			
PHYS1050	Physics for engineering students	6	Level 3 or above in HKDSE Physics or Combined Science with Physics components or equivalent; and (Level 2 or above in Module 1, or Module 2 of HKDSE Mathematics or equivalent, or Pass in MATH1011) (This course is exclusive for Engineering students.)	N	N			 Dr C C Ling, Physics			
PHYS1055	How things work	6	NIL	Υ	Υ	2	May	 Dr M K Yip, Physics			
PHYS1056	Weather, climate and climate change	6	NIL	Υ	Υ	1	Dec	 Dr F C C Ling, Physics			
PHYS1057	Kitchen science	6	NIL	N	N			 Prof A B Djurisic, Physics			
PHYS1150	Problem solving in physics	6	Level 3 or above in HKDSE Physics or equivalent, or Pass in PHYS1240	Y	Y	1, 2	Dec, May	 Dr M K Yip, Physics	Major in Physics (2014); Major in Physics (Intensive) (2021,2020,2019,2018, 2017,2016)	Major in Astronomy (2017,2016,2015); Major in Mathematics/Physics (2017,2016,2015); Major in Physics (2021,2020,2019,2018, 2017,2016,2015); Minor in Physics (2021,2020,2019,2018)	
PHYS1240	Physics by inquiry	6	NIL Not for students with level 3 or above in HKDSE Physics; and Not for students who have passed in PHYS1050 or PHYS1150 or PHYS1250, or already enrolled in these courses; and Not for students who have passed in any level 2 PHYS course or above.	Y	Y	2	May	 Dr F K Chow, Physics			
PHYS1250	Fundamental physics	6	Level 3 or above in HKDSE Physics or equivalent, or Pass in PHYS1240; and Not for students who have passed in PHYS1050, or already enrolled in this course; and Not for students who have passed in any level 2 PHYS course or above.	Y	Y	1, 2	Dec, May	 Dr J H C Lee, Physics	Major in Astronomy (2017,2016,2015,2014); Major in Mathematics/Physics (2017,2016,2015,2014); Major in Physics (2017,2016,2015,2014); Minor in Astronomy (2017,2016,2015,2014); Minor in Physics (2021,2020,2019,2018, 2017,2016,2015,2014)	Minor in Astronomy (2021,2020,2019,2018)	
PHYS1650	Nature of the universe	6	NIL	Y	Υ	1, 2	Dec, May	 Dr K M Lee, Physics	Major in Astronomy	Major in Physics	

						_				(2017,2016,2015,2014) ; Minor in Astronomy (2021,2020,2019,2018, 2017,2016,2015,2014)	(2021,2020,2019,2018, 2017,2016)	
PHYS2055	Introductory relativity	6	Pass in PHYS1050 or PHYS1150 or PHYS1250 or ENGG1300	Y	Y	2	May	1	Dr K M Lee, Physics	Major in Physics (Intensive) (2021,2020,2019,2018, 2017,2016)	Major in Astronomy (2017,2016,2015); Major in Mathematics/Physics (2017,2016,2015); Major in Physics (2021,2020,2019,2018, 2017,2016,2015); Minor in Astronomy (2021,2020,2019,2018); Minor in Physics (2021,2020,2019,2018)	
PHYS2150	Methods in physics I	6	Pass in MATH1013 or MATH1821 or MATH1851 or PHYS1150	Y	Y	1	Dec		Dr F K Chow, Physics	Major in Physics (Intensive) (2021,2020,2019,2018, 2017,2016)	Major in Astronomy (2017,2016,2015); Major in Mathematics/Physics (2017,2016,2015); Major in Physics (2021,2020,2019,2018, 2017,2016,2015); Minor in Physics (2021,2020,2019,2018)	
PHYS2155	Methods in physics II	6	Pass in MATH1013 or MATH1821 or MATH1851 or PHYS1150	Y	Y	2	May	l	Dr Y J Tu, Physics	Major in Physics (Intensive) (2021,2020,2019,2018, 2017,2016)	Major in Astronomy (2017,2016,2015); Major in Mathematics/Physics (2017,2016,2015); Major in Physics (2021,2020,2019,2018, 2017,2016,2015); Minor in Physics (2021,2020,2019,2018)	
PHYS2160	Introductory computational physics	6	Pass in MATH1013 or MATH1821 or MATH1851 or PHYS1150	Y	Y	2	May	30	Dr F K Chow, Physics		Major in Astronomy (2017); Major in Mathematics/Physics (2017); Major in Physics (2021, 2020, 2019, 2018, 2017); Major in Physics (Intensive) (2021, 2020, 2019, 2018, 2017, 2016); Minor in Astronomy (2021, 2020, 2019); Minor in Physics (2021, 2020, 2019, 2018, 2021, 2020, 2019, 2018)	
PHYS2250	Introductory mechanics	6	Pass in PHYS1050 or PHYS1150 or PHYS1250 or ENGG1300	Y	Y	1, 2	Dec, May		Dr M K Yip, Physics	Major in Astronomy (2017,2016,2015,2014); Major in Mathematics/Physics (2014); Major in Physics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Physics (Intensive) (2021,2020,2019,2018, 2017,2016); Minor in Physics (2017,2016,2015,2014)	Major in Mathematics/Physics (2017,2016,2015); Minor in Physics (2021,2020,2019,2018)	
PHYS2255	Introductory electricity and	6	Pass in PHYS1050 or PHYS1150 or	Y	Y	2	May		Dr J C S Pun, Physics	Major in Astronomy	Major in Astronomy	

	magnetism		PHYS1250 or ENGG1310						(2014); Major in Physics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Physics (Intensive) (2021,2020,2019,2018, 2017,2016)	(2017,2016,2015); Major in Mathematics/Physics (2017,2016,2015); Minor in Physics (2021,2020,2019,2018)	
PHYS2260	Heat and waves	6	Pass in PHYS1050 or PHYS1250	N	N			 Dr M Su, Physics	Major in Physics (2017,2016,2015,2014)	Major in Astronomy (2017,2016,2015); Major in Mathematics/Physics (2017,2016,2015)	
PHYS2261	Introductory heat and thermodynamics	6	Pass in PHYS1050 or PHYS1150 or PHYS1250 or ENGG1350	Y	Y	1	Dec	 Dr S Z Zhang, Physics	Major in Physics (2021,2020,2019,2018) ; Major in Physics (Intensive) (2021,2020,2019,2018, 2017,2016)	Minor in Physics (2021,2020,2019,2018)	
PHYS2265	Introductory quantum physics	6	Pass in PHYS1050 or PHYS1150 or PHYS1250 or ENGG1300	Y	Y	1, 2	Dec, May	 Dr F K Chow, Physics	Major in Astronomy (2017,2016,2015,2014) ; Major in Mathematics/Physics (2017,2016,2015,2014) ; Major in Physics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Physics (Intensive) (2021,2020,2019,2018, 2017,2016); Minor in Astronomy (2017,2016,2015,2014) ; Minor in Physics (2017,2016,2015,2014)	Minor in Physics (2021,2020,2019,2018)	
PHYS2650	Modern astronomy	6	Pass in PHYS1650	Y	Y	1	Dec	 Dr J J L Lim, Physics	Minor in Astronomy (2021,2020,2019,2018)	Major in Physics (Intensive) (2021,2020,2019,2018, 2017,2016)	
PHYS2850	Atomic and nuclear physics	6	Pass in PHYS2265	N	N			 Dr S Z Zhang, Physics			
PHYS3150	Theoretical physics	6	Pass in MATH2211 or PHYS2150 or PHYS2155	Y	Y	1	Dec	 Dr C J Wang, Physics	Major in Physics (Intensive) (2021,2020,2019,2018, 2017,2016)	Major in Astronomy (2017,2016,2015,2014) ; Major in Mathematics/Physics (2017,2016,2015,2014) ; Major in Physics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Physics (2021,2020,2019,2018, 2017,2016,2015,2014)	
PHYS3151	Machine learning in physics	6	Pass in MATH2014 or MATH2101 or MATH2211 or PHYS2155 or PHYS2160. Working knowledge of Python is needed (please talk to the course instructor in case of doubt).	Y	Y	2	May	 Dr Z Y Meng, Physics		Major in Astronomy (2017,2016,2015); Major in Mathematics/Physics (2017,2016,2015); Major in Physics (2021,2020,2019,2018, 2017,2016,2015); Major in Physics (Intensive) (2021,2020,2019,2018, 2017,2016); Minor in Physics (2021,2020,2019,2018, 2017,2016); Minor in Physics (2021,2020,2019,2018,	

				1	I					2017,2016,2015)	
PHYS3350	Classical mechanics	6	Pass in PHYS2150 and PHYS2250	Y	Y	1	Dec	 Prof S Q Shen, Physics	Major in Mathematics/Physics (2017,2016,2015,2014); Major in Physics (2017,2016,2015,2014); Major in Physics (Intensive) (2021,2020,2019,2018, 2017,2016)	Major in Astronomy (2017,2016,2015,2014) ; Major in Physics (2021,2020,2019,2018) ; Minor in Physics (2021,2020,2019,2018, 2017,2016,2015,2014)	
PHYS3351	Quantum mechanics	6	Pass in PHYS2150 and PHYS2265, knowledge of PHYS2155 will be advantageous	Y	Y	1	Dec	 Dr Y Wang, Physics	Major in Mathematics/Physics (2017,2016,2015,2014); Major in Physics (2017,2016,2015,2014); Major in Physics (Intensive) (2021,2020,2019,2018, 2017,2016)	Major in Astronomy (2017,2016,2015,2014) ; Major in Physics (2021,2020,2019,2018) ; Minor in Physics (2021,2020,2019,2018, 2017,2016,2015,2014)	
PHYS3450	Electromagnetism	6	Pass in PHYS2150 and PHYS2255, knowledge of PHYS2155 will be advantageous	Y	Y	2	May	 Prof S J Xu, Physics	Major in Physics (2017,2016,2015,2014); Major in Physics (Intensive) (2021,2020,2019,2018, 2017,2016)	Major in Astronomy (2017,2016,2015,2014); Major in Mathematics/Physics (2017,2016,2015,2014); Major in Physics (2021,2020,2019,2018); Minor in Physics (2021,2020,2019,2018, 2017,2016,2015,2014)	
PHYS3550	Statistical mechanics & thermodynamics	6	Pass in PHYS2150 and (PHYS2260 or PHYS2261)	Y	Y	2	May	 Dr S Z Zhang, Physics	Major in Physics (2017,2016,2015,2014); Major in Physics (Intensive) (2021,2020,2019,2018, 2017,2016)	Major in Astronomy (2017,2016,2015,2014) ; Major in Mathematics/Physics (2017,2016,2015,2014) ; Major in Physics (2021,2020,2019,2018) ; Minor in Physics (2021,2020,2019,2018, 2017,2016,2015,2014)	
PHYS3551	Introductory solid state physics	6	Pass in PHYS2260 and PHYS2265	N	N			 Prof J Gao, Physics		Major in Astronomy (2017,2016,2015,2014) ; Major in Mathematics/Physics (2017,2016,2015,2014) ; Major in Physics (2017,2016,2015,2014) ; Minor in Physics (2017,2016,2015,2014)	
PHYS3650	Observational astronomy	6	Pass in PHYS2255 or PHYS2650	Y	Y	1	Dec	 Dr J J L Lim, Physics	Major in Astronomy (2017,2016,2015,2014) ; Minor in Astronomy (2021,2020,2019,2018)	Major in Mathematics/Physics (2017,2016,2015,2014); Major in Physics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Physics (Intensive) (2021,2020,2019,2018, 2017,2016); Minor in Astronomy (2017,2016,2015,2014); Minor in Physics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Physics (2021,2020,2019,2018, 2017,2016,2015,2014)	
PHYS3651	The physical universe	6	Pass in PHYS1650 and (PHYS2250 or PHYS2265)	N	N			 Dr K M Lee, Physics	Major in Astronomy (2017,2016,2015,2014)	Major in Mathematics/Physics	

PHYS3652	Principles of astronomy	6	Pass in PHYS1650 and (PHYS2250 or PHYS2265)	N	N				Dr L X Dai, Physics	Major in Astronomy (2017,2016,2015,2014)	(2017,2016,2015,2014) ; Major in Physics (2017,2016,2015,2014) ; Minor in Astronomy (2017,2016,2015,2014) ; Minor in Physics (2017,2016,2015,2014)  Major in Mathematics/Physics (2017,2016,2015,2014) ; Major in Physics
											(2017,2016,2015,2014) ; Minor in Astronomy (2017,2016,2015,2014) ; Minor in Physics (2017,2016,2015,2014)
PHYS3653	Astrophysics	6	Pass in PHYS2250 or PHYS2265 or PHYS2650	Y	Y	2	May		Dr L X Dai, Physics		Major in Astronomy (2017,2016,2015); Major in Mathematics/Physics (2017,2016,2015); Major in Physics (2021,2020,2019,2018, 2017,2016,2015); Major in Physics (1021,2020,2019,2018, 2017,2016,2015); Major in Physics (Intensive) (2021,2020,2019,2018, 2017,2016); Minor in Astronomy (2021,2020,2019,2018, 2017,2016,2015); Minor in Physics (1021,2020,2019,2018, 2017,2016,2015); Minor in Physics (2021,2020,2019,2018, 2017,2016,2015)
PHYS3660	Astronomy laboratory	6	Pass in (PHYS2265 or PHYS2650); and Pass in PHYS3650, or already enrolled in this course.	Y	Y	1	Dec	9	Dr S C Y Ng, Physics		Major in Astronomy (2017,2016,2015); Major in Mathematics/Physics (2017,2016,2015); Major in Physics (2021,2020,2019,2018, 2017,2016,2015); Major in Physics (1021,2016,2015); Major in Physics (Intensive) (2021,2020,2019,2018, 2017,2016); Minor in Astronomy (2021,2020,2019,2018, 2017,2016,2015); Minor in Physics (2021,2020,2019,2018, 2017,2016,2015); Minor in Physics (2021,2020,2019,2018, 2017,2016,2015); Minor in Physics (2021,2020,2019,2018, 2017,2016,2015);
PHYS3750	Laser and spectroscopy	6	Pass in PHYS2255 and PHYS2265	Y	Y	1	Dec		Dr T T Luu, Physics		Major in Astronomy (2017,2016,2015,2014); Major in Mathematics/Physics (2017,2016,2015,2014); Major in Physics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Physics (Intensive) (2021,2020,2019,2018, 2017,2016); Minor in Physics (2021,2020,2019,2018, 2017,2016); Minor in Physics (2021,2020,2019,2018, 2017,2016,2015,2014)

PHYS3751	Physics of nanomaterials	6	Pass in PHYS3351; and Pass in PHYS3551, or already enrolled in this course.	N	N				TBC, Physics		Major in Astronomy (2017,2016,2015,2014); Major in Mathematics/Physics (2017,2016,2015,2014); Major in Physics (2017,2016,2015,2014); Minor in Physics (2017,2016,2015,2014); Minor in Physics (2017,2016,2015,2014)	
PHYS3760	Physics laboratory	6	Pass in any two of the following courses: PHYS3350, PHYS3351, PHYS3450, PHYS3550	Y	Y	2	May	16	Dr T T Luu, Physics	Major in Physics (Intensive) (2021,2020,2019,2018, 2017,2016)	Major in Astronomy (2017,2016,2015); Major in Mathematics/Physics (2017,2016,2015); Major in Physics (2021,2020,2019,2018, 2017,2016,2015); Minor in Physics (2021,2020,2019,2018, 2017,2016,2015)	
PHYS3850	Physical Optics	6	Pass in PHYS2250 and PHYS2255	Y	Y	2	May		Dr D K Ki, Physics		Major in Astronomy (2017,2016,2015,2014) ; Major in Mathematics/Physics (2017,2016,2015,2014) ; Major in Physics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Physics (Intensive) (2021,2020,2019,2018, 2017,2016); Minor in Physics (2021,2020,2019,2018, 2017,2016,2015,2014)	
PHYS3851	Atomic and nuclear physics	6	Pass in PHYS2265; and Pass in PHYS3351, or already enrolled in this course.	N	Y		-		Dr J H C Lee, Physics		Major in Astronomy (2017,2016,2015,2014); Major in Mathematics/Physics (2017,2016,2015,2014); Major in Physics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Physics (Intensive) (2021,2020,2019,2018, 2017,2016); Mi	
PHYS3999	Directed studies in physics	6	Pass in at least 24 credits of advanced level (3XXX level or above) disciplinary core/elective courses of the Physics Major, Physics (Intensive) Major, Mathematics/Physics Major or Astronomy Major curriculum. This capstone course is for Astronomy, Mathematics/Physics, Physics, and Physics (Intensive) Majors students only.  The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	1, 2, S	No exam		Dr F C C Ling, Physics		Minor in Physics (2017,2016,2015,2014)	Major in Astronomy (2017,2016,2015,2014); Major in Mathematics/Physics (2017,2016,2015,2014); Major in Physics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Physics (Intensive) (2021,2020,2019,2018, 2017,2016)
PHYS4150	Computational physics	6	Pass in (MATH3301 or MATH3401 or MATH3403 or MATH3405 or PHYS2160 or PHYS3151) and	Υ	Υ	1	Dec	24	Dr Z Y Meng, Physics		Major in Astronomy (2017,2016,2015,2014) ; Major in	

			(PHYS3350 or PHYS3351 or PHYS3450 or PHYS3550)							Mathematics/Physics (2017,2016,2015,2014); Major in Physics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Physics (Intensive) (2021,2020,2019,2018, 2017,2016); Minor in Physics (2021,2020,2019,2018, 2017,2016,2015,2014)	
PHYS4151	Data analysis and modeling in physics	6	Pass in (MATH3301 or MATH3401 or MATH3403 or MATH3405 or PHYS2160 or PHYS3150); and (PHYS3350 or PHYS3351 or PHYS3450 or PHYS3550)	N	Y			 Prof H F Chau, Physics		Major in Astronomy (2017,2016,2015,2014); Major in Mathematics/Physics (2017,2016,2015,2014); Major in Physics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Physics (Intensive) (2021,2020,2019,2018, 2017,2016); Minor in Physics (2021,2020,2019,2018, 2017,2016); Minor in Physics (2021,2020,2019,2018, 2017,2016,2015,2014)	
PHYS4350	Advanced classical mechanics	6	Pass in PHYS3350	N	N			 Prof S Q Shen, Physics		Major in Astronomy (2017,2016,2015,2014); Major in Mathematics/Physics (2017,2016,2015,2014); Major in Physics (2017,2016,2015,2014); Minor in Physics (2017,2016,2015,2014);	
PHYS4351	Advanced quantum mechanics	6	Pass in (PHYS2155 or PHYS3150) and PHYS3351	Y	Y	2	May	 Dr C Xiao, Physics	Major in Mathematics/Physics (2017,2016,2015,2014)	Major in Astronomy (2017,2016,2015,2014); Major in Physics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Physics (Intensive) (2021,2020,2019,2018, 2017,2016); Minor in Physics (2021,2020,2019,2018, 2017,2016,2015,2014)	
PHYS4450	Advanced electromagnetism	6	Pass in (PHYS2155 or PHYS3150) and PHYS3450	Y	Y	1	Dec	 Prof X D Cui, Physics		Major in Astronomy (2017,2016,2015,2014); Major in Mathematics/Physics (2017,2016,2015,2014); Major in Physics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Physics (Intensive) (2021,2020,2019,2018, 2017,2016); Minor in Physics (2021,2020,2019,2018, 2017,2016); Minor in Physics (2021,2020,2019,2018, 2017,2016,2015,2014)	
PHYS4550	Advanced statistical mechanics	6	Pass in PHYS3550	N	N			 Dr Y J Tu, Physics		Major in Astronomy (2017,2016,2015,2014) ; Major in	

										Mathematics/Physics (2017,2016,2015,2014) ; Major in Physics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Physics (Intensive) (2021,2020,2019,2018, 2017,2016); Minor in Physics (2021,2020,2019,2018, 2017,2016,2015,2014)
PHYS4551	Solid state physics	6	Pass in (PHYS2255 or PHYS2261) and PHYS3351	Y	Y	1	Dec	1	Prof M H Xie, Physics	Major in Astronomy (2017, 2016, 2015, 2014) ; Major in Mathematics/Physics (2017, 2016, 2015, 2014) ; Major in Physics (2021, 2020, 2019, 2018, 2017, 2016, 2015, 2014); Major in Physics (Intensive) (2021, 2020, 2019, 2018, 2017, 2016); Minor in Physics (2021, 2020, 2019, 2018, 2017, 2016); Minor in Physics (2021, 2020, 2019, 2018, 2017, 2016, 2015, 2014)
PHYS4650	Stellar physics	6	Pass in PHYS3351 and PHYS3651	N	Z	1			Dr S C Y Ng, Physics	Major in Astronomy (2017, 2016, 2015, 2014) ; Major in Mathematics/Physics (2017, 2016, 2015, 2014) ; Major in Physics (2021, 2020, 2019, 2018, 2017, 2016, 2015, 2014); Major in Physics (Intensive) (2021, 2020, 2019, 2018, 2017, 2016); Minor in Astronomy (2021, 2020, 2019, 2018, 2017, 2016, 2015, 2014); Minor in Physics (2021, 2020, 2019, 2018, 2017, 2016, 2015, 2014); Minor in Physics (2021, 2020, 2019, 2018, 2017, 2016, 2015, 2014); Minor in Physics (2021, 2020, 2019, 2018, 2017, 2016, 2015, 2014)
PHYS4651	Selected topics in astrophysics	6	Pass in PHYS3351 or PHYS3450 or PHYS3550 or PHYS3651	N	N			I	Prof K S Cheng, Physics	Major in Astronomy (2017,2016,2015,2014) ; Major in Mathematics/Physics (2017,2016,2015,2014) ; Major in Physics (2017,2016,2015,2014) ; Minor in Physics (2017,2016,2015,2014) ; Minor in Astronomy (2017,2016,2015,2014) ; Minor in Physics (2017,2016,2015,2014)
PHYS4652	Planetary science	6	Pass in PHYS3651 or PHYS3653 or (PHYS3350 and PHYS3550)	Y	Z	2	May	-	Dr M H Lee, Physics	Major in Astronomy (2017,2016,2015,2014) ; Major in Mathematics/Physics (2017,2016,2015,2014) ; Major in Physics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Physics (Intensive) (2021,2020,2019,2018,

									2017,2016); Minor in Astronomy (2021,2020,2019,2018 2017,2016,2015,2014 Minor in Physics (2021,2020,2019,2018 2017,2016,2015,2014	,	
PHYS4653	Cosmology	6	Pass in PHYS3651 or PHYS3652	N	Y			 Dr K M Lee, Physics	Major in Astronomy (2017,2016,2015,2014; Major in Mathematics/Physics (2017,2016,2015,2014; Major in Physics (2017,2016,2015,2014; Major in Physics (2021,2020,2019,2018,2017,2016,2015,2014) Major in Physics (Intensive) (2021,2020,2019,2018,2017,2016); Minor in Astronomy (2021,2020,2019,2018,2017,2016,2015,2014) Minor in Physics (2021,2020,2019,2018,2017,2016,2015,2014,2017,2016,2015,2014,2017,2016,2015,2014,2017,2016,2015,2014,2017,2016,2015,2014		
PHYS4654	General relativity	6	Pass in PHYS2055 and PHYS3350	Y	Y	1	Dec	 Dr K M Lee, Physics	Major in Astronomy (2017, 2016, 2015, 2014; Major in Mathematics/Physics (2017, 2016, 2015, 2014; Major in Physics (2017, 2016, 2015, 2014; Major in Physics (2021, 2020, 2019, 2018, 2017, 2016, 2015, 2014 Major in Physics (Intensive) (2021, 2020, 2019, 2018, 2017, 2016); Minor in Astronomy (2021, 2020, 2019, 2018, 2017, 2016, 2015, 2014 Minor in Physics (2021, 2020, 2019, 2018, 2017, 2016, 2015, 2014 Minor, in Physics (2021, 2020, 2019, 2018, 2017, 2016, 2015, 2014, 2017, 2016, 2015, 2014)		
PHYS4655	Interstellar medium	6	Pass in PHYS3651 or PHYS3653 or (PHYS3351 and PHY3550)	N	Y			 Dr M H Lee, Earth Sciences	Major in Astronomy (2017, 2016, 2015, 2014; Major in Mathematics/Physics (2017, 2016, 2015, 2014; Major in Physics (2017, 2016, 2015, 2014; Major in Physics (2021, 2020, 2019, 2018, 2017, 2016, 2015, 2014 Major in Physics (Intensive) (2021, 2020, 2019, 2018, 2017, 2016); Minor in Astronomy (2021, 2020, 2019, 2014, 2017, 2016, 2015, 2014 Minor in Physics (2021, 2020, 2019, 2018, 2017, 2016, 2015, 2014, 2017, 2016, 2015, 2014, 2017, 2016, 2015, 2014		
PHYS4656	Advanced astrophysics	6	Pass in PHYS3651 or PHYS3653 or (PHYS3351 and PHYS3450)	Y	Y	2	Мау	 Dr S C Y Ng, Physics	Major in Astronomy (2017,2016,2015); Major in Mathematics/Physics (2017,2016,2015); Major in Physics		

									(2021,2020,2019,2018, 2017,2016,2015); Major in Physics (Intensive) (2021,2020,2019,2018, 2017,2016); Minor in Astronomy (2021,2020,2019,2018, 2017,2016,2015); Minor in Physics (2021,2020,2019,2018, 2017,2016,2015)
PHYS4750	Experimental physics	6	TBC	N	N			 TBC, Physics	Major in Astronomy (2017,2016,2015,2014) ; Major in in Mathematics/Physics (2017,2016,2015,2014) ; Major in Physics (2017,2016,2015,2014) ; Minor in Physics (2017,2016,2015,2014)
PHYS4850	Particle physics	6	Pass in PHYS3351	N	Y			 Dr Y J Tu, Physics	Major in Astronomy (2017,2016,2015,2014) ; Major in Mathematics/Physics (2017,2016,2015,2014) ; Major in Physics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Physics (Intensive) (2021,2020,2019,2018, 2017,2016); Minor in Physics (2021,2020,2019,2018, 2017,2016); Minor in Physics (2021,2020,2019,2018, 2017,2016,2015,2014)
PHYS4966	Physics internship	6	Pass in at least 24 credits of advanced level (3XXX level or above) disciplinary core/elective courses of the Physics Major, Physics (Intensive) Major, Mathematics/Physics Major or Astronomy Major curriculum. This capstone course is for Astronomy, Mathematics/Physics, Physics, and Physics (Intensive) Majors students only. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	S	No exam	 Dr F C C Ling, Physics	Minor in Physics (2017,2016,2015,2014)  Major in Astronomy (2017,2016,2015,201)  Major in Mathematics/Physics (2017,2016,2015,201)  Major in Physics (2021,2020,2019,201) 2017,2016,2015,201 Major in Physics (Intensive) (2021,2020,2019,201) (2021,2020,2019,201) (2021,2020,2019,201)
PHYS4999	Physics project	12	Pass in at least 24 credits of advanced level (3XXX level or above) disciplinary core/elective courses of the Physics Major, Physics (Intensive) Major, Mathematics/Physics Major or Astronomy Major curriculum. This capstone course is for Astronomy, Mathematics/Physics, Physics, and Physics (Intensive) Majors students only.  The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	0	No exam	 Dr F C C Ling, Physics	Minor in Physics (2017,2016,2015,2014)  Major in Astronomy (2017,2016,2015,201) ; Major in Mathematics/Physics (2017,2016,2015,201) ; Major in Physics (2021,2020,2019,201) 2017,2016,2015,201 Major in Physics (Intensive) (2021,2020,2019,201) 2017,2016)
PHYS7350	Graduate classical mechanics	6	Pass in PHYS4350	N	N			 TBC, Physics	Major in Astronomy (2017,2016,2015,2014) ; Major in Mathematics/Physics

										, Ma (200 201 Maj (Inte (200 201 Phy (200	17,2016,2015,2014) ajor in Physics 21,2020,2019,2018, 17,2016,2015,2014); jor in Physics ensive) 21,2020,2019,2018, 17,2016); Minor in ysics 21,2020,2019,2018, 17,2016,2015,2014)	
PHYS7351	Graduate quantum mechanics	6	Pass in PHYS3150 and PHYS4351	Y	Y	1	Dec		Prof S Q Shen, Physics	(20° ; Me Mat (20° ; Me (202 201 Maj (Inte (200 201 Phy (200	jor in Astronomy 17,2016,2015,2014) ajor in thematics/Physics 17,2016,2015,2014) ajor in Physics 21,2020,2019,2018, 17,2016,2015,2014); jor in Physics ensive) 21,2020,2019,2018, 17,2016); Minor in ysics 21,2020,2019,2018,	
PHYS7450	Graduate electromagnetism	6	Pass in PHYS3150 and PHYS4450	N	Y				Prof Z D Wang, Physics	(20°; Ma Mat (20°; Me (200; 201) Maj (Inte (200; 201) Phy (200; 201)	jor in Astronomy 17,2016,2015,2014) ajor in thematics/Physics 17,2016,2015,2014) ajor in Physics 17,2016,2019,2018, 17,2016,2015,2014); jor in Physics ensive) 21,2020,2019,2018, 17,2016); Minor in //sics 21,2020,2019,2018, 17,2016,2015,2014)	
PHYS7550	Graduate statistical mechanics	6	Pass in (PHYS3550 and PHYS4351) or PHYS4550	Y	Y	2	May		Dr G Chen, Physics	(20° ; Me Mat (20° ; Me (20; 201 Maj (Inte (20; 201 Phy (20;	jor in Astronomy 17,2016,2015,2014) ajor in thematics/Physics 17,2016,2015,2014) ajor in Physics 17,2016,2019,2018, 17,2016,2015,2014); jor in Physics ensive) 21,2020,2019,2018, 17,2016); Minor in ysics 21,2020,2019,2018,	
PHYS7551  PHYS7650	Graduate solid state physics  Stellar atmospheres	6	Pass in PHYS3551 and PHYS4351 TBC	N	N				Prof J Wang, Physics TBC, Physics	(20° ; Me Mat (20° ; Me (20° ; Mi (20°	jor in Astronomy 17,2016,2015,2014) ajor in thematics/Physics 17,2016,2015,2014) ajor in Physics 17,2016,2015,2014) inor in Physics 17,2016,2015,2014) jor in Astronomy	
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											(2017,2016,2015,2014); Major in Mathematics/Physics (2017,2016,2015,2014); Major in Physics (2017,2016,2015,2014); Minor in Astronomy (2017,2016,2015,2014); Minor in Physics (2017,2016,2015,2014)	
PHYS7750	Nanophysics	6	Pass in PHYS3551 and PHYS4351	N	Y				Dr D K Ki, Physics		Major in Astronomy (2017,2016,2015,2014); Major in Mathematics/Physics (2017,2016,2015,2014); Major in Physics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Physics (Intensive) (2021,2020,2019,2018, 2017,2016); Minor in Physics (2021,2020,2019,2018, 2017,2016); Minor in Physics (2021,2020,2019,2018, 2017,2016,2015,2014)	
ENVS3006	Environmental radiation	6	Pass in CHEM2041 or ENVS2001 or ENVS2002 or PHYS2265	N	N				Dr J K C Leung, Physics		Major in Environmental Science (2014); Minor in Environmental Science (2017,2016,2015,2014)	
ENVS3010	Sustainable energy and environment	6	Pass in CHEM2041 or ENVS2001 or ENVS2002 or PHYS2260	Y	Y	2	May		Prof A B Djurisic, Physics		Major in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014)	
Faculty of Sc	ience		•	!		1	1					
ENTR2001	Professional and leadership development	6	Any level 1 undergraduate course	Y	Y	1	No exam	24	Dr R Law, Faculty	Minor in Science Entrepreneurship (2021,2020,2019,2018, 2017,2016)		
ENTR3001	Science-based innovation development	6	Pass in IIMT1611 and ENTR2001, or already enrolled in these courses	Y	Y	2	No exam	24	Dr M Kotaka, Biomedical Sciences	Minor in Science Entrepreneurship (2021,2020,2019,2018, 2017,2016)		
ENTR3002	Customer analysis and strategic marketing	6	Pass in IIMT1611 and ENTR2001, or already enrolled in these courses	Y	Y	2	No exam	24	Dr R Law, Faculty	Minor in Science Entrepreneurship (2021,2020,2019,2018, 2017,2016)		
ENTR4966	Entrepreneurship internship	6	Pass in ENTR3001 and ENTR3002 Students must be in their Year 3 study or beyond, as well as minoring in Science Entrepreneurship.	Y	Y	S	No exam	24	Dr R Law, Faculty	Minor in Science Entrepreneurship (2021,2020,2019,2018, 2017,2016)		
ENTR4999	Entrepreneurship project	6	Pass in ENTR3001 and ENTR3002 Students must be in their Year 3 study or beyond, as well as minoring in Science Entrepreneurship.	Y	Y	1	No exam	24	Dr R Law, Faculty	Minor in Science Entrepreneurship (2021,2020,2019,2018, 2017,2016)		
SCNC1111	Scientific method and reasoning	6	NIL (This course is compulsory for all students taking a Science major offered by the Faculty of Science, except those	Y	Y	1, 2	Dec, May		Dr R K W Lui, Faculty	Major in Astronomy (2017,2016,2015,2014) ; Major in Biochemistry (2021,2020,2019,2018,		

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	who are eligible for exemption. Students			2017,2016,2015,2014);		
	should take this course in their first			Major in Biological		
	year.)			Sciences		
				(2021 2020 2019 2018		
				(2021,2020,2019,2018, 2017,2016,2015,2014);		
				Major in Biological		
				Sciences (Intensive)		
				(2021,2020,2019,2018,		
				(2021,2020,2019,2016,		
				2017); Major in		
				Chemistry		
				(2021,2020,2019,2018,		
				2017,2016,2015,2014);		
				Major in Chemistry		
				(Intensive)		
				(2021,2020,2019,2018,		
				2017,2016,2015);		
				Major in Decision		
				Analytics		
				(2021,2020,2019,2018,		
				2017,2016,2015,2014);		
				Major in Earth System		
				Science		
				(2021,2020,2019,2018,		
				2017,2016,2015,2014);		
				Major in Ecology &		
				Biodiversity		
				(2021,2020,2019,2018,		
				2017,2016,2015,2014);		
				Mojor in Foology 8		
				Major in Ecology &		
				Biodiversity (Intensive)		
				(2021,2020,2019,2018,		
				2017,2016,2015);		
				Major in Environmental		
				Science		
				(2021,2020,2019,2018,		
				2017,2016,2015,2014);		
				Major in Food &		
				Nutritional Science		
				(2021,2020,2019,2018,		
				2017,2016,2015,2014);		
				Major in Geology		
				(2021,2020,2019,2018,		
				2017,2016,2015,2014);		
				Major in Geology		
				(Intensive)		
				(2021,2020,2019,2018,		
			I	2017,2016,2015);		
				Major in Mathematics		
				(2021,2020,2019,2018,		
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				2017,2016,2015,2014); Major in Mathematics		
				(Intensive)		
				(intensive) (2021,2020,2019,2018,		
			I	(2021,2020,2019,2018,		
				2017,2016); Major in		
				Mathematics/Physics		
			I	(2017,2016,2015,2014)		
			I	; Major in Molecular		
			I	Biology &		
			I	Biotechnology		
				(2021,2020,2019,2018,		
			I	2017,2016,2015,2014);		
			I	Major in Molecular		
				Biology &		
			I	Biotechnology		
			I	(Intensive)		
				(2021,2020,2019,2018,		
			I	2017,2016,2015);		
			I	Major in Physics		
				(2021,2020,2019,2018,		
			I	(2021,2020,2010,2010,		
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									2017,2016,2015,2014); Major in Physics (Intensive) (2021,2020,2019,2018, 2017,2016); Major in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014)		
SCNC1112	Fundamentals of modern science	6	NIL (This course is compulsory for all students taking a Science major offered by the Faculty of Science, except those who are eligible for exemption. Students should take this course in their first year.)	Y	Y	1, 2	Dec, May	Dr J C S Pun, Physics	Major in Astronomy (2017,2016,2015,2014); Major in Biochemistry (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Biological Sciences (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Biological Sciences (Intensive) (2021,2020,2019,2018, 2017); Major in Biological Sciences (Intensive) (2021,2020,2019,2018, 2017); Major in Chemistry (1021,2020,2019,2018, 2017,2016,2015,2014); Major in Chemistry (1021,2020,2019,2018, 2017,2016,2015); Major in Decision Analytics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Earth System Science (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Ecology & Biodiversity (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Ecology & Biodiversity (Intensive) (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Environmental Science (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Geology (1016,2015,2014); Major in Mathematics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Mathematics (1015,2014); Major in Mathematics (1021,2020,2019,2018,2017,2016,2015,2014); Major in Mathematics (10211,2020,2019,2018,2017,2016,2015,2014); Major in Mathematics (10211,2020,2019,2018,2017,2016,2015,2014); Major in Mathematics		

										2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014); Major in Molecular Biology & Biotechnology (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Molecular Biology & Biotechnology (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Major in Physics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Physics (Intensive) (2021,2020,2019,2018, 2017,2016); Major in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014)		
SCNC1113	The big history of our planet: a scientific perspective on everything that has ever happened	6	Level 3 or above in at least one science subject at the pre-university level (HKDSE Physics, Chemistry, Biology, Combined/Integrated Science or equivalent) This course is not offered to students in the 6901 BSc or 6119 BEd&BSc programmes.	N	Y			50	Dr W M Y Cheung, Faculty			
SCNC2121	Sustainable food production	6	Students are expected to have passed at least 30 credits of level 1 and/or level 2 science courses. Students will also need to pass an interview in order to be enrolled in the course.	N	Y			32	Dr H S El-Nezami, Biological Sciences			
SCNC2122	Marine life science: a North East Pacific perspective	6	Students are expected to have passed at least 30 credits of level 1 and/or level 2 science courses. Students will also need to pass an interview in order to be enrolled in the course.	N	Y			32	Dr T Vengatesen, Biological Sciences			
SCNC3111	Frontiers of science honours seminar course	6	Pass in a level 2 science course. The course is for Science students only . Students who participated or will participate in ORF/SRF must take this course.	Y	Y	1	No exam	120	Dr R K W Lui, Faculty			
Department of	of Statistics & Actuarial Science											
APAI1001	Artificial intelligence: foundation, philosophy and ethics	6	For BASc(AppliedAI) students only.	Y	Y	1	Dec	20	Dr Y Wang, Mathematics	Bachelor of Arts and Sciences in Applied Artificial Intelligence (2021,2020,2019)		
APAI3001	Deep learning	6	TBC	N	N			-	TBC			
APAI3010	Image processing and computer vision	6	Pass in STAT2602 and (COMP2113 or COMP2119 or COMP2396). For BASc(AppliedAI) students only.	Y	Y	2	May	30	Dr Y Cao, Statistics & Actuarial Science		Bachelor of Arts and Sciences in Applied Artificial Intelligence (2021,2020,2019)	
APAI3021	Modern biostatistics	6	Pass in STAT2602 For BASc(AppliedAI) students only.	N	Y			30	Dr J F Xu, Statistics & Actuarial Science		Bachelor of Arts and Sciences in Applied Artificial Intelligence (2021,2020,2019)	

APAI3799	Directed studies in Applied Al	6	Pass in at least 24 credits of advanced level disciplinary core/elective courses in BASc(AppliedAI) programme; and Not for students who have already enrolled in APAI4798 in this academic year. This capstone course is only for BASc (AppliedAI) students; and subject to the consent of the course coordinator. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	1, 2	No exam	50	Prof T W Ng, Mathematics		Bachelor of Arts and Sciences in Applied Artificial Intelligence (2021,2020,2019)
APAI4011	Natural language processing	6	Pass in STAT2602 and (COMP2113 or COMP2119 or COMP2396). Recommended: familiarity with deep learning or machine learning; strong programming skills (e.g., Python) For BASc(AppliedAl) students only.	Y	Y	2	May	30	Dr L Yu, Statistics & Actuarial Science	Bachelor of Arts and Sciences in Applied Artificial Intelligence (2021,2020,2019)	
APAI4012	High-performance computing	6	TBC For BASc(AppliedAI) students only.	N	Y				ТВС	Bachelor of Arts and Sciences in Applied Artificial Intelligence (2021,2020,2019)	
APAI4022	Omics data analysis	6	Pass in STAT2602, and pass or already enrolled in STAT3612 Knowledge in basic molecular biology/biochemistry/bioinformatics, undergraduate level statistics knowledge and programming skills are needed. For BASc(AppliedAI) students only.	N	N			30	Dr D Y Zhang, Statistics & Actuarial Science	Bachelor of Arts and Sciences in Applied Artificial Intelligence (2021,2020,2019)	
APAI4023	Medical image analysis	6	TBC For BASc(AppliedAl) students only.	N	N				ТВС	Bachelor of Arts and Sciences in Applied Artificial Intelligence (2021,2020,2019)	
APAI4099	Special topics of applied Al	6	TBC For BASc(AppliedAI) students only.	N	N				TBC, Statistics & Actuarial Science	Bachelor of Arts and Sciences in Applied Artificial Intelligence (2021,2021,2021,2021, 2021,2020,2020,2020	
APAI4766	Applied Al internship	6	Pass in at least 24 credits of advanced level disciplinary core/elective courses in student's selected concentration in BASc(AppliedAI) programme including COMP3340, MATH3904 and STAT3612. This internship course is only for BASc (AppliedAI) students. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	1, 2, S	No exam		Dr A S M Lau, Statistics & Actuarial Science		Bachelor of Arts and Sciences in Applied Artificial Intelligence (2021,2020,2019)
APAI4798	Applied AI project	12	Pass in at least 24 credits of advanced level disciplinary core/elective courses in BASc(AppliedAI) programme; and This is a selective course. Student are expected to have a CGPA higher than 3.0 and their enrollment is subject to the approval of the course coordinator. Not for students who have already enrolled in APAI3799 in this academic year.  This capstone course is only for BASc (AppliedAI) students; The earliest that a student is allowed to	Y	Y	0	No exam	50	Prof T W Ng, Mathematics		Bachelor of Arts and Sciences in Applied Artificial Intelligence (2021,2020,2019)

			take this capstone course is their year 3 study.									
STAT1005	Essential skills for undergraduates: foundations of data science	6	Not for students who have passed or already enrolled in any of the following courses: COMP2501, STAT1015; and Not for Year 2 or above BSc(ActuarSc) and BEng(CompSc) students; and Not for Year 2 or above students majoring in Computer Science/Decision Analytics/Risk Management/Statistics; and Not for Year 4 or above students from any curriculum.	Y	Y	1	No exam	210	Dr A S M Lau, Statistics & Actuarial Science			
STAT1015	Introduction to data science	6	Not for students who have passed in STAT1005, or already enrolled in this course; and This course is exclusive for BASc (AppliedAl) and BASc(FinTech) students.	N	N			40	Prof J J F Yao, Statistics & Actuarial Science			
STAT1600	Statistics: ideas and concepts	6	Not for students who have passed in any of the following courses: STAT1602, STAT1603, STAT3902.	Y	Y	1, 2	Dec, May		Dr C W Kwan, Statistics & Actuarial Science	Major in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014)		
STAT1601	Elementary statistical methods	6	Level 2 or above in HKDSE Mathematics or equivalent; and Not for students with Level 2 or above in HKDSE Mathematics Extended Module 1 or 2; and Not for students who have passed or already enrolled in any of the following courses: STAT2901, STAT1602, STAT2601, STAT1603, ECON1280	N	N				TBC, Statistics & Actuarial Science		Major in Chemistry (Intensive) (2021,2020,2019,2018, 2017,2016,2015); Major in Environmental Science (2017,2016,2015,2014); Minor in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT1602	Business statistics	6	Not for students who have passed or already enrolled in any of the following courses: STAT1601, STAT2601, STAT1603, STAT2901 or ECON1280 (This course is available to students pursuing a major/minor in Business only).	Y	N	1, 2	Dec, May		Dr J T Y Wong, Statistics & Actuarial Science		Minor in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT1603	Introductory statistics	6	(Level 2 or above in HKDSE Mathematics Extended Module 1 or 2 or equivalent) or (Pass or already enrolled in any of these courses: MATH1009, MATH1011, MATH1013, MATH1851, MATH1853); and Not for students who have passed or already enrolled in any of these courses: STAT1601, STAT1602, STAT2601, STAT2901	Y	N	1, 2	Dec, May		Dr E K F Lam, Statistics & Actuarial Science		Major in Chemistry (Intensive) (1021,2020,2019,2018, 2017,2016,2015); Major in Environmental Science (2017,2016,2015,2014); Major in Physics (Intensive) (2021,2020,2019,2018, 2017,2016); Minor in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT2601	Probability and statistics I	6	Pass or already enrolled in MATH2014	Υ	Υ	1, 2	Dec, May		Dr K P Wat, Statistics	Bachelor of Arts and	Minor in Actuarial	

			or (MATH2101 and MATH2211); and Not for students who have passed in STAT1603, STAT2901 or already enrolled in these courses; and Not for BSc(ActuarSc) students.					& Actuarial Science	Sciences in Applied Artificial Intelligence (2021,2020,2019); Major in Decision Analytics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Statistics (2021,2020,2019,2018, 2021,2020,2019,2018, 2021,2020,2019,2018,	Studies (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT2602	Probability and statistics II	6	Pass in STAT2601; and Not for students who have passed in STAT3902, or already enrolled in this course.	Y	Y	1, 2	Dec, May	 Dr J Xu, Statistics & Actuarial Science	Bachelor of Arts and Sciences in Applied Artificial Intelligence (2021,2020,2019); Major in Decision Analytics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014)	Minor in Actuarial Studies (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT2603	Data management with SAS	6	Pass in STAT1600 or MATH1821, or already enrolled in this course	N	N			 Dr G C S Lui, Statistics & Actuarial Science		Minor in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT2604	Introduction to R programming and elementary data analysis	6	Pass or already enrolled in STAT1600 or MATH1821.	Y	Y	1	No exam	 Dr Z Liu, Statistics & Actuarial Science		Minor in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT2605	Demographic and socio-economic statistics	6	(Level 2 or above in HKDSE Mathematics or Level 2 or above in HKDSE Mathematics Extended Module 1 or 2 or equivalent); and Pass or already enrolled in BIOL2102, ECON1280, STAT1601, STAT1602, STAT2601, STAT1603, STAT2901	N	N			 Ms L M S Kwan, Statistics & Actuarial Science		Minor in Actuarial Studies (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT2901	Probability and statistics: foundations of actuarial science	6	Pass in MATH1821 [for BSc(ActuarSc) students] or already enrolled in this course, or Pass in MATH1013 or already enrolled in this course [for students outside the BSc(ActuarSc) programme]; and Not for students who have passed or enrolled in any of these courses: STAT1601, STAT1602, STAT1603, STAT2601	Y	Y	2	May	 Prof S M S Lee, Statistics & Actuarial Science	BSc in Actuarial Science (2021,2020,2019,2018, 2017,2016,2015,2014)	Minor in Actuarial Studies (2020,2019,2018,2017, 2016,2015,2014)	
STAT2902	Financial mathematics	6	Pass in STAT2901, or already enrolled in this course; and Not for students who have passed in STAT3615, or already enrolled in this course.	Y	Y	2	May	 Prof K C Yuen, Statistics & Actuarial Science	BSc in Actuarial Science (2021,2020,2019,2018, 2017,2016,2015,2014)		

STAT3010	Image processing and computer vision	6	Pass in STAT2602 and (COMP2113 or COMP2119 or COMP2396).	Υ	Υ	2	May	15	Dr Y Cao, Statistics & Actuarial Science			
STAT3021	Modern biostatistics	6	Pass in STAT2602	N	Υ			15	Dr J Xu, Statistics & Actuarial Science			
STAT3600	Linear statistical analysis	6	Pass in STAT2602; and Not for students who have passed in STAT3907, or have already enrolled in this course.	Y	Y	1, 2	Dec, May		Prof T W K Fung, Statistics & Actuarial Science	Major in Decision Analytics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014)	Bachelor of Arts and Sciences in Applied Artificial Intelligence (2021,2020,2019); Minor in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT3602	Statistical inference	6	Pass in STAT2602 or STAT3902	Y	Y	1	Dec		Prof S M S Lee, Statistics & Actuarial Science		BSc in Actuarial Science (2017,2016,2015,2014); Major in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT3603	Stochastic processes	6	Pass in STAT2601; and Not for students who have passed in MATH3603, or have already enrolled in this course; and Not for students who have passed in STAT3903, or have already enrolled in this course.	Y	Y	1	Dec		Prof J J F Yao, Statistics & Actuarial Science	Major in Statistics (2015,2014)	Major in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Statistics (2021,2020,2019,2018, 2017,2016); Minor in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT3604	Design and analysis of experiments	6	Pass in STAT2602 or STAT3611 or STAT3902	Z	N			23	Dr D Y Zhang, Statistics & Actuarial Science		Major in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT3605	Quality control and management	6	Pass in BIOL2102 or (ECON1280 and any University level 2 course) or (STAT1601 and any University level 2 course) or (STAT1602 and any University level 2 course) or STAT2602 or (STAT1603 and any University level 2 course) or STAT2602 or (STAT1603 and any University level 2 course) or STAT3902	N	N				TBC, Statistics & Actuarial Science		Major in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT3606	Business logistics	6	Pass in BIOL2102 or (ECON1280 and any University level 2 course) or (STAT1601 and any University level 2 course) or (STAT1602 and any University level 2 course) or STAT2601 or (STAT1603 and any University level 2 course) or STAT2901; and Not for students who have passed MATH3901, or have already enrolled in this course.	Y	Y	1	Dec		Dr O T K Choi, Statistics & Actuarial Science		Major in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT3607	Statistics in clinical medicine and biomedical research	6	Pass in STAT2602 or STAT3902	N	N				Prof G Yin, Statistics & Actuarial Science		Major in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT3608	Statistical genetics	6	Pass in STAT2602 or STAT3902	N	N			23	Prof T W K Fung,		Major in Statistics	

									Statistics & Actuarial Science		(2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT3609	The statistics of investment risk	6	Pass in STAT2602, or already enrolled in this course, or Pass in (STAT1603 and any University level 2 course); and Not for students who have passed in FINA2320, or have already enrolled in this course; and Not for BSc(Actuarial Science) students	Y	Y	1	Dec		Dr K P Wat, Statistics & Actuarial Science	Major in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014)	Minor in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT3610	Risk management and insurance	6	Pass in BIOL2102 or (ECON1280 and any University level 2 course) or (STAT1601 and any University level 2 course) or (STAT1602 and any University level 2 course) or STAT2601 or (STAT1603 and any University level 2 course) or STAT2901. (Not available to Actuarial Science students)	N	N				Dr R W L Wong, Statistics & Actuarial Science		Major in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT3611	Computer-aided data analysis	6	Pass in BIOL2102 or (ECON1280 and any University level 2 course) or (STAT1601 and any University level 2 course) or (STAT1602 and any University level 2 course) or (STAT1603 and any University level 2 course); and Not for students who have passed in or have already enrolled in any of these courses: STAT2601, STAT2901, STAT3616	N	N				Dr E K F Lam, Statistics & Actuarial Science		Major in Environmental Science (2017, 2016, 2015, 2014) ; Minor in Risk Management (2021, 2020, 2019, 2018, 2017, 2016, 2015, 2014); Minor in Statistics (2021, 2020, 2019, 2018, 2017, 2016, 2015, 2014)	
STAT3612	Statistical machine learning	6	Pass in STAT2602 or (STAT1603 and any University level 2 course) or STAT3902; and Pass in STAT3600 or STAT3907, or already enrolled in these courses; and Not for students who have passed in STAT4904, or already enrolled in this course; and Not for BSc(Actuarial Science) students.  BSc(Actuarial Science) students are advised to take STAT4904 Statistical learning for risk modelling instead.	Y	Y	1	No exam	-	Dr C Wang, Statistics & Actuarial Science	Bachelor of Arts and Sciences in Applied Artificial Intelligence (2021,2020,2019); Major in Decision Analytics (2021,2020,2019,2018, 2017,2016,2015,2014)	BSc in Actuarial Science (2017,2016,2015,2014); Major in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT3613	Marketing analytics	6	Pass in BIOL2102 or (ECON1280 and any University level 2 course) or (STAT1601 and any University level 2 course) or (STAT1602 and any University level 2 course) or STAT2601 or (STAT1603 and any University level 2 course) or STAT2901	Y	Y	1	Dec	50	Dr C W Kwan, Statistics & Actuarial Science		Bachelor of Arts and Sciences in Applied Artificial Intelligence (2021,2020,2019); Major in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT3614	Business forecasting	6	Pass in BIOL2102 or (ECON1280 and any University level 2 course) or (STAT1601 and any University level 2 course) or (STAT1602 and any University level 2 course) or (STAT1603 and any University level 2 course); and	N	N				Dr R W L Wong, Statistics & Actuarial Science		Minor in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Statistics (2021,2020,2019,2018,	

			Not for students who have passed or already enrolled in any of these courses: STAT2601, STAT2901, STAT3907, STAT4601, ECON2280.								2017,2016,2015,2014)	
STAT3615	Practical mathematics for investment	6	Pass in (STAT1601 and any University level 2 course) or (STAT1602 and any University level 2 course) or STAT2601 or (STAT1603 and any University level 2 course) or STAT2901; and Not for students who have passed in STAT2902, or have already enrolled in this course.	Y	Y	2	May		Prof K C Yuen, Statistics & Actuarial Science	Major in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014)	Minor in Actuarial Studies (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT3616	Advanced SAS programming	6	Pass in STAT2601 or STAT2901 (Students are strongly recommended to take STAT2603 or STAT2604 prior to taking this course.)	N	N			50	TBC, Statistics & Actuarial Science		BSc in Actuarial Science (2017,2016,2015,2014) ; Major in Decision Analytics (2017,2016,2015,2014) ; Major in Statistics (2017,2016,2015,2014) ; Minor in Statistics (2017,2016,2015,2014)	
STAT3617	Sample survey methods	6	Pass or already enrolled in BIOL2102, or (ECON1280 and any University level 2 course), or (STAT1601 and any University level 2 course), or (STAT1602 and any University level 2 course), or STAT2601, or (STAT1603 and any University level 2 course), or STAT2901.	Y	Y	2	May		Ms O T K Choi, Statistics & Actuarial Science		Major in Food & Nutritional Science (2021,2020,2019); Major in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT3618	Derivatives and risk management	6	Pass in STAT3615; and Not for students who have passed or already enrolled in any of the following courses: FINA2322, STAT3905, STAT3910; and Not for BSc(Actuarial Science) students.	Y	Y	1	Dec		Dr K P Wat, Statistics & Actuarial Science		Major in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT3620	Modern nonparametric statistics	6	Pass in STAT2602 or STAT3902	N	Y				TBC, Statistics & Actuarial Science		Major in Decision Analytics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT3621	Statistical data analysis	6	Pass in STAT3600 or STAT3907 (Students are strongly recommended to take STAT2603 or STAT2604 prior to taking this course.)	Y	Y	2	May	50	Dr J F Xu, Statistics & Actuarial Science		Major in Decision Analytics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT3622	Data visualization	6	Pass in STAT2602 or STAT3902	N	N			50	Prof G Yin, Statistics & Actuarial Science		Bachelor of Arts and Sciences in Applied Artificial Intelligence (2021,2020,2019); Major in Decision Analytics	

											(2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT3655	Survival analysis	6	Pass in STAT3902, or already enrolled in this course; or Pass in STAT3600 or STAT3901; and Not for students who have passed in STAT3955, or already enrolled in this course.	N	Z				Dr J F Xu, Statistics & Actuarial Science		Bachelor of Arts and Sciences in Applied Artificial Intelligence (2021,2020,2019); Major in Decision Analytics (2021,2020,2019,2018, 2017,2016); Major in Risk Management (2021,2020,2019,2018, 2017,2016); Major in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT3799	Directed studies in statistics	6	Pass in at least 24 credits of advanced level disciplinary core/elective courses in the Decision Analytics/Risk Management/Statistics Majors; and Not for students who have already enrolled in STAT4799 in this academic year. This capstone course is only for students majoring in Decision Analytics/Risk Management/Statistics; and subject to the consent of course coordinator. This course is mutually exclusive with STAT4710. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	1, 2	No exam	50	Prof S M S Lee, Statistics & Actuarial Science			Major in Decision Analytics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014)
STAT3901	Life contingencies I	6	(Pass in STAT2602 and STAT3615) or (Pass in STAT2902 and (Pass in STAT3902 or already enrolled in this course)) or (Pass in STAT2602 and STAT2902)	Y	Y	1	Dec		Prof K C Yuen, Statistics & Actuarial Science	BSc in Actuarial Science (2021,2020,2019,2018, 2017,2016,2015,2014)	Minor in Actuarial Studies (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT3902	Statistical models	6	Pass in STAT2901; and Not for students who have passed in STAT2602, or already enrolled in this course; and For BSc(Actuarial Science) students only.	Y	Y	1	Dec		Dr J F Xu, Statistics & Actuarial Science	BSc in Actuarial Science (2021,2020,2019,2018, 2017,2016,2015,2014)		
STAT3903	Stochastic models	6	Pass in STAT2901; and Not for students who have passed in MATH3603, or have already enrolled in this course; and Not for students who have passed in STAT3603, or have already enrolled in this course; and For BSc(Actuarial Science) students only.	Y	Y	2	May		Dr K Zhu, Statistics & Actuarial Science	BSc in Actuarial Science (2021,2020,2019,2018, 2017,2016,2015,2014)		
STAT3904	Corporate finance for actuarial science	6	[(Pass in ACCT1101 and STAT2902) or (Pass in STAT3610 and STAT3615)]; and Not for students who have passed in FINA1310, or have already enrolled in this course.	Y	Y	2	Мау		Dr D Lee, Statistics & Actuarial Science	BSc in Actuarial Science (2021,2020,2019,2018, 2017,2016,2015,2014)	Minor in Actuarial Studies (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT3905	Introduction to financial derivatives	6	Pass in STAT2902; and Not for students who have passed in STAT3618, or have already enrolled in this course; and Not for students who have passed in	Y	Y	1	Dec		Dr K C Cheung, Statistics & Actuarial Science	BSc in Actuarial Science (2021,2020,2019,2018, 2017,2016,2015,2014)		

			FINA2322, or have already enrolled in this course; and For BSc(Actuarial Science) students only.								
STAT3906	Risk theory I	6	Pass in STAT3903, or already enrolled in this course; or Pass in MATH3603 or STAT3603	Y	Y	1	Dec	 Dr K C Cheung, Statistics & Actuarial Science	BSc in Actuarial Science (2021,2020,2019,2018, 2017,2016,2015,2014)	Minor in Actuarial Studies (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT3907	Linear models and forecasting	6	Pass in STAT2602 or STAT3902, or already enrolled in this course; and Not for students who have passed in STAT3600, or have already enrolled in this course; and Not for students who have passed in STAT4601, or have already enrolled in this course; and Not for students who have passed in ECON2280, or have already enrolled in this course; and For BSc(Actuarial Science) students only.	Y	Y	2	May	 Prof G Li, Statistics & Actuarial Science	BSc in Actuarial Science (2021,2020,2019,2018, 2017,2016,2015,2014)		
STAT3908	Credibility theory and loss distributions	6	Pass in STAT2602 or STAT3902 or STAT3906	Y	Y	2	May	 Dr K C Cheung, Statistics & Actuarial Science	BSc in Actuarial Science (2021,2020,2019,2018, 2017,2016,2015,2014)	Minor in Actuarial Studies (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT3909	Life contingencies II	6	Pass in STAT3901, or already enrolled in this course; and For BSc(Actuarial Science) students only.	Y	Y	2	May	 Dr D Lee, Statistics & Actuarial Science	BSc in Actuarial Science (2021,2020,2019,2018, 2017,2016,2015,2014)		
STAT3910	Financial economics I	6	Pass in STAT2602 or STAT3902; and Not for students who have passed in STAT3618, or have already enrolled in this course; and Not for students who have passed in FINA2322, or have already enrolled in this course.	Y	Y	1	Dec	 Prof H L Yang, Statistics & Actuarial Science	BSc in Actuarial Science (2021,2020,2019,2018, 2017,2016,2015,2014)	Minor in Actuarial Studies (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT3911	Financial economics II	6	Pass in MATH3603 or STAT3603 or STAT3903 or STAT3910	Y	Y	2	May	 Prof H L Yang, Statistics & Actuarial Science	BSc in Actuarial Science (2017,2016,2015,2014)	BSc in Actuarial Science (2021,2020,2019,2018) ; Major in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Actuarial Studies (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT3951	Further topics in contingencies	6	Pass in STAT3909; and Pass in STAT3910, or already enrolled in this course; and For BSc(Actuarial Science) students only.	Y	Y	1	Dec	 Dr D Lee, Statistics & Actuarial Science		BSc in Actuarial Science (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT3952	Investment and asset management	6	Pass in STAT3901; and Not for students who have passed in FINA2320, or have already enrolled in this course; and For BSc(Actuarial Science) students only.	N	N			 TBC, Statistics & Actuarial Science			
STAT3953	Fundamentals of actuarial practice	6	Pass in STAT3901.	Y	Y	1	No exam	 Dr A G Benchimol, Statistics & Actuarial Science		BSc in Actuarial Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Actuarial Studies	

											(2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT3954	Current topics in actuarial science	6	Pass in STAT3901, or already enrolled in this course; or Pass in STAT3909, or already enrolled in this course; and For BSc(Actuarial Science) students only.	N	N				TBC, Statistics & Actuarial Science		BSc in Actuarial Science (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT3955	Survival analysis	6	Pass in STAT3902, or already enrolled in this course; or Pass in STAT3600 or STAT3901; Not for students who have passed in STAT3955, or already enrolled in this course.	N	N				Dr J F Xu, Statistics & Actuarial Science		Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019); BSc in Actuarial Science (2019, 2018, 2017, 2016, 2015, 2014); Major in Statistics (2019, 2018, 2017, 2016, 2015, 2014); Minor in Statistics (2019, 2018, 2017, 2016, 2015, 2014)	
STAT3956	Pension funds and pension mathematics	6	Pass in STAT3909; and For BSc(Actuarial Science) students only.	Y	Υ	1	Dec		Prof G Ma, Statistics & Actuarial Science		BSc in Actuarial Science (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT4011	Natural language processing	6	Pass in STAT2602 and (COMP2113 or COMP2119 or COMP2396). Recommended: familiarity with deep learning or machine learning; strong programming skills (e.g., Python)	Y	Υ	2	May	15	Dr L Yu, Statistics & Actuarial Science			
STAT4022	Omics data analysis	6	Pass in STAT2602, and pass or already enrolled in STAT3612 Knowledge in basic molecular biology/biochemistry/bioinformatics, undergraduate level statistics knowledge and programming skills are needed.	N	N			15	Dr D Y Zhang, Statistics & Actuarial Science			
STAT4601	Time-series analysis	6	Pass in STAT3600; and Not for students who have passed in STAT3614, or have already enrolled in this course; and Not for students who have passed in STAT3907, or have already enrolled in this course.	Y	Y	2	May		Prof G Li, Statistics & Actuarial Science	Major in Risk Management (2015,2014); Major in Statistics (2015,2014)	Bachelor of Arts and Sciences in Applied Artificial Intelligence (2021,2020,2019); Major in Decision Analytics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Risk Management (2021,2020,2019,2018, 2017,2016); Major in Statistics (2021,2020,2019,2018, 2017,2016); Minor in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT4602	Multivariate data analysis	6	Pass in STAT3600 or STAT3907	Y	Y	2	May	50	Prof T W K Fung, Statistics & Actuarial Science	Major in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014)	Bachelor of Arts and Sciences in Applied Artificial Intelligence (2021,2020,2019); BSc in Actuarial Science (2017,2016,2015,2014) ; Major in Decision	

STAT4603	Current topics in risk management	6	Pass in (STAT3618 or FINA2322)	Y	Y	1	Dec		Dr O T K Choi,		Analytics (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014) Major in Risk	
									Statistics & Actuarial Science		Management (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT4606	Risk management and Basel Accords in banking and finance	6	Pass in STAT3618 or STAT3910 or STAT3905 or (FINA2322 and any University level 3 course)	N	N				Mr P K Y Pang, Statistics & Actuarial Science		Major in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT4607	Credit risk analysis	6	Pass in STAT3618 or STAT3905 or STAT3910 or (FINA2322 and any University level 3 course)	Y	Y	2	May	1	Dr K P Wat, Statistics & Actuarial Science		BSc in Actuarial Science (2019,2018,2017,2016, 2015,2014); Major in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT4608	Market risk analysis	6	Pass in STAT3907 and STAT3910; or Pass in STAT4601 and (FINA2320 or STAT3609)	Y	Y	2	May		Dr K Zhu, Statistics & Actuarial Science		BSc in Actuarial Science (2019,2018,2017,2016, 2015,2014); Major in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014)	
STAT4609	Big data analytics	6	Pass in STAT3612 or STAT4904	Y	Y	2	No exam	50	Dr M M Y Zhang, Statistics & Actuarial Science	Major in Decision Analytics (2021,2020,2019,2018, 2017,2016,2015,2014)		
STAT4610	Bayesian learning	6	Pass in STAT3600 or STAT3602 or STAT3603 or STAT3902	N	Y				Prof G Yin, Statistics & Actuarial Science		Bachelor of Arts and Sciences in Applied Artificial Intelligence (2021,2020,2019); Major in Decision Analytics (2021,2020,2019,2018, 2017,2016); Major in Statistics (2021,2020,2019,2018, 2017,2016); Minor in Statistics (2021,2020,2019,2018, 2017,2016)	
STAT4710	Capstone experience for statistics undergraduates	6	Students are expected to have satisfactorily completed at least 24 credits of advanced level disciplinary	Y	Y	1, 2	No exam	50	Prof G Yin, Statistics & Actuarial Science			Major in Decision Analytics (2021,2020,2019,2018,

			core/elective courses in the Decision Analytics/Risk Management/Statistics Majors. Students who are interested in taking the course should submit their applications to the Department. This capstone course is only for students majoring in Decision Analytics/Risk Management/Statistics, and is mutually exclusive with STAT3799, STAT4766 and STAT4799. The earliest that a student is allowed to take this capstone course is their year 3 study.								2017,2016,2015,2014); Major in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014)
STAT4711	Capstone experience for actuarial science undergraduates	6	Pass in at least 24 credits of advanced level disciplinary core/elective courses in BSc(Actuarial Science) programme including (Pass in STAT3901, or already enrolled in this course; or Pass in STAT3909, or already enrolled in this course); and This capstone course is only for BSc (Actuarial Science) students, and is mutually exclusive with STAT4767 and STAT4798. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	1, 2	No exam	50	Prof G Yin, Statistics & Actuarial Science		BSc in Actuarial Science (2021,2020,2019,2018, 2017,2016,2015,2014)
STAT4766	Statistics internship	6	Pass in at least 24 credits of advanced level disciplinary core/elective courses in the Decision Analytics/Risk Management/Statistics Majors. This capstone course is only for students majoring in Decision Analytics/Risk Management/Statistics; and is mutually exclusive with STAT4710. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	1, 2, S	No exam		Dr C W Kwan, Statistics & Actuarial Science		Major in Decision Analytics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014)
STAT4767	Actuarial science internship	6	Pass in at least 24 credits of advanced level disciplinary core/elective courses in BSc(Actuarial Science) programme including STAT3901; and This capstone course is only for BSc (Actuarial Science) students; and is mutually exclusive with STAT4711. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	1, 2	No exam		Dr K P Wat, Statistics & Actuarial Science		BSc in Actuarial Science (2021,2020,2019,2018, 2017,2016,2015,2014)
STAT4798	Statistics and actuarial science project	6	Pass in at least 24 credits of advanced level disciplinary core/elective courses in BSc(Actuarial Science) programme including STAT3902 and STAT3907; and Pass or already enrolled in at least one of the following courses: STAT3911, STAT4602, STAT4904; and This capstone course is only for BSc (Actuarial Science) students; and subject to the consent of course coordinator. This course is mutually exclusive with STAT4711. The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	1, 2	No exam	50	Prof S M S Lee, Statistics & Actuarial Science		BSc in Actuarial Science (2021,2020,2019,2018, 2017,2016,2015,2014)

STAT4799	Statistics project	12	Pass in at least 24 credits of advanced level disciplinary core/elective courses in the Decision Analytics/Risk Management/Statistics Majors including STAT3600; and Pass or already enrolled in at least one of the following courses: STAT3612, STAT3911, STAT4601, STAT4602; and Not for students who have already enrolled in STAT3799 in this academic year.  This capstone course is only for students majoring in Decision Analytics/Risk Management/Statistics; and subject to the consent of course coordinator.  This course is mutually exclusive with STAT4710.  The earliest that a student is allowed to take this capstone course is their year 3 study.	Y	Y	0	No exam	50	Prof S M S Lee, Statistics & Actuarial Science				Major in Decision Analytics (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Risk Management (2021,2020,2019,2018, 2017,2016,2015,2014); Major in Statistics (2021,2020,2019,2018, 2017,2016,2015,2014)
STAT4901	Risk theory II	6	Pass in STAT3906	N	N				TBC, Statistics & Actuarial Science		BSc in Actuarial Science (2021,2020,2019,2018, 2017,2016,2015,2014)		
STAT4902	Selected topics in actuarial science	6	Pass in STAT3906	Y	N	2	May		Dr J T Y Wong, Statistics & Actuarial Science		BSc in Actuarial Science (2021,2020,2019,2018, 2017,2016,2015,2014)		
STAT4903	Actuarial techniques for general insurance	6	Pass in STAT3906	Y	Y	1	Dec		Dr A G Benchimol, Statistics & Actuarial Science		BSc in Actuarial Science (2021,2020,2019,2018, 2017,2016,2015,2014); Minor in Actuarial Studies (2021,2020,2019,2018, 2017,2016,2015,2014)		
STAT4904	Statistical learning for risk modelling	6	Pass in STAT3907 or STAT3600; and Not for students who have passed in STAT3612, or already enrolled in this course; and For BSc(Actuarial Science) students only.	Y	Y	2	Мау		Dr C Wang, Statistics & Actuarial Science	BSc in Actuarial Science (2021,2020,2019,2018)	BSc in Actuarial Science (2017,2016,2015,2014)		
STAT7609	Research methods in statistics	6	Pass in STAT3600 or STAT3907	Y	Y	1	Dec		Prof J J F Yao, Statistics & Actuarial Science				
STAT7610	Advanced probability	6	Pass in STAT3603 or STAT3903	Y	Y	1	Dec		Prof H L Yang, Statistics & Actuarial Science				
STAT7611	Computational statistics	6	Pass in STAT3600 or STAT3907	Y	Υ	1	Dec		Prof G Yin, Statistics & Actuarial Science				
STAT7614	Advanced statistical modelling	6	Pass in STAT3600 or STAT3907	Y	Υ	1, 2	Dec, May		Prof G Yin, Statistics & Actuarial Science				
STAT7615	Advanced quantitative risk management and finance	6	Pass in STAT4608	Y	N	2	May		Dr Z Zhang, Statistics & Actuarial Science				
Common Co	re Courses								<del></del>			<del></del>	
CCCH9052	Arts, Science and Artifacts in Chinese Cultural Heritage	6	NIL	Y	Υ	1	No exam	120	Prof Q A Parker, Physics				
CCGL9016	Feeding the World	6	NIL	Υ	Υ	1	No exam	120	Dr G V Akom, Faculty				
CCGL9017	Food: Technology, Trade and Culture	6	NIL	Y	Y	1	Dec	120	Dr M Yasuhara, Biological Sciences				

CCGL9033	Weapons of Mass Destruction: Science, Proliferation and Terrorism	6	NIL	Y	Y	2	No exam	120	Dr K H Lemke, Earth Sciences
CCGL9059	Water in a Changing World	6		Υ	Υ	2	No exam	120	D Dr G V Akom
CCST9012	Our Place in the Universe	6	NIL	Y	Y	2	May	120	Dr T D Wotherspoon, Faculty
CCST9013	Our Living Environment	6	NIL	Y	Y	1	No exam	120	0 Dr S C Chang, Earth Sciences
CCST9014	Science and Music	6	NIL	Υ	Υ	2	No exam	120	0 Dr J C S Pun, Physics
CCST9017	Hidden Order in Daily Life: A Mathematical Perspective	6	NIL	Y	Y	1	No exam	120	0 Prof T W Ng, Mathematics
CCST9018	Origin and Evolution of Life	6	NIL	Y	Y	2	No exam	120	D Dr K H Lemke, Earth Sciences
CCST9019	Understanding Climate Change	6	NIL	Y	Y	2	No exam	120	Dr J Kaplan, Earth Sciences
CCST9021	Hong Kong: Our Marine Heritage	6	NIL	N	N			120	0 Dr G V Akom, Faculty
CCST9022	How the Mass Media Depicts Science, Technology and the Natural World	6	NIL	Y	Y	1	No exam	120	Prof H F Chau, Physics
CCST9023	The Oceans: Science and Society	6	NIL	Y	Y	1	No exam	120	D Dr J A King, Earth Sciences
CCST9026	Scientific Revolutions: Their Continuing Impact on Our World and Society	6	NIL	Y	Y	1	No exam	120	O Prof Q A Parker, Physics
CCST9030	Forensic Science: Unmasking Evidence, Mysteries and Crimes	6	NIL	Υ	Y	1	No exam	120	0 Prof Z X Guo, Chemistry
CCST9037	Mathematics: A Cultural Heritage	6	NIL	Υ	Y	1	No exam	120	0 Dr B R Kane, Mathematics
CCST9038	Science and Science Fiction	6	NIL	Y	Y	2	No exam	120	0 Prof A B Djurisic, Physics
CCST9043	Time's Arrow	6	NIL	Y	Y	2	No exam	120	D Dr Y Li, Earth Sciences
CCST9045	The Science and Lore of Culinary Culture	6	NIL	Υ	Y	2	No exam	120	D Dr A M Y Yuen, Chemistry
CCST9048	Simplifying Complexity	6	NIL	Υ	Y	1	No exam	120	0 Dr T D Wotherspoon, Faculty
CCST9051	What are We Made of - the Fundamental Nature of Matter	6	NIL	Υ	Y	1	No exam	120	Dr J C S Pun, Physics
CCST9054	War, Peace, and the Natural World	6	NIL	Y	Y	S	No exam	120	D Dr D M Baker, Biological Sciences
CCST9056	The Force is with You: How Things Work	6	NIL	Y	Y	1	No exam	120	Dr F C C Ling, Physics
CCST9065	Women in Science	6	NIL	Υ	Y	2	No exam	120	0 Prof A B Djurisic, Physics
CCST9067	Leaving Earth: Our Future in Space	6	NIL	N	N			120	Dr J R Michalski, Earth Sciences
CCST9068	Artificial Intelligence: Utopia or Dystopia?	6	NIL	Y	Y	2	No exam	120	Dr R K W Lui, Faculty

# **Equivalency of HKDSE and**

other qualifications

# SCIENCE

# SECTION V Equivalency of HKDSE and other qualifications

# Table of Equivalence between HKDSE and Other Qualifications

HIZDGE	6.1		Equivalent Q	ualification to	HKDSE	
HKDSE	Grade	IB	GCE	SATII	AP	Gao Kao (高考)
Biology	3 or above	Biology (SL/HL)	Biology (AL)	Biology	Biology	
Chemistry	3 or above	Chemistry (SL/HL)	Chemistry (AL)	Chemistry	Chemistry	
Physics	3 or above	Physics (SL/HL)	Physics (AL)	Physics	Physics B or C	Equivalent to
Mathematics	2 or above	Mathematics (SL)/Mathematical Studies (SL)	Mathematics (AL)	Mathematics Level 1 or 2		HKDSE requirements
Mathematics + (M1 or M2)	2 or above	Mathematics (HL)/Mathematical Studies (HL)	Pure Mathematics (AL) Further Mathematics (AL)		Calculus AB or BC	

Note:

HL: Higher Level SL: Standard Level AL: Advanced Level

#### Remarks:

For science students admitted through non-JUPAS scheme, the equivalent subject qualification(s) to HKDSE, if possessed, can be identified by the SIS for on-line course selection.

For other non-science students admitted through non-JUPAS scheme, they are still required to obtain the approval (written/via email) from the Course Selection Adviser of the course offering department even they have possessed the equivalent HKDSE subject qualification(s) to meet the course prerequisite requirement. Once approval is given, they need to forward it to their home faculties to add the course on-line.

Science Majors 2021-2022

# SCIENCE

# SECTION VI Science Majors on offer in 2021/2022

# Majors offered by Science Faculty

#### **Majors**

Astronomy (only for 2017 cohort or before)

**Biochemistry** 

**Biological Sciences** 

Biological Sciences (Intensive) (for BSc students (2017 cohort and thereafter) only)

Chemistry

Chemistry (Intensive) (for BSc students (2015 cohort and thereafter) only)

Decision Analytics (not for BASc(AppliedAI) students)

Earth System Science

Ecology & Biodiversity

Ecology & Biodiversity (Intensive) (for BSc students (2015 cohort and thereafter) only)

**Environmental Science** 

Food & Nutritional Science

Geology

Geology (Intensive) (for BSc students (2015 cohort and thereafter) only)

Mathematics

Mathematics (Intensive) (for BSc students (2016 cohort and thereafter) only)

Mathematics/Physics (only for 2017 cohort or before)

Molecular Biology & Biotechnology

Molecular Biology & Biotechnology (Intensive) (for BSc students (2015 cohort and thereafter) only)

**Physics** 

Physics (Intensive) (for BSc students (2016 cohort and thereafter) only)

Risk Management

Statistics

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

The 21st century is the golden age for astronomy as space-based telescopes are being used to explore the Universe in all parts of the electromagnetic spectrum, including X-ray, ultraviolet, and infrared. The Major in Astronomy is intended for the students who would like to acquire a solid foundation on the subject. A large selection of elective courses is provided for students to pursue their interested specialization in the subject, including observational astronomy, planetary science, stellar physics, and interstellar medium. Students will attain professional knowledge in astronomy, research experience and the training of analytical thinking and quantitative reasoning during their studies. In addition to preparing students for postgraduate studies as professional astronomers, astronomy training can lead to local careers in museums, weather services, and the education sectors. Beyond Hong Kong, astronomy graduates have challenging careers in aerospace, communications, energy, and computer industries, as well as in astronomical observatories and space research centers.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe astrophysical phenomena with their professional knowledge (by means of coursework and tutorial classes in the curriculum)
- PLO 2: have developed their scientific intuition, abilities and techniques to tackle astrophysical problems either theoretical or observational in nature (by means of coursework, tutorial classes, and frequent opportunities in field activities in the curriculum)
- PLO 3: analyze astrophysical problems qualitatively and quantitatively, and recognize moral and ethical issues related to the discipline (by means of coursework, tutorial classes and research-based projects in the curriculum)
- PLO 4: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)
- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-world setting (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

#### Impermissible Combinations:

Minor in Astronomy

#### Required courses (96 credits)

#### 1. Introductory level courses (48 credits)

# Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

PHYS1250 Fundamental physics (6)
PHYS1650 Nature of the universe (6)
EASC2408 Planetary geology (6)
PHYS2250 Introductory mechanics (6)
PHYS2265 Introductory quantum physics (6)

#### **Disciplinary Electives (6 Credits)**

At least 6 credits selected from the following courses:

PHYS1150 Problem solving in physics (6)

PHYS2055 Introductory relativity (6)

PHYS2150 Methods in physics I (6)

PHYS2155 Methods in physics II (6)

PHYS2160 Introductory computational physics (6)
PHYS2255 Introductory electricity and magnetism (6)

PHYS2260 Heat and waves (6)

#### 2. Advanced level courses (42 credits) Disciplinary Core Courses (18 credits)

PHYS3650 Observational astronomy (6)
PHYS3651 The physical universe (6)
PHYS3652 Principles of astronomy (6)

# Disciplinary Electives (24 credits)

At least 12 credits selected from courses in List A: List A

PHYS4650 Stellar physics (6)

PHYS4651 Selected topics in astrophysics (6) PHYS4652 Planetary science (6)

PHYS4653 Cosmology (6)
PHYS4655 Interstellar medium (6)
PHYS7650 Stellar atmospheres (6)

Plus at least 12 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current course list includes courses in List B and those courses not selected to fulfill the requirements in List A and the capstone requirement.

List B

PHYS3150 Theoretical physics (6)
PHYS3151 Machine learning in physics (6)
PHYS3350 Classical mechanics (6)

	PHYS3351	Quantum mechanics (6)	
	PHYS3450	Electromagnetism (6)	
	PHYS3550	Statistical mechanics & thermodynamics (6)	
	PHYS3551	Introductory solid state physics (6)	
	PHYS3653	Astrophysics (6)	
	PHYS3660	Astronomy laboratory (6)	
	PHYS3750	Laser and spectroscopy (6)	
	PHYS3751	Physics of nanomaterials (6)	
	PHYS3760	Physics laboratory (6)	
	PHYS3850	Physical Optics (6)	[previous title: Waves and optics
			(6) ]
	PHYS3851	Atomic and nuclear physics (6)	
	PHYS4150	Computational physics (6)	
	PHYS4151	Data analysis and modeling in physics (6)	
	PHYS4350	Advanced classical mechanics (6)	
	PHYS4351	Advanced quantum mechanics (6)	
	PHYS4450	Advanced electromagnetism (6)	
	PHYS4550	Advanced statistical mechanics (6)	
	PHYS4551	Solid state physics (6)	
	PHYS4654	General relativity (6)	
	PHYS4656	Advanced astrophysics (6)	
	PHYS4750	Experimental physics (6)	
	PHYS4850	Particle physics (6)	
	PHYS7350	Graduate classical mechanics (6)	
	PHYS7351	Graduate quantum mechanics (6)	
	PHYS7450	Graduate electromagnetism (6)	
	PHYS7550	Graduate statistical mechanics (6)	
	PHYS7551	Graduate solid state physics (6)	
	PHYS7750	Nanophysics (6)	
	3. Capstone requireme		
		cted from the following courses:	
J	PHYS3999	Directed studies in physics (6) Physics internship (6)	
	PHYS4966	,	
J	PHYS4999	Physics project (12)	
1			

#### Notes:

- 1. Students are strongly advised to consult departmental course selection advisors for course and career planning before selecting the courses.
- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 and SCNC1112. Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details
- 6. Students must have level 3 or above in HKDSE Physics or equivalent to take this major. Students who do not fulfill this requirement are advised to take PHYS1240.

#### Remarks:

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

The 21st century is the golden age for astronomy as space-based telescopes are being used to explore the Universe in all parts of the electromagnetic spectrum, including X-ray, ultraviolet, and infrared. The Major in Astronomy is intended for the students who would like to acquire a solid foundation on the subject. A large selection of elective courses is provided for students to pursue their interested specialization in the subject, including observational astronomy, planetary science, stellar physics, and interstellar medium. Students will attain professional knowledge in astronomy, research experience and the training of analytical thinking and quantitative reasoning during their studies. In addition to preparing students for postgraduate studies as professional astronomers, astronomy training can lead to local careers in museums, weather services, and the education sectors. Beyond Hong Kong, astronomy graduates have challenging careers in aerospace, communications, energy, and computer industries, as well as in astronomical observatories and space research centers.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe astrophysical phenomena with their professional knowledge (by means of coursework and tutorial classes in the curriculum)
- PLO 2: have developed their scientific intuition, abilities and techniques to tackle astrophysical problems either theoretical or observational in nature (by means of coursework, tutorial classes, and frequent opportunities in field activities in the curriculum)
- PLO 3: analyze astrophysical problems qualitatively and quantitatively, and recognize moral and ethical issues related to the discipline (by means of coursework, tutorial classes and research-based projects in the curriculum)
- PLO 4: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)
- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-world setting (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

#### Impermissible Combinations:

Minor in Astronomy

#### Required courses (96 credits)

#### 1. Introductory level courses (48 credits)

# Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

PHYS1250 Fundamental physics (6)
PHYS1650 Nature of the universe (6)
EASC2408 Planetary geology (6)
PHYS2250 Introductory mechanics (6)
PHYS2265 Introductory quantum physics (6)

#### **Disciplinary Elective (6 credits)**

At least 6 credits selected from the following courses:

PHYS1150 Problem solving in physics (6)

PHYS2055 Introductory relativity (6)

PHYS2150 Methods in physics I (6)

PHYS2155 Methods in physics II (6)

PHYS2255 Introductory electricity and magnetism (6)

PHYS2260 Heat and waves (6)

#### 2. Advanced level courses (42 credits) Disciplinary Core Courses (18 credits)

PHYS3650 Observational astronomy (6)
PHYS3651 The physical universe (6)
PHYS3652 Principles of astronomy (6)

# Disciplinary Electives (24 credits)

At least 12 credits selected from courses in List A:

List A

PHYS4650 Stellar physics (6)

PHYS4651 Selected topics in astrophysics (6)

PHYS4652 Planetary science (6)
PHYS4653 Cosmology (6)
PHYS4655 Interstellar medium (6)
PHYS7650 Stellar atmospheres (6)

Plus at least 12 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current course list includes courses in List B and those courses not selected to fulfill the requirements in List A and the capstone requirement.

List B

PHYS3150 Theoretical physics (6)
PHYS3151 Machine learning in physics (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)

PHYS3450	Electromagnetism (6)	
PHYS3550	Statistical mechanics & thermodynamics (6)	
PHYS3551	Introductory solid state physics (6)	
PHYS3653	Astrophysics (6)	
PHYS3660	Astronomy laboratory (6)	
PHYS3750	Laser and spectroscopy (6)	
PHYS3751	Physics of nanomaterials (6)	
PHYS3760	Physics laboratory (6)	
PHYS3850	Physical Optics (6)	[previous title: Waves and optics (6)]
PHYS3851	Atomic and nuclear physics (6)	(-7.2
PHYS4150	Computational physics (6)	
PHYS4151	Data analysis and modeling in physics (6)	
PHYS4350	Advanced classical mechanics (6)	
PHYS4351	Advanced quantum mechanics (6)	
PHYS4450	Advanced electromagnetism (6)	
PHYS4550	Advanced statistical mechanics (6)	
PHYS4551	Solid state physics (6)	
PHYS4654	General relativity (6)	
PHYS4656	Advanced astrophysics (6)	
PHYS4750	Experimental physics (6)	
PHYS4850	Particle physics (6)	
PHYS7350	Graduate classical mechanics (6)	
PHYS7351	Graduate quantum mechanics (6)	
PHYS7450	Graduate electromagnetism (6)	
PHYS7550	Graduate statistical mechanics (6)	
PHYS7551	Graduate solid state physics (6)	
PHYS7750	Nanophysics (6)	
3. Capstone requireme	,	
	cted from the following courses:	
PHYS3999	Directed studies in physics (6)	
PHYS4966	Physics internship (6)	
PHYS4999	Physics project (12)	

#### Notes:

- 1. Students are strongly advised to consult departmental course selection advisors for course and career planning before selecting the courses.
- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 and SCNC1112. Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
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- 5. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details
- 6. Students must have level 3 or above in HKDSE Physics or equivalent to take this major. Students who do not fulfill this requirement are advised to take PHYS1240.

#### Remarks:

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

The 21st century is the golden age for astronomy as space-based telescopes are being used to explore the Universe in all parts of the electromagnetic spectrum, including X-ray, ultraviolet, and infrared. The Major in Astronomy is intended for the students who would like to acquire a solid foundation on the subject. A large selection of elective courses is provided for students to pursue their interested specialization in the subject, including observational astronomy, planetary science, stellar physics, and interstellar medium. Students will attain professional knowledge in astronomy, research experience and the training of analytical thinking and quantitative reasoning during their studies. In addition to preparing students for postgraduate studies as professional astronomers, astronomy training can lead to local careers in museums, weather services, and the education sectors. Beyond Hong Kong, astronomy graduates have challenging careers in aerospace, communications, energy, and computer industries, as well as in astronomical observatories and space research centers.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe astrophysical phenomena with their professional knowledge (by means of coursework and tutorial classes in the curriculum)
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- PLO 3: analyze astrophysical problems qualitatively and quantitatively, and recognize moral and ethical issues related to the discipline (by means of coursework, tutorial classes and research-based projects in the curriculum)
- PLO 4: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)
- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-world setting (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

#### Impermissible Combinations:

Minor in Astronomy

#### Required courses (96 credits)

#### 1. Introductory level courses (48 credits)

#### Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

PHYS1250 Fundamental physics (6)
PHYS1650 Nature of the universe (6)
EASC2408 Planetary geology (6)
PHYS2250 Introductory mechanics (6)
PHYS2265 Introductory quantum physics (6)

#### **Disciplinary Electives (6 credits)**

At least 6 credits selected from the following courses:
PHYS1150 Problem solving in physics (6)
PHYS2055 Introductory relativity (6)
PHYS2150 Methods in physics I (6)
PHYS2155 Methods in physics II (6)

PHYS2255 Introductory electricity and magnetism (6)

PHYS2260 Heat and waves (6)

# 2. Advanced level courses (42 credits)

#### **Disciplinary Core Courses (18 credits)**

PHYS3650 Observational astronomy (6) PHYS3651 The physical universe (6) PHYS3652 Principles of astronomy (6)

# Disciplinary Electives (24 credits)

At least 12 credits selected from courses in List A:

List A

PHYS4650 Stellar physics (6)

PHYS4651 Selected topics in astrophysics (6)

PHYS4652 Planetary science (6)
PHYS4653 Cosmology (6)
PHYS4655 Interstellar medium (6)
PHYS7650 Stellar atmospheres (6)

Plus at least 12 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current course list includes courses in List B and those courses not selected to fulfill the requirements in List A and the capstone requirement.

List B

PHYS3150 Theoretical physics (6)
PHYS3151 Machine learning in physics (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)

PHYS3450	Electromagnetism (6)	
PHYS3550	Statistical mechanics & thermodynamics (6)	
PHYS3551	Introductory solid state physics (6)	
PHYS3653	Astrophysics (6)	
PHYS3660	Astronomy laboratory (6)	
PHYS3750	Laser and spectroscopy (6)	
PHYS3751	Physics of nanomaterials (6)	
PHYS3760	Physics laboratory (6)	
PHYS3850	Physical Optics (6)	[previous title: Waves and optics
11110000	, c. ca c p. 100 (0)	(6) ]
PHYS3851	Atomic and nuclear physics (6)	( / /
PHYS4150	Computational physics (6)	
PHYS4151	Data analysis and modeling in physics (6)	
PHYS4350	Advanced classical mechanics (6)	
PHYS4351	Advanced quantum mechanics (6)	
PHYS4450	Advanced electromagnetism (6)	
PHYS4550	Advanced statistical mechanics (6)	
PHYS4551	Solid state physics (6)	
PHYS4654	General relativity (6)	
PHYS4656	Advanced astrophysics (6)	
PHYS4750	Experimental physics (6)	
PHYS4850	Particle physics (6)	
PHYS7350	Graduate classical mechanics (6)	
PHYS7351	Graduate quantum mechanics (6)	
PHYS7450	Graduate electromagnetism (6)	
PHYS7550	Graduate statistical mechanics (6)	
PHYS7551	Graduate solid state physics (6)	
PHYS7750	Nanophysics (6)	
3. Capstone requirement	,	
At least 6 credits selected from the following courses:		
PHYS3999	Directed studies in physics (6)	
PHYS4966	Physics internship (6)	
PHYS4999	Physics project (12)	

#### Notes:

- 1. Students are strongly advised to consult departmental course selection advisors for course and career planning before selecting the courses.
- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 and SCNC1112. Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details
- 6. Students must have level 3 or above in HKDSE Physics or equivalent to take this major. Students who do not fulfill this requirement are advised to take PHYS1240.

#### Remarks:

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

The 21st century is the golden age for astronomy as space-based telescopes are being used to explore the Universe in all parts of the electromagnetic spectrum, including X-ray, ultraviolet, and infrared. The Major in Astronomy is intended for the students who would like to acquire a solid foundation on the subject. A large selection of elective courses is provided for students to pursue their interested specialization in the subject, including observational astronomy, planetary science, stellar physics, and interstellar medium. Students will attain professional knowledge in astronomy, research experience and the training of analytical thinking and quantitative reasoning during their studies. In addition to preparing students for postgraduate studies as professional astronomers, astronomy training can lead to local careers in museums, weather services, and the education sectors. Beyond Hong Kong, astronomy graduates have challenging careers in aerospace, communications, energy, and computer industries, as well as in astronomical observatories and space research centers.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe astrophysical phenomena with their professional knowledge (by means of coursework and tutorial classes in the curriculum)
- PLO 2: have developed their scientific intuition, abilities and techniques to tackle astrophysical problems either theoretical or observational in nature (by means of coursework, tutorial classes, and frequent opportunities in field activities in the curriculum)
- PLO 3: analyze astrophysical problems qualitatively and quantitatively, and recognize moral and ethical issues related to the discipline (by means of coursework, tutorial classes and research-based projects in the curriculum)
- PLO 4: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)
- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-world setting (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

#### Impermissible Combinations:

Minor in Astronomy

### Required courses (96 credits)

#### 1. Introductory level courses (48 credits)

# Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

PHYS1250 Fundamental physics (6)
PHYS1650 Nature of the universe (6)
EASC2408 Planetary geology (6)
PHYS2250 Introductory mechanics (6)

PHYS2255 Introductory electricity and magnetism (6)

PHYS2265 Introductory quantum physics (6)

# 2. Advanced level courses (42 credits)

# **Disciplinary Core Courses (18 credits)**

PHYS3650 Observational astronomy (6)
PHYS3651 The physical universe (6)
PHYS3652 Principles of astronomy (6)

#### **Disciplinary Electives (24 credits)**

At least 12 credits selected from courses in List A:

List A

PHYS4650 Stellar physics (6)

PHYS4651 Selected topics in astrophysics (6)

PHYS4652 Planetary science (6)
PHYS4653 Cosmology (6)
PHYS4655 Interstellar medium (6)
PHYS7650 Stellar atmospheres (6)

Plus at least 12 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current course list includes courses in List B and those courses not selected to fulfill the requirements in List A and the capstone requirement.

List B

PHYS3150 Theoretical physics (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)
PHYS3450 Electromagnetism (6)

PHYS3550 Statistical mechanics & thermodynamics (6)

PHYS3551 Introductory solid state physics (6)
PHYS3750 Laser and spectroscopy (6)
PHYS3751 Physics of nanomaterials (6)

PHYS3850 Physical Optics (6) [previous title: Waves and optics (6)]

PHYS3851 Atomic and nuclear physics (6) PHYS4150 Computational physics (6)

PHYS4151	Data analysis and modeling in physics (6)		
PHYS4350	Advanced classical mechanics (6)		
PHYS4351	Advanced quantum mechanics (6)		
PHYS4450	Advanced electromagnetism (6)		
PHYS4550	Advanced statistical mechanics (6)		
PHYS4551	Solid state physics (6)		
PHYS4654	General relativity (6)		
PHYS4750	Experimental physics (6)		
PHYS4850	Particle physics (6)		
PHYS7350	Graduate classical mechanics (6)		
PHYS7351	Graduate quantum mechanics (6)		
PHYS7450	Graduate electromagnetism (6)		
PHYS7550	Graduate statistical mechanics (6)		
PHYS7551	Graduate solid state physics (6)		
PHYS7750	Nanophysics (6)		
3 Canstone requirement (6 credits)			

#### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:
PHYS3999 Directed studies in physics (6)
PHYS4966 Physics internship (6)
PHYS4999 Physics project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 and SCNC1112. Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 5. Students must have level 3 or above in HKDSE Physics or equivalent to take this major. Students who do not fulfill this requirement are advised to take PHYS1240.

#### Remarks:

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

The 21st century is the golden age for astronomy as space-based telescopes are being used to explore the Universe in all parts of the electromagnetic spectrum, including X-ray, ultraviolet, and infrared. The Major in Astronomy is intended for the students who would like to acquire a solid foundation on the subject. A large selection of elective courses is provided for students to pursue their interested specialization in the subject, including observational astronomy, planetary science, stellar physics, and interstellar medium. Students will attain professional knowledge in astronomy, research experience and the training of analytical thinking and quantitative reasoning during their studies. In addition to preparing students for postgraduate studies as professional astronomers, astronomy training can lead to local careers in museums, weather services, and the education sectors. Beyond Hong Kong, astronomy graduates have challenging careers in aerospace, communications, energy, and computer industries, as well as in astronomical observatories and space research centers.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe astrophysical phenomena with their professional knowledge (by means of coursework and tutorial classes in the curriculum)
- PLO 2: have developed their scientific intuition, abilities and techniques to tackle astrophysical problems either theoretical or observational in nature (by means of coursework, tutorial classes, and frequent opportunities in field activities in the curriculum)
- PLO 3: analyze astrophysical problems qualitatively and quantitatively, and recognize moral and ethical issues related to the discipline (by means of coursework, tutorial classes and research-based projects in the curriculum)
- PLO 4: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)
- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-world setting (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

#### Impermissible Combinations:

Minor in Astronomy

### Required courses (96 credits)

#### 1. Introductory level courses (48 credits)

# Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

PHYS1250 Fundamental physics (6)
PHYS1650 Nature of the universe (6)
EASC2408 Planetary geology (6)
PHYS2250 Introductory mechanics (6)

PHYS2255 Introductory electricity and magnetism (6)

PHYS2265 Introductory quantum physics (6)

#### 2. Advanced level courses (42 credits)

# Disciplinary Core Courses (18 credits)

PHYS3650 Observational astronomy (6)
PHYS3651 The physical universe (6)
PHYS3652 Principles of astronomy (6)

#### **Disciplinary Electives (24 credits)**

At least 12 credits selected from courses in List A:

List A

PHYS4650 Stellar physics (6)

PHYS4651 Selected topics in astrophysics (6)

PHYS4652 Planetary science (6)
PHYS4653 Cosmology (6)
PHYS4655 Interstellar medium (6)
PHYS7650 Stellar atmospheres (6)

Plus at least 12 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current course list includes courses in List B and those courses not selected to fulfill the requirements in List A and the capstone requirement.

List B

PHYS3150 Theoretical physics (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)
PHYS3450 Electromagnetism (6)

PHYS3550 Statistical mechanics & thermodynamics (6)

PHYS3551 Introductory solid state physics (6)
PHYS3750 Laser and spectroscopy (6)
PHYS3751 Physics of nanomaterials (6)

PHYS3850 Physical Optics (6) [previous title: Waves and optics (6) ]

PHYS3851 Atomic and nuclear physics (6)
PHYS4150 Computational physics (6)

PHYS4151	Data analysis and modeling in physics (6)	
PHYS4350	Advanced classical mechanics (6)	
PHYS4351	Advanced quantum mechanics (6)	
PHYS4450	Advanced electromagnetism (6)	
PHYS4550	Advanced statistical mechanics (6)	
PHYS4551	Solid state physics (6)	
PHYS4654	General relativity (6)	
PHYS4750	Experimental physics (6)	
PHYS4850	Particle physics (6)	
PHYS7350	Graduate classical mechanics (6)	
PHYS7351	Graduate quantum mechanics (6)	
PHYS7450	Graduate electromagnetism (6)	
PHYS7550	Graduate statistical mechanics (6)	
PHYS7551	Graduate solid state physics (6)	
PHYS7750	Nanophysics (6)	
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#### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:
PHYS3999 Directed studies in physics (6)
PHYS4966 Physics internship (6)
PHYS4999 Physics project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 and SCNC1112. Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 5. Students must have level 3 or above in HKDSE Physics or equivalent to take this major. Students who do not fulfill this requirement are advised to take PHYS1240.

#### Remarks:

Major Title Major in Astronomy

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

The 21st century is the golden age for astronomy as space-based telescopes are being used to explore the Universe in all parts of the electromagnetic spectrum, including X-ray, ultraviolet, and infrared. The Major in Astronomy is intended for the students who would like to acquire a solid foundation on the subject. A large selection of elective courses is provided for students to pursue their interested specialization in the subject, including observational astronomy, planetary science, stellar physics, and interstellar medium. Students will attain professional knowledge in astronomy, research experience and the training of analytical thinking and quantitative reasoning during their studies. In addition to preparing students for postgraduate studies as professional astronomers, astronomy training can lead to local careers in museums, weather services, and the education sectors. Beyond Hong Kong, astronomy graduates have challenging careers in aerospace, communications, energy, and computer industries, as well as in astronomical observatories and space research centers.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe astrophysical phenomena with their professional knowledge (by means of coursework and tutorial classes in the curriculum)
- PLO 2: have developed their scientific intuition, abilities and techniques to tackle astrophysical problems either theoretical or observational in nature (by means of coursework, tutorial classes, and frequent opportunities in field activities in the curriculum)
- PLO 3: analyze astrophysical problems qualitatively and quantitatively, and recognize moral and ethical issues related to the discipline (by means of coursework, tutorial classes and research-based projects in the curriculum)
- PLO 4: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)
- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-world setting (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

#### Impermissible Combinations:

Minor in Astronomy

## Required courses (96 credits)

### 1. Introductory level courses (48 credits)

# Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

PHYS1250 Fundamental physics (6)
PHYS1650 Nature of the universe (6)
EASC2408 Planetary geology (6)
PHYS2250 Introductory mechanics (6)

PHYS2255 Introductory electricity and magnetism (6)

PHYS2265 Introductory quantum physics (6)

### 2. Advanced level courses (42 credits)

# **Disciplinary Core Courses (18 credits)**

PHYS3650 Observational astronomy (6)
PHYS3651 The physical universe (6)
PHYS3652 Principles of astronomy (6)

### **Disciplinary Electives (24 credits)**

At least 12 credits selected from courses in List A:

List A

PHYS4650 Stellar physics (6)

PHYS4651 Selected topics in astrophysics (6)

PHYS4652 Planetary science (6)
PHYS4653 Cosmology (6)
PHYS4655 Interstellar medium (6)
PHYS7650 Stellar atmospheres (6)

Plus at least 12 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current course list includes courses in List B and those courses not selected to fulfill the requirements in List A and the capstone requirement.

List B

PHYS3150 Theoretical physics (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)
PHYS3450 Electromagnetism (6)

PHYS3550 Statistical mechanics & thermodynamics (6)

PHYS3551 Introductory solid state physics (6)
PHYS3750 Laser and spectroscopy (6)
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PHYS3850 Physical Optics (6) [previous title: Waves and optics (6)]

PHYS3851 Atomic and nuclear physics (6) PHYS4150 Computational physics (6)

PHYS4151	Data analysis and modeling in physics (6)
PHYS4350	Advanced classical mechanics (6)
PHYS4351	Advanced quantum mechanics (6)
PHYS4450	Advanced electromagnetism (6)
PHYS4550	Advanced statistical mechanics (6)
PHYS4551	Solid state physics (6)
PHYS4654	General relativity (6)
PHYS4750	Experimental physics (6)
PHYS4850	Particle physics (6)
PHYS7350	Graduate classical mechanics (6)
PHYS7351	Graduate quantum mechanics (6)
PHYS7450	Graduate electromagnetism (6)
PHYS7550	Graduate statistical mechanics (6)
PHYS7551	Graduate solid state physics (6)
PHYS7750	Nanophysics (6)
3. Capstone requirement (6 credits)	

#### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses: Directed studies in physics (6) PHYS3999 **PHYS4966** Physics internship (6) PHYS4999 Physics project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 and SCNC1112. Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for
- 5. Students must have level 3 or above in HKDSE Physics or equivalent to take this major. Students who do not fulfill this requirement are advised to take PHYS1240.

#### Remarks:

Offered to students 2021

admitted to Year 1 in

#### **Objectives:**

The Major in Biochemistry aims to provide students with both basic and advanced knowledge in contemporary biochemistry and molecular biology. Core courses in the curriculum emphasize equipping students with a general understanding of the fundamental ideas, principles and theories of biochemistry with particular focus on the relevance of biochemistry, molecular biology and genomics to biology, human health and disease. Elective courses extend this core knowledge to provide students with specialized insight into both basic and applied scientific endeavour in biochemistry, bioinformatics, molecular biology and molecular genetics. Throughout the curriculum there is an emphasis on experiential learning through laboratory practicals, problem-solving exercises, group-based learning, industrial experience, overseas exchange and research-based projects. These experiences are designed to develop students' ability to read and interpret scientific data, to integrate knowledge with wider scientific theory, and to improve logical thinking and communication skills. The ultimate goal is to provide a comprehensive degree-level biochemistry education that equips students with the critical thinking, communication and analytical skills essential for them to play a leading role in society in the future.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the principles of biomolecular structure, metabolism, molecular interactions, molecular processes and their regulation, genetics and systems biology critical to contemporary biochemistry and molecular biology (by means of coursework and experiential learning)
- PLO 2: apply biochemical, bioinformatics and molecular genetics technologies for new observations, measurements and analyses; and to design experiments that bring discovery and insight into the unknown (by means of laboratory-based and research project-based learning)
- PLO 3: interpret and communicate scientific data and literature using appropriate scientific language (by means of literature-based coursework and debate)
- PLO 4: work effectively as a team and synergize with their colleagues in a supportive manner (by means of group-based learning and by group-based problem solving)
- PLO 5: recognize the interconnections of biochemistry with other disciplines in science, medicine and engineering, humanities and ethics, which are relevant for diverse working environment in the society (by means of multidisciplinary-based research projects, internship and debate)

#### Impermissible Combinations:

Minor in Biochemistry

### Required courses (96 credits)

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

Disciplinary Core Courses (24 credits)

CHEM1042 General chemistry I (6)
CHEM1043 General chemistry II (6)
BIOC2600 Basic biochemistry (6)

BIOL2220 Principles of biochemistry (6)

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CHEM2441 Organic chemistry I (6)

**Disciplinary Electives (6 credits)** 

BIOC1600 Perspectives in biochemistry (6)

BIOL1110 From molecules to cells (6)

Take either BIOC1600 or BIOL1110 to fulfill this 6 credits requirement, but not both.

Take either BIOC1600 or BIOL1110 to fulfill this 6 credits requirement, but not both.

Take either BIOC2600 or BIOL2220 to fulfill

Take either BIOC2600 or BIOL2220 to fulfill

this 24 credits requirement, but not both. BIOC2600 and BIOL2220 are mutually

this 24 credits requirement, but not both. BIOC2600 and BIOL2220 are mutually

exclusive

exclusive.

# 2. Advanced level courses (48 credits)

## Disciplinary Core Courses (30 credits)

BIOC3601 Basic metabolism (6)

BIOC3604 Essential techniques in biochemistry and molecular biology (6)

BIOL3401 Molecular biology (6) BIOC4610 Advanced biochemistry (6)

BIOC4613 Advanced techniques in biochemistry & molecular biology (6)

**Disciplinary Electives (18 credits)** 

At least 18 credits selected from the following courses:

BIOC3605 Sequence bioinformatics (6)
BIOC3606 Molecular medicine (6)
BIOL3202 Nutritional biochemistry (6)
BIOL3402 Cell biology and cell technology (6)

BIOL3403 Immunology (6)

BIOL3404 Protein structure and function (6)

BIOL3408 Genetics (6)

CHEM3441 Organic chemistry II (6)

BIOC4612 Molecular biology of the gene (6)

BIOL4417 'Omics' and systems biology (6)
CHEM4145 Medicinal chemistry (6)
CHEM4444 Chemical biology (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:
BIOC3999 Directed studies in biochemistry (6)
BIOC4966 Biochemistry internship (6)
BIOC4999 Biochemistry project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.
- 5. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis
- 6. Candidates who have been admitted to Year 1 in 2021-22 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1112. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Biology, Chemistry, and Physics in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Biology, Chemistry, and Physics Higher Level in International Baccalaureate (IB)
- Grade B or above in Biology, Chemistry, and Physics in General Certificate of Education Advanced Level (GCEAL)
- Biology, Chemistry, and Physics qualification in Gao Kao will be considered on a case-by-case basis

#### Remarks:

Offered to students 2020

admitted to Year 1 in

#### **Objectives:**

The Major in Biochemistry aims to provide students with both basic and advanced knowledge in contemporary biochemistry and molecular biology. Core courses in the curriculum emphasize equipping students with a general understanding of the fundamental ideas, principles and theories of biochemistry with particular focus on the relevance of biochemistry, molecular biology and genomics to biology, human health and disease. Elective courses extend this core knowledge to provide students with specialized insight into both basic and applied scientific endeavour in biochemistry, bioinformatics, molecular biology and molecular genetics. Throughout the curriculum there is an emphasis on experiential learning through laboratory practicals, problem-solving exercises, group-based learning, industrial experience, overseas exchange and research-based projects. These experiences are designed to develop students' ability to read and interpret scientific data, to integrate knowledge with wider scientific theory, and to improve logical thinking and communication skills. The ultimate goal is to provide a comprehensive degree-level biochemistry education that equips students with the critical thinking, communication and analytical skills essential for them to play a leading role in society in the future.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the principles of biomolecular structure, metabolism, molecular interactions, molecular processes and their regulation, genetics and systems biology critical to contemporary biochemistry and molecular biology (by means of coursework and experiential learning)
- PLO 2: apply biochemical, bioinformatics and molecular genetics technologies for new observations, measurements and analyses; and to design experiments that bring discovery and insight into the unknown (by means of laboratory-based and research project-based learning)
- PLO 3: interpret and communicate scientific data and literature using appropriate scientific language (by means of literature-based coursework and debate)
- PLO 4: work effectively as a team and synergize with their colleagues in a supportive manner (by means of group-based learning and by group-based problem solving)
- PLO 5: recognize the interconnections of biochemistry with other disciplines in science, medicine and engineering, humanities and ethics, which are relevant for diverse working environment in the society (by means of multidisciplinary-based research projects, internship and debate)

#### Impermissible Combinations:

Minor in Biochemistry

### Required courses (96 credits)

# 1. Introductory level courses (42 credits)

**Disciplinary Core Courses: Science Foundation Courses (12 credits)** 

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (24 credits)** 

CHEM1042 General chemistry I (6)
CHEM1043 General chemistry II (6)
BIOC2600 Basic biochemistry (6)

BIOL2220 Principles of biochemistry (6)

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CHEM2441 Organic chemistry I (6)

**Disciplinary Electives (6 credits)** 

BIOC1600 Perspectives in biochemistry (6)

BIOL1110 From molecules to cells (6)

Take either BIOC1600 or BIOL1110 to fulfill this 6 credits requirement, but not both. Take either BIOC1600 or BIOL1110 to fulfill this 6 credits requirement, but not both.

Take either BIOC2600 or BIOL2220 to fulfill

Take either BIOC2600 or BIOL2220 to fulfill

this 24 credits requirement, but not both. BIOC2600 and BIOL2220 are mutually

this 24 credits requirement, but not both. BIOC2600 and BIOL2220 are mutually

exclusive

exclusive.

# 2. Advanced level courses (48 credits)

# **Disciplinary Core Courses (30 credits)**

BIOC3601 Basic metabolism (6)

BIOC3604 Essential techniques in biochemistry and molecular biology (6)

BIOL3401 Molecular biology (6) BIOC4610 Advanced biochemistry (6)

BIOC4613 Advanced techniques in biochemistry & molecular biology (6)

**Disciplinary Electives (18 credits)** 

At least 18 credits selected from the following courses:

BIOC3605 Sequence bioinformatics (6)
BIOC3606 Molecular medicine (6)
BIOL3202 Nutritional biochemistry (6)
BIOL3402 Cell biology and cell technology (6)

BIOL3403 Immunology (6)

BIOL3404 Protein structure and function (6)

BIOL3408 Genetics (6)

CHEM3441 Organic chemistry II (6)

BIOC4612 Molecular biology of the gene (6)

BIOL4417 'Omics' and systems biology (6)
CHEM4145 Medicinal chemistry (6)
CHEM4444 Chemical biology (6)

CHEM4444 Chemical biolog
3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:
BIOC3999 Directed studies in biochemistry (6)
BIOC4966 Biochemistry internship (6)
BIOC4999 Biochemistry project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
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- 4. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.
- 5. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis

#### Remarks:

Offered to students 2019

admitted to Year 1 in

#### **Objectives:**

The Major in Biochemistry aims to provide students with both basic and advanced knowledge in contemporary biochemistry and molecular biology. Core courses in the curriculum emphasize equipping students with a general understanding of the fundamental ideas, principles and theories of biochemistry with particular focus on the relevance of biochemistry, molecular biology and genomics to biology, human health and disease. Elective courses extend this core knowledge to provide students with specialized insight into both basic and applied scientific endeavour in biochemistry, bioinformatics, molecular biology and molecular genetics. Throughout the curriculum there is an emphasis on experiential learning through laboratory practicals, problem-solving exercises, group-based learning, industrial experience, overseas exchange and research-based projects. These experiences are designed to develop students' ability to read and interpret scientific data, to integrate knowledge with wider scientific theory, and to improve logical thinking and communication skills. The ultimate goal is to provide a comprehensive degree-level biochemistry education that equips students with the critical thinking, communication and analytical skills essential for them to play a leading role in society in the future.

## **Learning Outcomes:**

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#### Impermissible Combinations:

Minor in Biochemistry

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**Disciplinary Electives (6 credits)** 

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BIOL3408 Genetics (6)

CHEM3441 Organic chemistry II (6)

BIOC4612 Molecular biology of the gene (6)

BIOL4417 'Omics' and systems biology (6)
CHEM4145 Medicinal chemistry (6)
CHEM4444 Chemical biology (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:
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- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 5. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.

#### Remarks

Offered to students 2018

admitted to Year 1 in

#### **Objectives:**

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## **Learning Outcomes:**

By the end of this programme, students should be able to:

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#### Impermissible Combinations:

Minor in Biochemistry

### Required courses (96 credits)

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (24 credits)** 

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CHEM1043 General chemistry II (6)
BIOC2600 Basic biochemistry (6)

BIOL2220 Principles of biochemistry (6)

CHEM2441 Organic chemistry I (6)

**Disciplinary Electives (6 credits)** 

BIOC1600 Perspectives in biochemistry (6)

BIOL1110 From molecules to cells (6)

Take either BIOC1600 or BIOL1110 to fulfill this 6 credits requirement, but not both. Take either BIOC1600 or BIOL1110 to fulfill this 6 credits requirement, but not both.

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# 2. Advanced level courses (48 credits)

### Disciplinary Core Courses (30 credits)

BIOC3601 Basic metabolism (6)

BIOC3604 Essential techniques in biochemistry and molecular biology (6)

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BIOC4613 Advanced techniques in biochemistry & molecular biology (6)

# **Disciplinary Electives (18 credits)**

At least 18 credits selected from the following courses:

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BIOL3202 Nutritional biochemistry (6)
BIOL3402 Cell biology and cell technology (6)

BIOL3403 Immunology (6)

BIOL3404 Protein structure and function (6)

BIOL3408 Genetics (6)

CHEM3441 Organic chemistry II (6)

BIOC4612 Molecular biology of the gene (6)

BIOL4417 'Omics' and systems biology (6)
CHEM4145 Medicinal chemistry (6)

CHEM4444 Chemical biology (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:
BIOC3999 Directed studies in biochemistry (6)
BIOC4966 Biochemistry internship (6)
BIOC4999 Biochemistry project (12)

#### Notes:

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#### Remarks

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

The Major in Biochemistry aims to provide students with both basic and advanced knowledge in contemporary biochemistry and molecular biology. Core courses in the curriculum emphasize equipping students with a general understanding of the fundamental ideas, principles and theories of biochemistry with particular focus on the relevance of biochemistry, molecular biology and genomics to biology, human health and disease. Elective courses extend this core knowledge to provide students with specialized insight into both basic and applied scientific endeavour in biochemistry, bioinformatics, molecular biology and molecular genetics. Throughout the curriculum there is an emphasis on experiential learning through laboratory practicals, problem-solving exercises, group-based learning, industrial experience, overseas exchange and research-based projects. These experiences are designed to develop students' ability to read and interpret scientific data, to integrate knowledge with wider scientific theory, and to improve logical thinking and communication skills. The ultimate goal is to provide a comprehensive degree-level biochemistry education that equips students with the critical thinking, communication and analytical skills essential for them to play a leading role in society in the future.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the principles of biomolecular structure, metabolism, molecular interactions, molecular processes and their regulation, genetics and systems biology critical to contemporary biochemistry and molecular biology (by means of coursework and experiential learning)
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#### Impermissible Combinations:

Minor in Biochemistry

### Required courses (96 credits)

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

Scientific method and reasoning (6) **SCNC1111** Fundamentals of modern science (6) SCNC1112

**Disciplinary Core Courses (24 credits)** 

General chemistry I (6) CHEM1042 CHEM1043 General chemistry II (6) Basic biochemistry (6) BIOC2600

**BIOL2220** Principles of biochemistry (6)

Organic chemistry I (6) CHEM2441

**Disciplinary Electives (6 credits)** 

Perspectives in biochemistry (6) **BIOC1600** 

BIOL1110 From molecules to cells (6)

Take either BIOC1600 or BIOL1110 to fulfill this 6 credits requirement, but not both. Take either BIOC1600 or BIOL1110 to fulfill this 6 credits requirement, but not both.

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# 2. Advanced level courses (48 credits)

# **Disciplinary Core Courses (30 credits)**

Basic metabolism (6) BIOC3601

BIOC3604 Essential techniques in biochemistry and molecular biology (6)

BIOL3401 Molecular biology (6) Advanced biochemistry (6) BIOC4610

**BIOC4613** Advanced techniques in biochemistry & molecular biology (6)

**Disciplinary Electives (18 credits)** 

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Sequence bioinformatics (6) BIOC3605 BIOC3606 Molecular medicine (6) BIOL3202 Nutritional biochemistry (6) BIOL3402 Cell biology and cell technology (6)

Immunology (6) BIOL3403

Protein structure and function (6) BIOL3404

BIOL3408 Genetics (6)

CHEM3441 Organic chemistry II (6)

BIOC4612 Molecular biology of the gene (6) BIOL4417 'Omics' and systems biology (6)
CHEM4145 Medicinal chemistry (6)
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3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:
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#### Notes:

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#### Remarks

Offered to students 2016

admitted to Year 1 in

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#### Impermissible Combinations:

Minor in Biochemistry

### Required courses (96 credits)

# 1. Introductory level courses (42 credits)

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#### Remarks

Offered to students 2015

admitted to Year 1 in

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- PLO 2: apply biochemical, bioinformatics and molecular genetics technologies for new observations, measurements and analyses; and to design experiments that bring discovery and insight into the unknown (by means of laboratory-based and research project-based learning)
- PLO 3: interpret and communicate scientific data and literature using appropriate scientific language (by means of literature-based coursework and debate)
- PLO 4: work effectively as a team and synergize with their colleagues in a supportive manner (by means of group-based learning and by group-based problem solving)
- PLO 5: recognize the interconnections of biochemistry with other disciplines in science, medicine and engineering, humanities and ethics, which are relevant for diverse working environment in the society (by means of multidisciplinary-based research projects, internship and debate)

#### Impermissible Combinations:

Minor in Biochemistry

### Required courses (96 credits)

# 1. Introductory level courses (42 credits)

**Disciplinary Core Courses: Science Foundation Courses (12 credits)** 

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

Disciplinary Core Courses (24 credits)

CHEM1042 General chemistry I (6)
CHEM1043 General chemistry II (6)
BIOC2600 Basic biochemistry (6)

BIOL2220 Principles of biochemistry (6)

CHEM2441 Organic chemistry I (6)

**Disciplinary Electives (6 credits)** 

BIOC1600 Perspectives in biochemistry (6)

BIOL1110 From molecules to cells (6)

Take either BIOC1600 or BIOL1110 to fulfill this 6 credits requirement, but not both. Take either BIOC1600 or BIOL1110 to fulfill this 6 credits requirement, but not both.

Take either BIOC2600 or BIOL2220 to fulfill

Take either BIOC2600 or BIOL2220 to fulfill

this 24 credits requirement, but not both. BIOC2600 and BIOL2220 are mutually

this 24 credits requirement, but not both. BIOC2600 and BIOL2220 are mutually

exclusive

exclusive.

# 2. Advanced level courses (48 credits)

### Disciplinary Core Courses (30 credits)

BIOC3601 Basic metabolism (6)

BIOC3604 Essential techniques in biochemistry and molecular biology (6)

BIOL3401 Molecular biology (6) BIOC4610 Advanced biochemistry (6)

BIOC4613 Advanced techniques in biochemistry & molecular biology (6)

**Disciplinary Electives (18 credits)** 

At least 18 credits selected from the following courses:

BIOC3605 Sequence bioinformatics (6)
BIOC3606 Molecular medicine (6)
BIOL3202 Nutritional biochemistry (6)
BIOL3402 Cell biology and cell technology (6)

BIOL3403 Immunology (6)

BIOL3404 Protein structure and function (6)

BIOL3408 Genetics (6)

CHEM3441 Organic chemistry II (6)

BIOC4612 Molecular biology of the gene (6)

BIOL4417 'Omics' and systems biology (6)
CHEM4145 Medicinal chemistry (6)

CHEM4444 Chemical biology (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses: BIOC3999 Directed studies in biochemistry (6)

BIOC4966 Biochemistry internship (6)
BIOC4999 Biochemistry project (12)

### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 5. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.

#### Remarks

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

The Major in Biochemistry aims to provide students with both basic and advanced knowledge in contemporary biochemistry and molecular biology. Core courses in the curriculum emphasize equipping students with a general understanding of the fundamental ideas, principles and theories of biochemistry with particular focus on the relevance of biochemistry, molecular biology and genomics to biology, human health and disease. Elective courses extend this core knowledge to provide students with specialized insight into both basic and applied scientific endeavour in biochemistry, bioinformatics, molecular biology and molecular genetics. Throughout the curriculum there is an emphasis on experiential learning through laboratory practicals, problem-solving exercises, group-based learning, industrial experience, overseas exchange and research-based projects. These experiences are designed to develop students' ability to read and interpret scientific data, to integrate knowledge with wider scientific theory, and to improve logical thinking and communication skills. The ultimate goal is to provide a comprehensive degree-level biochemistry education that equips students with the critical thinking, communication and analytical skills essential for them to play a leading role in society in the future.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the principles of biomolecular structure, metabolism, molecular interactions, molecular processes and their regulation, genetics and systems biology critical to contemporary biochemistry and molecular biology (by means of coursework and experiential learning)
- PLO 2: apply biochemical, bioinformatics and molecular genetics technologies for new observations, measurements and analyses; and to design experiments that bring discovery and insight into the unknown (by means of laboratory-based and research project-based learning)
- PLO 3: interpret and communicate scientific data and literature using appropriate scientific language (by means of literature-based coursework and debate)
- PLO 4: work effectively as a team and synergize with their colleagues in a supportive manner (by means of group-based learning and by group-based problem solving)
- PLO 5: recognize the interconnections of biochemistry with other disciplines in science, medicine and engineering, humanities and ethics, which are relevant for diverse working environment in the society (by means of multidisciplinary-based research projects, internship and debate)

#### Impermissible Combinations:

Minor in Biochemistry

### Required courses (96 credits)

# 1. Introductory level courses (48 credits)

**Disciplinary Core Courses: Science Foundation Courses (12 credits)** 

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

BIOC1600 Perspectives in biochemistry (6)
BIOL1110 From molecules to cells (6)
CHEM1042 General chemistry I (6)
BIOC2600 Basic biochemistry (6)
CHEM2441 Organic chemistry I (6)

Disciplinary Electives (6 credits)

CHEM1043 General chemistry II (6)

CHEM2541 Introductory physical chemistry (6)

Take either CHEM1043 or CHEM2541 to fulfill this 6 credits requirement, but not both. Take either CHEM1043 or CHEM2541 to fulfill this 6 credits requirement, but not both.

# 2. Advanced level courses (42 credits)

# **Disciplinary Core Courses (30 credits)**

BIOC3601 Basic metabolism (6)

BIOC3604 Essential techniques in biochemistry and molecular biology (6)

BIOL3401 Molecular biology (6) BIOC4610 Advanced biochemistry (6)

BIOC4613 Advanced techniques in biochemistry & molecular biology (6)

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOC3605 Sequence bioinformatics (6)
BIOC3606 Molecular medicine (6)
BIOL3202 Nutritional biochemistry (6)

BIOL3402 Cell biology and cell technology (6)

BIOL3403 Immunology (6)

BIOL3404 Protein structure and function (6)

BIOL3408 Genetics (6)
CHEM3441 Organic chemistry II (6)
PIOC4642 Melocular histograph of the

BIOC4612 Molecular biology of the gene (6)
BIOL4417 'Omics' and systems biology (6)
CHEM4145 Medicinal chemistry (6)
CHEM4444 Chemical biology (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

BIOC3999	Directed studies in biochemistry (6)
BIOC4966	Biochemistry internship (6)
BIOC4999	Biochemistry project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 5. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.

#### Remarks:

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

The Major in Biochemistry aims to provide students with both basic and advanced knowledge in contemporary biochemistry and molecular biology. Core courses in the curriculum emphasize equipping students with a general understanding of the fundamental ideas, principles and theories of biochemistry with particular focus on the relevance of biochemistry, molecular biology and genomics to biology, human health and disease. Elective courses extend this core knowledge to provide students with specialized insight into both basic and applied scientific endeavour in biochemistry, bioinformatics, molecular biology and molecular genetics. Throughout the curriculum there is an emphasis on experiential learning through laboratory practicals, problem-solving exercises, group-based learning, industrial experience, overseas exchange and research-based projects. These experiences are designed to develop students' ability to read and interpret scientific data, to integrate knowledge with wider scientific theory, and to improve logical thinking and communication skills. The ultimate goal is to provide a comprehensive degree-level biochemistry education that equips students with the critical thinking, communication and analytical skills essential for them to play a leading role in society in the future.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the principles of biomolecular structure, metabolism, molecular interactions, molecular processes and their regulation, genetics and systems biology critical to contemporary biochemistry and molecular biology (by means of coursework and experiential learning)
- PLO 2: apply biochemical, bioinformatics and molecular genetics technologies for new observations, measurements and analyses; and to design experiments that bring discovery and insight into the unknown (by means of laboratory-based and research project-based learning)
- PLO 3: interpret and communicate scientific data and literature using appropriate scientific language (by means of literature-based coursework and debate)
- PLO 4: work effectively as a team and synergize with their colleagues in a supportive manner (by means of group-based learning and by group-based problem solving)
- PLO 5: recognize the interconnections of biochemistry with other disciplines in science, medicine and engineering, humanities and ethics, which are relevant for diverse working environment in the society (by means of multidisciplinary-based research projects, internship and debate)

#### Impermissible Combinations:

Minor in Biochemistry

### Required courses (96 credits)

# 1. Introductory level courses (48 credits)

**Disciplinary Core Courses: Science Foundation Courses (12 credits)** 

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

BIOC1600 Perspectives in biochemistry (6)
BIOL1110 From molecules to cells (6)
CHEM1042 General chemistry I (6)
BIOC2600 Basic biochemistry (6)
CHEM2441 Organic chemistry I (6)

Disciplinary Electives (6 credits)

CHEM1043 General chemistry II (6)

CHEM2541 Introductory physical chemistry (6)

Take either CHEM1043 or CHEM2541 to fulfill this 6 credits requirement, but not both. Take either CHEM1043 or CHEM2541 to fulfill this 6 credits requirement, but not both.

# 2. Advanced level courses (42 credits)

# **Disciplinary Core Courses (30 credits)**

BIOC3601 Basic metabolism (6)

BIOC3604 Essential techniques in biochemistry and molecular biology (6)

BIOL3401 Molecular biology (6) BIOC4610 Advanced biochemistry (6)

BIOC4613 Advanced techniques in biochemistry & molecular biology (6)

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOC3605 Sequence bioinformatics (6)
BIOC3606 Molecular medicine (6)
BIOL3202 Nutritional biochemistry (6)
BIOL3402 Cell biology and cell technology (6)

BIOL3403 Immunology (6)

BIOL3404 Protein structure and function (6) BIOL3408 Genetics (6)

CHEM3441 Organic chemistry II (6)
BIOC4612 Molecular biology of the gene (6)
BIOL4417 'Omics' and systems biology (6)
CHEM4145 Medicinal chemistry (6)

CHEM4444 Chemical biology (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

BIOC3999	Directed studies in biochemistry (6)
BIOC4966	Biochemistry internship (6)
BIOC4999	Biochemistry project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details
- 5. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.

#### Remarks:

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

The Major in Biochemistry aims to provide students with both basic and advanced knowledge in contemporary biochemistry and molecular biology. Core courses in the curriculum emphasize equipping students with a general understanding of the fundamental ideas, principles and theories of biochemistry with particular focus on the relevance of biochemistry, molecular biology and genomics to biology, human health and disease. Elective courses extend this core knowledge to provide students with specialized insight into both basic and applied scientific endeavour in biochemistry, bioinformatics, molecular biology and molecular genetics. Throughout the curriculum there is an emphasis on experiential learning through laboratory practicals, problem-solving exercises, group-based learning, industrial experience, overseas exchange and research-based projects. These experiences are designed to develop students' ability to read and interpret scientific data, to integrate knowledge with wider scientific theory, and to improve logical thinking and communication skills. The ultimate goal is to provide a comprehensive degree-level biochemistry education that equips students with the critical thinking, communication and analytical skills essential for them to play a leading role in society in the future.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the principles of biomolecular structure, metabolism, molecular interactions, molecular processes and their regulation, genetics and systems biology critical to contemporary biochemistry and molecular biology (by means of coursework and experiential learning)
- PLO 2: apply biochemical, bioinformatics and molecular genetics technologies for new observations, measurements and analyses; and to design experiments that bring discovery and insight into the unknown (by means of laboratorybased and research project-based learning)
- PLO 3: interpret and communicate scientific data and literature using appropriate scientific language (by means of literaturebased coursework and debate)
- PLO 4: work effectively as a team and synergize with their colleagues in a supportive manner (by means of group-based learning and by group-based problem solving)
- PLO 5: recognize the interconnections of biochemistry with other disciplines in science, medicine and engineering, humanities and ethics, which are relevant for diverse working environment in the society (by means of multidisciplinary-based research projects, internship and debate)

#### Impermissible Combinations:

Minor in Biochemistry

# Required courses (96 credits)

# 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

Scientific method and reasoning (6) **SCNC1111** SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

Perspectives in biochemistry (6) BIOC1600 BIOL1110 From molecules to cells (6) General chemistry I (6) CHEM1042 BIOC2600 Basic biochemistry (6) Organic chemistry I (6) CHEM2441

**Disciplinary Electives (6 credits)** 

General chemistry II (6) CHEM1043

CHEM2541 Introductory physical chemistry (6)

Take either CHEM1043 or CHEM2541 to fulfill this 6 credits requirement, but not both. Take either CHEM1043 or CHEM2541 to fulfill this 6 credits requirement, but not both.

# 2. Advanced level courses (42 credits)

# **Disciplinary Core Courses (30 credits)**

BIOC3601 Basic metabolism (6)

BIOC3604 Essential techniques in biochemistry and molecular biology (6)

Molecular biology (6) BIOL3401 Advanced biochemistry (6) BIOC4610

Advanced techniques in biochemistry & molecular biology (6) BIOC4613

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOC3605 Sequence bioinformatics (6) BIOC3606 Molecular medicine (6) Nutritional biochemistry (6) BIOL3202

BIOL3402 Cell biology and cell technology (6) BIOL3403 Immunology (6)

Protein structure and function (6) BIOL3404

Genetics (6) BIOL3408 Organic chemistry II (6) CHEM3441

BIOC4612 Molecular biology of the gene (6) 'Omics' and systems biology (6) **BIOL4417** Medicinal chemistry (6) CHEM4145

CHEM4444 Chemical biology (6) 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

BIOC3999	Directed studies in biochemistry (6)
BIOC4966	Biochemistry internship (6)
BIOC4999	Biochemistry project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 5. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.

#### Remarks

Major Title Major in Biological Sciences

Offered to students 2021

admitted to Year 1 in

#### **Objectives:**

This Major is designed for students seeking a broad-based training in modern biology. Students are guided in an inquiry-driven learning environment to appreciate the major biological systems at different levels of biological organization. Teaching emphasizes both core concepts and applied aspects in biological sciences. The programme is highly flexible as students can select courses according to their own interests from a wide spectrum of elective courses. At the advanced level, students are further exposed to three fundamental areas of biological sciences (genetics, molecular & cell biology; ecology, systematics and evolution; physiology and organismic biology) and will undertake experiential learning activities. The diverse learning experience exposes students to problem-based learning, and an exciting array of laboratory and field techniques. Students will also be able to acquire valuable transferable skills in analysis, organization and communication. The Biological Sciences Major applies modern scientific inquiry to prepare graduates for employment as professionals in a variety of careers or for postgraduate study.

### Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: describe and explain the key concepts in genetics, molecular & cell biology; ecology, systematics and evolution; physiology and organismic biology (by means of coursework, laboratory- and/or research-based learning in the curriculum)
- PLO 2: analyze and interpret quantitative and qualitative biological data to provide scientifically based conclusions and/or judgements (by means of coursework, laboratory- and/or research-based learning in the curriculum)
- PLO 3: tackle biological research problems by formulating hypothesis and designing experimental investigations (by means of coursework, laboratory- and/or research-based learning in the curriculum)
- PLO 4: communicate effectively and professionally with scientists, educators, media, and general public in oral and written forms (by means of coursework, laboratory- and/or research-based learning, and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Major in Biological Sciences (Intensive)

Major in Ecology & Biodiversity (Intensive)

Major in Molecular Biology & Biotechnology (Intensive)

# Required courses (96 credits)

#### 1. Introductory level courses (48 credits)

#### Disciplinary Core Courses: Science Foundation Courses (12 credits)

Scientific method and reasoning (6) SCNC1111 SCNC1112 Fundamentals of modern science (6)

# **Disciplinary Core Courses (36 credits)**

From molecules to cells (6) BIOL1110 BIOL1309 Evolutionary diversity (6) Biostatistics (6) **BIOL2102** 

BIOL2103 Biological sciences laboratory course (6)

**BIOL2220** Principles of biochemistry (6)

Take either BIOL2220 or BIOC2600 to fulfill this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually

exclusive.

BIOL2306 Ecology and evolution (6)

**BIOC2600** Basic biochemistry (6)

Take either BIOL2220 or BIOC2600 to fulfill this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually

# 2. Advanced level courses (at least 42 credits)

## **Disciplinary Electives (42 credits)**

# (A) Genetics, molecular and cell biology (at least 12 credits selected from area A)

**BIOL3401** Molecular biology (6)

BIOL3402 Cell biology and cell technology (6) Protein structure and function (6) BIOL3404 Genetics (6)

**BIOL3408** 

## (B) Ecology, systematics and evolution (at least 12 credits selected from area B)

Marine biology (6) BIOL3301

Systematics and phylogenetics (6) BIOL3302 Conservation biology (6) BIOL3303 Tropical terrestrial ecology (6) BIOL3319 Evolutionary biology (6) BIOL3506

### (C) Physiology and organismic biology (at least 18 credits with 6 credits from each of List I, II & III)

Animal physiology and environmental adaptation (6) BIOL3105 Human physiology (6) BIOL3205

List I

BIOL3403 **BIOL3406** Reproduction and reproductive biotechnology (6)

Immunology (6) BIOL3503 Endocrinology: human physiology II (6) List II

Plant structure and evolution (6) **BIOL3314** Plant physiology and climate change (6) ENVS3202 BIOL4411 Plant and food biotechnology (6)

List III

BIOL3109 Environmental microbiology (6)

BIOL3203 Food microbiology (6)

BIOL3508 Microbial physiology and biotechnology (6)

# 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:
BIOL3994 Directed studies in biological sciences (6)
BIOL4964 Biological sciences internship (6)
BIOL4994 Biological sciences project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis
- 5. Candidates who have been admitted to Year 1 in 2021-22 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1112. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Biology, Chemistry, and Physics in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Biology, Chemistry, and Physics Higher Level in International Baccalaureate (IB)
- Grade B or above in Biology, Chemistry, and Physics in General Certificate of Education Advanced Level (GCEAL)
- Biology, Chemistry, and Physics qualification in Gao Kao will be considered on a case-by-case basis

#### Remarks:

Major Title Major in Biological Sciences

Offered to students 2020

admitted to Year 1 in

#### **Objectives:**

This Major is designed for students seeking a broad-based training in modern biology. Students are guided in an inquiry-driven learning environment to appreciate the major biological systems at different levels of biological organization. Teaching emphasizes both core concepts and applied aspects in biological sciences. The programme is highly flexible as students can select courses according to their own interests from a wide spectrum of elective courses. At the advanced level, students are further exposed to three fundamental areas of biological sciences (genetics, molecular & cell biology; ecology, systematics and evolution; physiology and organismic biology) and will undertake experiential learning activities. The diverse learning experience exposes students to problem-based learning, and an exciting array of laboratory and field techniques. Students will also be able to acquire valuable transferable skills in analysis, organization and communication. The Biological Sciences Major applies modern scientific inquiry to prepare graduates for employment as professionals in a variety of careers or for postgraduate study.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and explain the key concepts in genetics, molecular & cell biology; ecology, systematics and evolution; physiology and organismic biology (by means of coursework, laboratory- and/or research-based learning in the curriculum)
- PLO 2: analyze and interpret quantitative and qualitative biological data to provide scientifically based conclusions and/or judgements (by means of coursework, laboratory- and/or research-based learning in the curriculum)
- PLO 3: tackle biological research problems by formulating hypothesis and designing experimental investigations (by means of coursework, laboratory- and/or research-based learning in the curriculum)
- PLO 4: communicate effectively and professionally with scientists, educators, media, and general public in oral and written forms (by means of coursework, laboratory- and/or research-based learning, and presentation opportunities in the curriculum)

### Impermissible Combinations:

Major in Biological Sciences (Intensive)

Major in Ecology & Biodiversity (Intensive)

Major in Molecular Biology & Biotechnology (Intensive)

### Required courses (96 credits)

#### 1. Introductory level courses (48 credits)

# Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

# **Disciplinary Core Courses (36 credits)**

BIOL1110 From molecules to cells (6)
BIOL1309 Evolutionary diversity (6)
BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

Take either BIOL2220 or BIOC2600 to fulfill this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually

exclusive.

BIOL2306 Ecology and evolution (6)

BIOC2600 Basic biochemistry (6)

Take either BIOL2220 or BIOC2600 to fulfill this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually population.

# 2. Advanced level courses (at least 42 credits)

# **Disciplinary Electives (42 credits)**

# (A) Genetics, molecular and cell biology (at least 12 credits selected from area A)

BIOL3401 Molecular biology (6)

BIOL3402 Cell biology and cell technology (6)
BIOL3404 Protein structure and function (6)
BIOL3408 Genetics (6)

## (B) Ecology, systematics and evolution (at least 12 credits selected from area B)

BIOL3301 Marine biology (6)

BIOL3302 Systematics and phylogenetics (6)
BIOL3303 Conservation biology (6)
BIOL3319 Tropical terrestrial ecology (6)
BIOL3506 Evolutionary biology (6)

### (C) Physiology and organismic biology (at least 18 credits with 6 credits from each of List I, II & III)

BIOL3105 Animal physiology and environmental adaptation (6) BIOL3205 Human physiology (6)

List I

BIOL3403 Immunology (6)

BIOL3406 Reproduction and reproductive biotechnology (6)

BIOL3503 Endocrinology: human physiology II (6)

BIOL3314 Plant structure and evolution (6)
ENVS3202 Plant physiology and climate change (6)
BIOL4411 Plant and food biotechnology (6)

List III

BIOL3109 Environmental microbiology (6)

BIOL3203 Food microbiology (6)

BIOL3508 Microbial physiology and biotechnology (6)
BIOL4401 Medical microbiology and applied immunology (6)

#### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:
BIOL3994 Directed studies in biological sciences (6)
BIOL4964 Biological sciences internship (6)
BIOL4994 Biological sciences project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis

#### Remarks:

Major Title Major in Biological Sciences

Offered to students 2019

admitted to Year 1 in

#### **Objectives:**

This Major is designed for students seeking a broad-based training in modern biology. Students are guided in an inquiry-driven learning environment to appreciate the major biological systems at different levels of biological organization. Teaching emphasizes both core concepts and applied aspects in biological sciences. The programme is highly flexible as students can select courses according to their own interests from a wide spectrum of elective courses. At the advanced level, students are further exposed to three fundamental areas of biological sciences (genetics, molecular & cell biology; ecology, systematics and evolution; physiology and organismic biology) and will undertake experiential learning activities. The diverse learning experience exposes students to problem-based learning, and an exciting array of laboratory and field techniques. Students will also be able to acquire valuable transferable skills in analysis, organization and communication. The Biological Sciences Major applies modern scientific inquiry to prepare graduates for employment as professionals in a variety of careers or for postgraduate study.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand concepts underpinning advances in genetics, molecular & cell biology; ecology, systematics and evolution; physiology and organismic biology (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: evaluate diverse threads of enquiry in science, and identify the value of datasets and written output (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: interpret scientific data from a range of sources and explain trends observed (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: demonstrate independent and critical thinking and appreciate moral and ethical issues related to biological sciences (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: communicate in a professional capacity with educators, business, media and the scientific community (by means of coursework, tutorial classes, project-based and presentation opportunities in the curriculum)
- PLO 6: be prepared to enter employment as professional scientists, educators and managers (by means of coursework, tutorial classes, laboratory-based, project-based and capstone learning in the curriculum)

#### Impermissible Combinations:

Major in Biological Sciences (Intensive)

Major in Ecology & Biodiversity (Intensive)

Major in Molecular Biology & Biotechnology (Intensive)

### Required courses (96 credits)

# 1. Introductory level courses (48 credits)

# Disciplinary Core Courses: Science Foundation Courses (12 credits)

Scientific method and reasoning (6) SCNC1111 SCNC1112 Fundamentals of modern science (6)

### **Disciplinary Core Courses (36 credits)**

BIOL1110 From molecules to cells (6) BIOL1309 Evolutionary diversity (6) Biostatistics (6)

BIOL2102

BIOL2103 Biological sciences laboratory course (6)

Principles of biochemistry (6) **BIOL2220** 

Take either BIOL2220 or BIOC2600 to fulfill this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

**BIOL 2306** Ecology and evolution (6)

**BIOC2600** Basic biochemistry (6)

Take either BIOL2220 or BIOC2600 to fulfill this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

### 2. Advanced level courses (at least 42 credits)

# **Disciplinary Electives (42 credits)**

# (A) Genetics, molecular and cell biology (at least 12 credits selected from area A)

Molecular biology (6) BIOL3401

Cell biology and cell technology (6) BIOL3402 BIOL3404 Protein structure and function (6)

BIOL3408 Genetics (6)

# (B) Ecology, systematics and evolution (at least 12 credits selected from area B)

BIOL3301 Marine biology (6) BIOL3302 Systematics and phylogenetics (6) BIOL3303 Conservation biology (6) BIOL3319 Tropical terrestrial ecology (6) Evolutionary biology (6) **BIOL3506** 

# (C) Physiology and organismic biology (at least 18 credits with 6 credits from each of List I, II & III)

List I

Animal physiology and environmental adaptation (6) BIOL3105 BIOL3205 Human physiology (6)

Immunology (6) **BIOL3403** 

**BIOL3406** Reproduction and reproductive biotechnology (6)

Endocrinology: human physiology II (6) BIOL3503

I	1:-411		
	List II BIOL3107	Plant physiology (6)	Take eithe
	DIOLO107	Train priyolology (o)	this 6 cred
			both. BIO
			exclusive.
	BIOL3314	Plant structure and evolution (6)	
	ENVS3202	Plant physiology and climate change (6)	Take eithe
			this 6 cred
			both. BIO exclusive.
	BIOL4411	Plant and food biotechnology (6)	exclusive.
	List III	Traint and lood blotosimology (0)	
	BIOL3109	Environmental microbiology (6)	
	BIOL3203	Food microbiology (6)	
	BIOL3508	Microbial physiology and biotechnology (6)	
	BIOL4401	Medical microbiology and applied immunology (6)	
	3. Capstone requi	o,	
		s selected from the following courses:	
	BIOL3994	Directed studies in biological sciences (6)	
	BIOL4964	Biological sciences internship (6)	
		,	
	BIOL4994	Biological sciences project (12)	

Take either BIOL3107 or ENVS3202 to fulfill this 6 credits requirement in List II, but not both. BIOL3107 and ENVS3202 are mutually

Take either BIOL3107 or ENVS3202 to fulfill this 6 credits requirement in List II, but not both. BIOL3107 and ENVS3202 are mutually explicited.

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

#### Remarks

Major Title Major in Biological Sciences

Offered to students 2018

admitted to Year 1 in

#### **Objectives:**

This Major is designed for students seeking a broad-based training in modern biology. Students are guided in an inquiry-driven learning environment to appreciate the major biological systems at different levels of biological organization. Teaching emphasizes both core concepts and applied aspects in biological sciences. The programme is highly flexible as students can select courses according to their own interests from a wide spectrum of elective courses. At the advanced level, students are further exposed to three fundamental areas of biological sciences (genetics, molecular & cell biology; ecology, systematics and evolution; physiology and organismic biology) and will undertake experiential learning activities. The diverse learning experience exposes students to problem-based learning, and an exciting array of laboratory and field techniques. Students will also be able to acquire valuable transferable skills in analysis, organization and communication. The Biological Sciences Major applies modern scientific inquiry to prepare graduates for employment as professionals in a variety of careers or for postgraduate study.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand concepts underpinning advances in genetics, molecular & cell biology; ecology, systematics and evolution; physiology and organismic biology (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: evaluate diverse threads of enquiry in science, and identify the value of datasets and written output (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: interpret scientific data from a range of sources and explain trends observed (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: demonstrate independent and critical thinking and appreciate moral and ethical issues related to biological sciences (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: communicate in a professional capacity with educators, business, media and the scientific community (by means of coursework, tutorial classes, project-based and presentation opportunities in the curriculum)
- PLO 6: be prepared to enter employment as professional scientists, educators and managers (by means of coursework, tutorial classes, laboratory-based, project-based and capstone learning in the curriculum)

#### Impermissible Combinations:

Major in Biological Sciences (Intensive)

Major in Ecology & Biodiversity (Intensive)

Major in Molecular Biology & Biotechnology (Intensive)

#### Required courses (96 credits)

# 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

Scientific method and reasoning (6) SCNC1111 Fundamentals of modern science (6) SCNC1112

### **Disciplinary Core Courses (36 credits)**

BIOL1110 From molecules to cells (6) BIOL1309 Evolutionary diversity (6) Biostatistics (6)

BIOL2102 BIOL2103 Biological sciences laboratory course (6)

Principles of biochemistry (6) **BIOL2220** 

Take either BIOL2220 or BIOC2600 to fulfill this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually

exclusive.

**BIOL 2306** Ecology and evolution (6)

**BIOC2600** Basic biochemistry (6) Take either BIOL2220 or BIOC2600 to fulfill this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

### 2. Advanced level courses (at least 42 credits)

# **Disciplinary Electives (42 credits)**

### (A) Genetics, molecular and cell biology (at least 12 credits selected from area A)

Molecular biology (6) BIOL3401

Cell biology and cell technology (6) BIOL3402 BIOL3404 Protein structure and function (6)

BIOL3408 Genetics (6)

# (B) Ecology, systematics and evolution (at least 12 credits selected from area B)

BIOL3301 Marine biology (6) BIOL3302 Systematics and phylogenetics (6)

**BIOL3303** Conservation biology (6)

BIOL3419 Insect ecology: the little things that run the world (6)

Evolution (6) **BIOL3501** 

this 12 credits requirement, but not both. BIOL3501 and BIOL3506 are mutually

exclusive

Take either BIOL3501 or BIOL3506 to fulfill Evolutionary biology (6) **BIOL3506** 

this 12 credits requirement, but not both. BIOL3501 and BIOL3506 are mutually

Take either BIOL3501 or BIOL3506 to fulfill

exclusive.

(C) Physiology and organismic biology (at least 18 credits with 6 credits from each of List I, II & III)

BIOL3503 Endocrinology: human physiology II (6)	
BIOL3107 Plant physiology (6)  Take either BIOL3107 or ENVS this 6 credits requirement in Lis both. BIOL3107 and ENVS3202 exclusive.	st II, but not
BIOL3314 Plant structure and evolution (6)	
ENVS3202 Plant physiology and climate change (6) Take either BIOL3107 or ENVS this 6 credits requirement in Lis both. BIOL3107 and ENVS3202 exclusive.	st II, but not
BIOL4411 Plant and food biotechnology (6)	
List III	
BIOL3109 Environmental microbiology (6)	
BIOL3203 Food microbiology (6)	
BIOL3508 Microbial physiology and biotechnology (6)	
BIOL4401 Medical microbiology and applied immunology (6)	
3. Capstone requirement (6 credits)	
At least 6 credits selected from the following courses:	
BIOL3994 Directed studies in biological sciences (6)	
BIOL4964 Biological sciences internship (6)	
BIOL4994 Biological sciences project (12)	

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

### Remarks:

Major Title Major in Biological Sciences

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

This Major is designed for students seeking a broad-based training in modern biology. Students are guided in an inquiry-driven learning environment to appreciate the major biological systems at different levels of biological organization. Teaching emphasizes both core concepts and applied aspects in biological sciences. The programme is highly flexible as students can select courses according to their own interests from a wide spectrum of elective courses. At the advanced level, students are further exposed to three fundamental areas of biological sciences (genetics, molecular & cell biology; ecology, systematics and evolution; physiology and organismic biology) and will undertake experiential learning activities. The diverse learning experience exposes students to problem-based learning, and an exciting array of laboratory and field techniques. Students will also be able to acquire valuable transferable skills in analysis, organization and communication. The Biological Sciences Major applies modern scientific inquiry to prepare graduates for employment as professionals in a variety of careers or for postgraduate study.

### Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: understand concepts underpinning advances in genetics, molecular & cell biology; ecology, systematics and evolution; physiology and organismic biology (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: evaluate diverse threads of enquiry in science, and identify the value of datasets and written output (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: interpret scientific data from a range of sources and explain trends observed (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: demonstrate independent and critical thinking and appreciate moral and ethical issues related to biological sciences (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: communicate in a professional capacity with educators, business, media and the scientific community (by means of coursework, tutorial classes, project-based and presentation opportunities in the curriculum)
- PLO 6: be prepared to enter employment as professional scientists, educators and managers (by means of coursework, tutorial classes, laboratory-based, project-based and capstone learning in the curriculum)

#### Impermissible Combinations:

Major in Biological Sciences (Intensive)

Major in Ecology & Biodiversity (Intensive)

Major in Molecular Biology & Biotechnology (Intensive)

#### Required courses (96 credits)

# 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

Scientific method and reasoning (6) SCNC1111 Fundamentals of modern science (6) SCNC1112

**Disciplinary Core Courses (36 credits)** 

BIOL1110 From molecules to cells (6) BIOL1309 Evolutionary diversity (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

Principles of biochemistry (6) Take either BIOL2220 or BIOC2600 to fulfill **BIOL2220** 

this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually

exclusive.

**BIOL 2306** Ecology and evolution (6)

**BIOC2600** Basic biochemistry (6)

Take either BIOL2220 or BIOC2600 to fulfill this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

### 2. Advanced level courses (at least 42 credits)

# **Disciplinary Electives (42 credits)**

### (A) Genetics, molecular and cell biology (at least 12 credits selected from area A)

Molecular biology (6) BIOL3401

Cell biology and cell technology (6) BIOL3402 BIOL3404 Protein structure and function (6)

BIOL3408 Genetics (6)

# (B) Ecology, systematics and evolution (at least 12 credits selected from area B)

BIOL3301 Marine biology (6)

BIOL3302 Systematics and phylogenetics (6)

**BIOL3303** Conservation biology (6)

BIOL3419 Insect ecology: the little things that run the world (6)

Evolution (6) **BIOL3501** 

Take either BIOL3501 or BIOL3506 to fulfill this 12 credits requirement, but not both. BIOL3501 and BIOL3506 are mutually

exclusive

Take either BIOL3501 or BIOL3506 to fulfill Evolutionary biology (6) **BIOL3506** 

this 12 credits requirement, but not both. BIOL3501 and BIOL3506 are mutually exclusive.

(C) Physiology and organismic biology (at least 18 credits with 6 credits from each of List I, II & III)

List I BIOL3105 BIOL3205 BIOL3403 BIOL3406 BIOL3503 List II	Animal physiology and environmental adaptation (6) Human physiology (6) Immunology (6) Reproduction and reproductive biotechnology (6) Endocrinology: human physiology II (6)	
BIOL3107	Plant physiology (6)	Take either BIOL3107 or ENVS3202 to fulfill this 6 credits requirement in List II, but not both. BIOL3107 and ENVS3202 are mutually exclusive.
BIOL3314	Plant structure and evolution (6)	
ENVS3202	Plant physiology and climate change (6)	Take either BIOL3107 or ENVS3202 to fulfill this 6 credits requirement in List II, but not both. BIOL3107 and ENVS3202 are mutually exclusive.
BIOL4411	Plant and food biotechnology (6)	
List III		
BIOL3109	Environmental microbiology (6)	
BIOL3203	Food microbiology (6)	
BIOL3508	Microbial physiology and biotechnology (6)	
BIOL4401	Medical microbiology and applied immunology (6)	
3. Capstone requirer	ment (6 credits)	
At least 6 credits se	elected from the following courses:	
BIOL3994	Directed studies in biological sciences (6)	
BIOL4964	Biological sciences internship (6)	
BIOL4994	Biological sciences project (12)	

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

### Remarks:

Major Title Major in Biological Sciences

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

This Major is designed for students seeking a broad-based training in modern biology. Students are guided in an inquiry-driven learning environment to appreciate the major biological systems at different levels of biological organization. Teaching emphasizes both core concepts and applied aspects in biological sciences. The programme is highly flexible as students can select courses according to their own interests from a wide spectrum of elective courses. At the advanced level, students are further exposed to three fundamental areas of biological sciences (genetics, molecular & cell biology; ecology, systematics and evolution; physiology and organismic biology) and will undertake experiential learning activities. The diverse learning experience exposes students to problem-based learning, and an exciting array of laboratory and field techniques. Students will also be able to acquire valuable transferable skills in analysis, organization and communication. The Biological Sciences Major applies modern scientific inquiry to prepare graduates for employment as professionals in a variety of careers or for postgraduate study.

## Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: understand concepts underpinning advances in genetics, molecular & cell biology; ecology, systematics and evolution; physiology and organismic biology (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: evaluate diverse threads of enquiry in science, and identify the value of datasets and written output (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: interpret scientific data from a range of sources and explain trends observed (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: demonstrate independent and critical thinking and appreciate moral and ethical issues related to biological sciences (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: communicate in a professional capacity with educators, business, media and the scientific community (by means of coursework, tutorial classes, project-based and presentation opportunities in the curriculum)
- PLO 6: be prepared to enter employment as professional scientists, educators and managers (by means of coursework, tutorial classes, laboratory-based, project-based and capstone learning in the curriculum)

#### Impermissible Combinations:

Major in Ecology & Biodiversity (Intensive)

Major in Molecular Biology & Biotechnology (Intensive)

### Required courses (96 credits)

### 1. Introductory level courses (48 credits)

# Disciplinary Core Courses: Science Foundation Courses (12 credits)

Scientific method and reasoning (6) SCNC1111 SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

From molecules to cells (6) BIOL1110 BIOL1309 Evolutionary diversity (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

**BIOL2220** Principles of biochemistry (6)

Take either BIOL2220 or BIOC2600 to fulfill this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually

exclusive.

**BIOL2306** Ecology and evolution (6) Basic biochemistry (6) BIOC2600

Take either BIOL2220 or BIOC2600 to fulfill this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually

2. Advanced level courses (at least 42 credits)

### **Disciplinary Electives (42 credits)**

# (A) Genetics, molecular and cell biology (at least 12 credits selected from area A)

BIOL3401 Molecular biology (6)

BIOL3402 Cell biology and cell technology (6) Protein structure and function (6) BIOL3404

**BIOL3408** Genetics (6)

# (B) Ecology, systematics and evolution (at least 12 credits selected from area B)

BIOL3301 Marine biology (6)

Systematics and phylogenetics (6) BIOL3302

Conservation biology (6) **BIOL3303** 

**BIOL3419** Insect ecology: the little things that run the world (6)

BIOL3501 Evolution (6)

Take either BIOL3501 or BIOL3506 to fulfill this 12 credits requirement, but not both. BIOL3501 and BIOL3506 are mutually exclusive.

**BIOL3506** Evolutionary biology (6) Take either BIOL3501 or BIOL3506 to fulfill this 12 credits requirement, but not both. BIOL3501 and BIOL3506 are mutually

exclusive

# (C) Physiology and organismic biology (at least 18 credits with 6 credits from each of List I, II & III)

BIOL3105 BIOL3205 BIOL3403 BIOL3406 BIOL3503	Animal physiology and environmental adaptation (6) Human physiology (6) Immunology (6) Reproduction and reproductive biotechnology (6) Endocrinology: human physiology II (6)	
BIOL3107	Plant physiology (6)	Take either BIOL3107 or ENVS3202 to fulfill this 6 credits requirement in List II, but not both. BIOL3107 and ENVS3202 are mutually exclusive.
BIOL3314	Plant structure and evolution (6)	
ENVS3202	Plant physiology and climate change (6)	Take either BIOL3107 or ENVS3202 to fulfill this 6 credits requirement in List II, but not both. BIOL3107 and ENVS3202 are mutually exclusive.
BIOL4411 List III	Plant and food biotechnology (6)	
BIOL3109	Environmental microbiology (6)	
BIOL3203	Food microbiology (6)	
BIOL3508	Microbial physiology and biotechnology (6)	
BIOL4401	Medical microbiology and applied immunology (6)	
3. Capstone requirement (6 credits)		
At least 6 credits selected from the following courses:		
BIOL3994	Directed studies in biological sciences (6)	
BIOL4964	Biological sciences internship (6)	
BIOL4994	Biological sciences project (12)	

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details

#### Remarks:

Major Title Major in Biological Sciences

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

This Major is designed for students seeking a broad-based training in modern biology. Students are guided in an inquiry-driven learning environment to appreciate the major biological systems at different levels of biological organization. Teaching emphasizes both core concepts and applied aspects in biological sciences. The programme is highly flexible as students can select courses according to their own interests from a wide spectrum of elective courses. At the advanced level, students are further allowed to specialize in areas such as microbiology, genetics & cytology, physiology & homeostasis, or diversity of life & environmental biology and undertake experiential learning activities. The diverse learning experience exposes students to problem-based learning, and an exciting array of laboratory and field techniques. Students will also be able to acquire valuable transferable skills in analysis, organization and communication. The Biological Sciences Major applies modern scientific inquiry to prepare graduates for employment as professionals in a variety of careers or for postgraduate study.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand concepts underpinning advances in cell biology and genetics, physiology and systems biology, diversity of life and environmental biology, and applied biology (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: evaluate diverse threads of enquiry in science, and identify the value of datasets and written output (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: interpret scientific data from a range of sources and explain trends observed (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: demonstrate independent and critical thinking and appreciate moral and ethical issues related to biological sciences (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: communicate in a professional capacity with educators, business, media and the scientific community (by means of coursework, tutorial classes, project-based and presentation opportunities in the curriculum)
- PLO 6: be prepared to enter employment as professional scientists, educators and managers (by means of coursework, tutorial classes, laboratory-based, project-based and capstone learning in the curriculum)

#### Impermissible Combinations:

Major in Ecology & Biodiversity (Intensive)

Major in Molecular Biology & Biotechnology (Intensive)

### Required courses (96 credits)

## 1. Introductory level courses (48 credits)

# Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

BIOL1110 From molecules to cells (6)
BIOL1309 Evolutionary diversity (6)
BIOL2102 Biostatistics (6)

BIOL 2102 Biostatistics (0)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

Take either BIOL2220 or BIOC2600 to fulfill this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually

exclusive.

BIOL2306 Ecology and evolution (6)
BIOC2600 Basic biochemistry (6)

Take either BIOL2220 and BIOC2600 to fulfill this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

2. Advanced level courses (at least 42 credits)

### **Disciplinary Electives (42 credits)**

Students must select at least 6 credits from each of the following area A, B, C & D:

### (A) Genetics and cell biology

BIOL3401 Molecular biology (6)

BIOL3402 Cell biology and cell technology (6)

BIOL3403 Immunology (6) BIOL3408 Genetics (6)

(B) Physiology and systems biology

BIOL3105 Animal physiology and environmental adaptation (6)

BIOL3107 Plant physiology (6) BIOL3108 Microbial physiology (6)

Take either BIOL3108 or BIOL3508 to fulfill this 42 credits requirement, but not both. BIOL3108 and BIOL3508 are mutually exclusive.

BIOL3205 Human physiology (6)

BIOL3508 Microbial physiology and biotechnology (6)

Take either BIOL3108 or BIOL3508 to fulfill this 42 credits requirement, but not both. BIOL3108 and BIOL3508 are mutually exclusive.

# (C) Diversity of life and environmental biology

BIOL3109 Environmental microbiology (6)

BIOL3110 Environmental toxicology (6)

BIOL3301 Marine biology (6)

BIOL3302 Systematics and phylogenetics (6)

(D) Applied biology

BIOL3303 Conservation biology (6)

BIOL3409 Business aspects of biotechnology (6)

BIOL4301 Fish and fisheries (6)

BIOL4401 Medical microbiology and applied immunology (6)

### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:
BIOL3994 Directed studies in biological sciences (6)
BIOL4964 Biological sciences internship (6)
BIOL4994 Biological sciences project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

#### Remarks:

Major Title Major in Biological Sciences

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

This Major is designed for students seeking a broad-based training in modern biology. Students are guided in an inquiry-driven learning environment to appreciate the major biological systems at different levels of biological organization. Teaching emphasizes both core concepts and applied aspects in biological sciences. The programme is highly flexible as students can select courses according to their own interests from a wide spectrum of elective courses. At the advanced level, students are further allowed to specialize in areas such as microbiology, genetics & cytology, physiology & homeostasis, or diversity of life & environmental biology and undertake experiential learning activities. The diverse learning experience exposes students to problem-based learning, and an exciting array of laboratory and field techniques. Students will also be able to acquire valuable transferable skills in analysis, organization and communication. The Biological Sciences Major applies modern scientific inquiry to prepare graduates for employment as professionals in a variety of careers or for postgraduate study.

### Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: understand concepts underpinning advances in cell biology and genetics, physiology and systems biology, diversity of life and environmental biology, and applied biology (by means of coursework, tutorial classes and laboratorybased learning in the curriculum)
- PLO 2: evaluate diverse threads of enquiry in science, and identify the value of datasets and written output (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: interpret scientific data from a range of sources and explain trends observed (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: demonstrate independent and critical thinking and appreciate moral and ethical issues related to biological sciences (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: communicate in a professional capacity with educators, business, media and the scientific community (by means of coursework, tutorial classes, project-based and presentation opportunities in the curriculum)
- PLO 6: be prepared to enter employment as professional scientists, educators and managers (by means of coursework, tutorial classes, laboratory-based, project-based and capstone learning in the curriculum)

### Impermissible Combinations:

### Required courses (96 credits)

### 1. Introductory level courses (48 credits)

# Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

# **Disciplinary Core Courses (36 credits)**

From molecules to cells (6) BIOL1110 Introductory microbiology (6) **BIOL1111** BIOL1309 Evolutionary diversity (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

**BIOL2306** Ecology and evolution (6)

# 2. Advanced level courses (at least 42 credits)

# **Disciplinary Electives (42 credits)**

Students must select at least 6 credits from each of the following area A, B, C & D:

### (A) Genetics and cell biology

BIOL3401 Molecular biology (6)

BIOL3402 Cell biology and cell technology (6)

BIOL3403 Immunology (6) Genetics (6) **BIOL3408** 

(B) Physiology and systems biology

**BIOL3105** Animal physiology and environmental adaptation (6)

**BIOL3107** Plant physiology (6) Microbial physiology (6) **BIOL3108** 

Take either BIOI 3108 or BIOI 3508 to fulfill this 42 credits requirement, but not both. BIOL3108 and BIOL3508 are mutually exclusive.

BIOL3205 Human physiology (6)

Microbial physiology and biotechnology (6) BIOL3508

Take either BIOL3108 or BIOL3508 to fulfill this 42 credits requirement, but not both. BIOL3108 and BIOL3508 are mutually exclusive.

### (C) Diversity of life and environmental biology

Environmental microbiology (6) **BIOL3109** BIOL3110 Environmental toxicology (6)

Marine biology (6) BIOL3301

Systematics and phylogenetics (6) BIOL3302

(D) Applied biology

Conservation biology (6) BIOL3303

**BIOL3409** Business aspects of biotechnology (6)

Fish and fisheries (6) BIOL4301

BIOL4401 Medical microbiology and applied immunology (6)

### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:
BIOL3994 Directed studies in biological sciences (6)

BIOL4964 Biological sciences internship (6) BIOL4994 Biological sciences project (12)

### Notes:

- 1. BIOL1111 Introductory Microbiology is not offered from 2015-16. Students should take either BIOL2220 Principles of biochemistry or BIOC2600 Basic biochemistry as a replacement, both BIOL2220 and BIOC2600 are mutually exclusive.
- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details

#### Remarks:

Major Title Major in Biological Sciences

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

This Major is designed for students seeking a broad-based training in modern biology. Students are guided in an inquiry-driven learning environment to appreciate the major biological systems at different levels of biological organization. Teaching emphasizes both core concepts and applied aspects in biological sciences. The programme is highly flexible as students can select courses according to their own interests from a wide spectrum of elective courses. At the advanced level, students are further allowed to specialize in areas such as microbiology, genetics & cytology, physiology & homeostasis, or diversity of life & environmental biology and undertake experiential learning activities. The diverse learning experience exposes students to problem-based learning, and an exciting array of laboratory and field techniques. Students will also be able to acquire valuable transferable skills in analysis, organization and communication. The Biological Sciences Major applies modern scientific inquiry to prepare graduates for employment as professionals in a variety of careers or for postgraduate study.

### Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: understand concepts underpinning advances in cell biology and genetics, physiology and systems biology, diversity of life and environmental biology, and applied biology (by means of coursework, tutorial classes and laboratorybased learning in the curriculum)
- PLO 2: evaluate diverse threads of enquiry in science, and identify the value of datasets and written output (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: interpret scientific data from a range of sources and explain trends observed (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: demonstrate independent and critical thinking and appreciate moral and ethical issues related to biological sciences (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: communicate in a professional capacity with educators, business, media and the scientific community (by means of coursework, tutorial classes, project-based and presentation opportunities in the curriculum)
- PLO 6: be prepared to enter employment as professional scientists, educators and managers (by means of coursework, tutorial classes, laboratory-based, project-based and capstone learning in the curriculum)

### Impermissible Combinations:

### Required courses (96 credits)

### 1. Introductory level courses (48 credits)

### Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

### **Disciplinary Core Courses (36 credits)**

From molecules to cells (6) BIOL1110 Introductory microbiology (6) **BIOL1111** BIOL1309 Evolutionary diversity (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

**BIOL2306** Ecology and evolution (6)

# 2. Advanced level courses (at least 42 credits)

# **Disciplinary Electives (42 credits)**

Students must select at least 6 credits from each of the following area A, B, C & D:

### (A) Genetics and cell biology

BIOL3401 Molecular biology (6)

BIOL3402 Cell biology and cell technology (6)

BIOL3403 Immunology (6) Genetics (6) **BIOL3408** (B) Physiology and systems biology

**BIOL3105** Animal physiology and environmental adaptation (6)

**BIOL3107** Plant physiology (6)

**BIOL3108** Microbial physiology (6)

BIOL3205 Human physiology (6)

Microbial physiology and biotechnology (6) BIOL3508

Take either BIOL3108 or BIOL3508 to fulfill this 42 credits requirement, but not both. BIOL3108 and BIOL3508 are mutually exclusive.

Take either BIOL3108 or BIOL3508 to fulfill

this 42 credits requirement, but not both. BIOL3108 and BIOL3508 are mutually

exclusive.

### (C) Diversity of life and environmental biology

Environmental microbiology (6) **BIOL3109** BIOL3110 Environmental toxicology (6)

Marine biology (6) BIOL3301

Systematics and phylogenetics (6) BIOL3302

(D) Applied biology

Conservation biology (6) BIOL3303

**BIOL3409** Business aspects of biotechnology (6)

Fish and fisheries (6) BIOL4301

BIOL4401 Medical microbiology and applied immunology (6)

### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:
BIOL3994 Directed studies in biological sciences (6)

BIOL4964 Biological sciences internship (6) BIOL4994 Biological sciences project (12)

### Notes:

- 1. BIOL1111 Introductory Microbiology is not offered from 2015-16. Students should take either BIOL2220 Principles of biochemistry or BIOC2600 Basic biochemistry as a replacement, both BIOL2220 and BIOC2600 are mutually exclusive.
- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details

#### Remarks:

Major Title Major in Biological Sciences

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

This Major is designed for students seeking a broad-based training in modern biology. Students are guided in an inquiry-driven learning environment to appreciate the major biological systems at different levels of biological organization. Teaching emphasizes both core concepts and applied aspects in biological sciences. The programme is highly flexible as students can select courses according to their own interests from a wide spectrum of elective courses. At the advanced level, students are further allowed to specialize in areas such as microbiology, genetics & cytology, physiology & homeostasis, or diversity of life & environmental biology and undertake experiential learning activities. The diverse learning experience exposes students to problem-based learning, and an exciting array of laboratory and field techniques. Students will also be able to acquire valuable transferable skills in analysis, organization and communication. The Biological Sciences Major applies modern scientific inquiry to prepare graduates for employment as professionals in a variety of careers or for postgraduate study.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand concepts underpinning advances in cell biology and genetics, physiology and systems biology, diversity of life and environmental biology, and applied biology (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: evaluate diverse threads of enquiry in science, and identify the value of datasets and written output (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: interpret scientific data from a range of sources and explain trends observed (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: demonstrate independent and critical thinking and appreciate moral and ethical issues related to biological sciences (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: communicate in a professional capacity with educators, business, media and the scientific community (by means of coursework, tutorial classes, project-based and presentation opportunities in the curriculum)
- PLO 6: be prepared to enter employment as professional scientists, educators and managers (by means of coursework, tutorial classes, laboratory-based, project-based and capstone learning in the curriculum)

### Impermissible Combinations:

NIL

### Required courses (96 credits)

### 1. Introductory level courses (48 credits)

# Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

# Disciplinary Core Courses (36 credits)

BIOL1110 From molecules to cells (6)
BIOL1111 Introductory microbiology (6)
BIOL1309 Evolutionary diversity (6)
BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2306 Ecology and evolution (6)

# 2. Advanced level courses (at least 42 credits)

# Disciplinary Electives (42 credits)

Students must select at least 6 credits from each of the following area A, B, C & D:

### (A) Genetics and cell biology

BIOL3401 Molecular biology (6)

BIOL3402 Cell biology and cell technology (6)

BIOL3403 Immunology (6) BIOL3408 Genetics (6)

(B) Physiology and systems biology

BIOL3105 Animal physiology and environmental adaptation (6)

BIOL3107 Plant physiology (6) BIOL3108 Microbial physiology (6)

this 42 credits requirement, but not both.

BIOL3108 and BIOL3508 are mutually
exclusive.

BIOL3205 Human physiology (6)

BIOL3508 Microbial physiology and biotechnology (6)

Take either BIOL3108 or BIOL3508 to fulfill this 42 credits requirement, but not both. BIOL3108 and BIOL3508 are mutually exclusive.

Take either BIOL3108 or BIOL3508 to fulfill

### (C) Diversity of life and environmental biology

BIOL3109 Environmental microbiology (6)
BIOL3110 Environmental toxicology (6)

BIOL3301 Marine biology (6)

BIOL3302 Systematics and phylogenetics (6)

(D) Applied biology

BIOL3303 Conservation biology (6)

BIOL3409 Business aspects of biotechnology (6)

BIOL4301 Fish and fisheries (6)

BIOL4401 Medical microbiology and applied immunology (6)

### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:
BIOL3994 Directed studies in biological sciences (6)

BIOL4964 Biological sciences internship (6) BIOL4994 Biological sciences project (12)

### Notes:

- 1. BIOL1111 Introductory Microbiology is not offered from 2015-16. Students should take either BIOL2220 Principles of biochemistry or BIOC2600 Basic biochemistry as a replacement, both BIOL2220 and BIOC2600 are mutually exclusive.
- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details

#### Remarks:

Major Title Major in Biological Sciences (Intensive)

Offered to students 2021

admitted to Year 1 in

#### **Objectives:**

This major is designed for students seeking a broad-based training in conventional and modern biology. Students are guided in a stimulating learning environment to explore major biological systems at different levels of biological organization. Teaching emphasizes both core concepts and applied aspects in biological sciences. The curriculum allows students to select courses according to their own interests from a wide spectrum of elective courses. At the advanced level, students are further exposed to three fundamental areas of biological sciences (genetics, molecular & cell biology; ecology, systematics and evolution; physiology and organismic biology). Students are engaged in scientific learning through a wide range of laboratory and field work. They will acquire valuable transferable skills in analysis, organization and communication. The Biological Sciences Major prepares graduates for employment as professionals in a variety of careers or for postgraduate study. The intensive major includes additional coursework and a compulsory capstone research project. It is designed for students with a strong desire to acquire knowledge with sufficient depth and breadth in biological sciences.

This intensive major has been accredited by the Royal Society of Biology (RSB), UK, for the purpose of meeting in part the academic and experience requirement for the Membership and Chartered Biologist (CBiol).

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and explain the key concepts in genetics, molecular & cell biology; ecology, systematics and evolution; physiology and organismic biology, and to appraise the related ethical and moral issues (by means of coursework, laboratory- and/or research-based learning in the curriculum)
- PLO 2: equip with sufficient knowledge in chemistry for application within a biological context (by means of coursework, laboratory- and/or research-based learning in the curriculum)
- PLO 3: analyze and interpret quantitative and qualitative biological data to provide scientifically based conclusions and/or judgements (by means of coursework, laboratory- and/or research-based learning in the curriculum)
- PLO 4: tackle biological research problems by formulating hypothesis and designing experimental investigations (by means of coursework, laboratory- and/or research-based learning in the curriculum)
- PLO 5: communicate effectively and professionally with scientists, educators, media, and general public in oral and written forms (by means of coursework, laboratory- and/or research-based learning, and presentation opportunities in the curriculum)

### Impermissible Combinations:

Major in Biological Sciences

Major in Ecology & Biodiversity

Major in Ecology & Biodiversity (Intensive)

Major in Molecular Biology & Biotechnology

Major in Molecular Biology & Biotechnology (Intensive)

### Required courses (144 credits)

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		el courses (60 credits) Courses: Science Foundation Courses (12 credits)	
	SCNC1111	Scientific method and reasoning (6)	(Note 1)
	SCNC1112	Fundamentals of modern science (6)	(Note 1)
	Disciplinary Core	Courses (48 credits)	
	BIOL1110	From molecules to cells (6)	(Note 1)
	BIOL1309	Evolutionary diversity (6)	(Note 1)
	CHEM1042	General chemistry I (6)	
	CHEM1043	General chemistry II (6)	
	BIOL2102	Biostatistics (6)	(Note 1)
	BIOL2103	Biological sciences laboratory course (6)	(Note 1)
	BIOL2220	Principles of biochemistry (6)	Take either BIOL2220 or BIOC2600 to fulfill this 48 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive. (Note 1)
	BIOL2306	Ecology and evolution (6)	(Note 1)
	BIOC2600	Basic biochemistry (6)	Take either BIOL2220 or BIOC2600 to fulfill this 48 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive. (Note 1)

### 2. Advanced level courses (72 credits)

Disciplinary Electives (72 credits with at least 18 credits of Level 4XXX courses))

(A) Genetics,	molecular and	cel	l biol	ogy (a	it least 12	2 credits	selected	trom	area A	ı)

BIOL3401 Molecular biology (6)
BIOL3402 Cell biology and cell technology (6)
BIOL3404 Protein structure and function (6)
BIOL3408 Genetics (6)
BIOL4416 Stem cells and regenerative biology (6)
BIOL4417 'Omics' and systems biology (6)

(B) Ecology, systematics and evolution (at least 12 credits selected from area B)

BIOL3301 Marine biology (6)

BIOL3302 Systematics and phylogenetics (6) BIOL3303 Conservation biology (6)

BIOL3319 BIOL3506	Tropical terrestrial ecology (6) Evolutionary biology (6)
BIOL4302	Environmental impact assessment (6)
. ,	d organismic biology (at least 18 credits with 6 credits from each of List I, II & III)
List I	A : 11 1 : (6)
BIOL3101	Animal behaviour (6)
BIOL3105	Animal physiology and environmental adaptation (6)
BIOL3205	Human physiology (6)
BIOL3403	Immunology (6)
BIOL3406	Reproduction and reproductive biotechnology (6)
BIOL3503	Endocrinology: human physiology II (6)
List II	
BIOL3314	Plant structure and evolution (6)
ENVS3202	Plant physiology and climate change (6)
BIOL4411	Plant and food biotechnology (6)
List III	
BIOL3109	Environmental microbiology (6)
BIOL3203	Food microbiology (6)
BIOL3508	Microbial physiology and biotechnology (6)
3. Capstone requi	rement (12 credits)
BIOL4994	Biological sciences project (12)

### Notes:

- 1. These are core courses in the regular Biological Sciences Major (96 credits) curriculum.
- 2. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis
- 3. Candidates who have been admitted to Year 1 in 2021-22 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1112. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Biology, Chemistry, and Physics in the Hong Kong Diploma of Secondary Education (HKDSE)
   Level 5 or above in Biology, Chemistry, and Physics Higher Level in International Baccalaureate (IB)
- Grade B or above in Biology, Chemistry, and Physics in General Certificate of Education Advanced Level (GCEAL)
   Biology, Chemistry, and Physics qualification in Gao Kao will be considered on a case-by-case basis
- 4. As this curriculum is accredited by the Royal Society of Biology (RSB), students must follow the curriculum in full (i.e. no replacement courses are possible) in order to graduate with this accredited programme.

### Remarks:

Major Title Major in Biological Sciences (Intensive)

Offered to students 2020

admitted to Year 1 in

#### **Objectives:**

This major is designed for students seeking a broad-based training in conventional and modern biology. Students are guided in a stimulating learning environment to explore major biological systems at different levels of biological organization. Teaching emphasizes both core concepts and applied aspects in biological sciences. The curriculum allows students to select courses according to their own interests from a wide spectrum of elective courses. At the advanced level, students are further exposed to three fundamental areas of biological sciences (genetics, molecular & cell biology; ecology, systematics and evolution; physiology and organismic biology). Students are engaged in scientific learning through a wide range of laboratory and field work. They will acquire valuable transferable skills in analysis, organization and communication. The Biological Sciences Major prepares graduates for employment as professionals in a variety of careers or for postgraduate study. The intensive major includes additional coursework and a compulsory capstone research project. It is designed for students with a strong desire to acquire knowledge with sufficient depth and breadth in biological sciences.

This intensive major has been accredited by the Royal Society of Biology (RSB), UK, for the purpose of meeting in part the academic and experience requirement for the Membership and Chartered Biologist (CBiol).

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and explain the key concepts in genetics, molecular & cell biology; ecology, systematics and evolution; physiology and organismic biology, and to appraise the related ethical and moral issues (by means of coursework, laboratory- and/or research-based learning in the curriculum)
- PLO 2: equip with sufficient knowledge in chemistry for application within a biological context (by means of coursework, laboratory- and/or research-based learning in the curriculum)
- PLO 3: analyze and interpret quantitative and qualitative biological data to provide scientifically based conclusions and/or judgements (by means of coursework, laboratory- and/or research-based learning in the curriculum)
- PLO 4: tackle biological research problems by formulating hypothesis and designing experimental investigations (by means of coursework, laboratory- and/or research-based learning in the curriculum)
- PLO 5: communicate effectively and professionally with scientists, educators, media, and general public in oral and written forms (by means of coursework, laboratory- and/or research-based learning, and presentation opportunities in the curriculum)

### Impermissible Combinations:

Major in Biological Sciences

Major in Ecology & Biodiversity

Major in Ecology & Biodiversity (Intensive)

Major in Molecular Biology & Biotechnology

Major in Molecular Biology & Biotechnology (Intensive)

# Required courses (144 credits)

Required courses	s (144 Credits)	
1. Introductory lev	el courses (60 credits)	
Disciplinary Core	Courses: Science Foundation Courses (12 credits)	
SCNC1111	Scientific method and reasoning (6)	(Note 1)
SCNC1112	Fundamentals of modern science (6)	(Note 1)
Disciplinary Core	Courses (48 credits)	
BIOL1110	From molecules to cells (6)	(Note 1)
BIOL1309	Evolutionary diversity (6)	(Note 1)
CHEM1042	General chemistry I (6)	
CHEM1043	General chemistry II (6)	
BIOL2102	Biostatistics (6)	(Note 1)
BIOL2103	Biological sciences laboratory course (6)	(Note 1)
BIOL2220	Principles of biochemistry (6)	Take either BIOL2220 or BIOC2600 to fulfill this 48 credits requirement, but not both.
		BIOL2220 and BIOC2600 are mutually
DIOL 2206	Foology and syclution (6)	exclusive. (Note 1)
BIOL2306	Ecology and evolution (6)	(Note 1)
BIOC2600	Basic biochemistry (6)	Take either BIOL2220 or BIOC2600 to fulfill
		this 48 credits requirement, but not both.
		BIOL2220 and BIOC2600 are mutually
2 Advanced level	courses (72 credits)	exclusive. (Note 1)
2. Auvanceu level	Courses (12 Credits)	

Disciplinary Electives (72 credits with at least 18 credits of Level 4XXX courses))

(A	) Gen	etics.	molecular and	cell biology (at least 12 credits selected from area A	1)

BIOL3401 Molecular biology (6) BIOL3402 Cell biology and cell technology (6) Protein structure and function (6) BIOL3404 **BIOL3408** Genetics (6) Stem cells and regenerative biology (6) **BIOL4416** 

**BIOL4417** 'Omics' and systems biology (6) (B) Ecology, systematics and evolution (at least 12 credits selected from area B)

BIOL3301 Marine biology (6)

BIOL3302 Systematics and phylogenetics (6) BIOL3303 Conservation biology (6)

BIOL3319	Tropical terrestrial ecology (6)
BIOL3506	Evolutionary biology (6)
BIOL4302	Environmental impact assessment (6)
	d organismic biology (at least 18 credits with 6 credits from each of List I, II & III)
List I	d organismic bloogy (at least to creats with a creats from each of List i, ii a iii)
BIOL3101	Animal behaviour (6)
BIOL3105	Animal physiology and environmental adaptation (6)
BIOL3205	Human physiology (6)
BIOL3403	Immunology (6)
BIOL3406	Reproduction and reproductive biotechnology (6)
BIOL3503	Endocrinology: human physiology II (6)
List II	
BIOL3314	Plant structure and evolution (6)
ENVS3202	Plant physiology and climate change (6)
BIOL4411	Plant and food biotechnology (6)
List III	
BIOL3109	Environmental microbiology (6)
BIOL3203	Food microbiology (6)
BIOL3508	Microbial physiology and biotechnology (6)
BIOL4401	Medical microbiology and applied immunology (6)
3. Capstone requir	rement (12 credits)
BIOL4994	Biological sciences project (12)

- 1. These are core courses in the regular Biological Sciences Major (96 credits) curriculum.
- 2. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
   Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis
- 3. As this curriculum is accredited by the Royal Society of Biology (RSB), students must follow the curriculum in full (i.e. no replacement courses are possible) in order to graduate with this accredited programme.

### Remarks:

Major Title Major in Biological Sciences (Intensive)

Offered to students 2019

admitted to Year 1 in

#### **Objectives:**

This major is designed for students seeking a broad-based training in conventional and modern biology. Students are guided in a stimulating learning environment to explore major biological systems at different levels of biological organization. Teaching emphasizes both core concepts and applied aspects in biological sciences. The curriculum allows students to select courses according to their own interests from a wide spectrum of elective courses. At the advanced level, students are further exposed to three fundamental areas of biological sciences (genetics, molecular & cell biology; ecology, systematics and evolution; physiology and organismic biology). Students are engaged in scientific learning through a wide range of laboratory and field work. They will acquire valuable transferable skills in analysis, organization and communication. The Biological Sciences Major prepares graduates for employment as professionals in a variety of careers or for postgraduate study. The intensive major includes additional coursework and a compulsory capstone research project. It is designed for students with a strong desire to acquire knowledge with sufficient depth and breadth in biological sciences.

This intensive major has been accredited by the Royal Society of Biology (RSB), UK, for the purpose of meeting in part the academic and experience requirement for the Membership and Chartered Biologist (CBiol).

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and explain the key concepts in genetics, molecular & cell biology; ecology, systematics and evolution; physiology and organismic biology, and to appraise the related ethical and moral issues (by means of coursework, laboratory- and/or research-based learning in the curriculum)
- PLO 2: equip with sufficient knowledge in chemistry for application within a biological context (by means of coursework, laboratory- and/or research-based learning in the curriculum)
- PLO 3: analyze and interpret quantitative and qualitative biological data to provide scientifically based conclusions and/or judgements (by means of coursework, laboratory- and/or research-based learning in the curriculum)
- PLO 4: tackle biological research problems by formulating hypothesis and designing experimental investigations (by means of coursework, laboratory- and/or research-based learning in the curriculum)
- PLO 5: communicate effectively and professionally with scientists, educators, media, and general public in oral and written forms (by means of coursework, laboratory- and/or research-based learning, and presentation opportunities in the curriculum)

### Impermissible Combinations:

Major in Biological Sciences

Major in Ecology & Biodiversity

Major in Ecology & Biodiversity (Intensive)

Major in Molecular Biology & Biotechnology

Major in Molecular Biology & Biotechnology (Intensive)

# Required courses (144 credits)

Required courses	5 (144 Credits)	
1. Introductory lev	rel courses (60 credits)	
Disciplinary Core	Courses: Science Foundation Courses (12 credits)	
SCNC1111	Scientific method and reasoning (6)	(Note 1)
SCNC1112	Fundamentals of modern science (6)	(Note 1)
Disciplinary Core	Courses (48 credits)	
BIOL1110	From molecules to cells (6)	(Note 1)
BIOL1309	Evolutionary diversity (6)	(Note 1)
CHEM1042	General chemistry I (6)	
CHEM1043	General chemistry II (6)	
BIOL2102	Biostatistics (6)	(Note 1)
BIOL2103	Biological sciences laboratory course (6)	(Note 1)
BIOL2220	Principles of biochemistry (6)	Take either BIOL2220 or BIOC2600 to fulfill this 48 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive. (Note 1)
BIOL2306	Ecology and evolution (6)	(Note 1)
BIOC2600	Basic biochemistry (6)	Take either BIOL2220 or BIOC2600 to fulfill this 48 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive. (Note 1)
2 Advanced level	courses (72 eredite)	

## 2. Advanced level courses (72 credits)

Disciplinary Electives (72 credits with at least 18 credits of Level 4XXX courses )

(A) Genetics,	molecular and	cell	piolo	gy (at	least 12	credits se	lected fro	m area A

BIOL3401 Molecular biology (6)
BIOL3402 Cell biology and cell technology (6)
BIOL3404 Protein structure and function (6)
BIOL3408 Genetics (6)
BIOL4416 Stem cells and regenerative biology (6)

BIOL4417 'Omics' and systems biology (6)
(B) Ecology, systematics and evolution (at least 12 credits selected from area B)

BIOL3101 Animal behaviour (6)
BIOL3301 Marine biology (6)

BIOL3302 Systematics and phylogenetics (6)

BIOL3303	Conservation biology (6)	
BIOL3319	Tropical terrestrial ecology (6)	
BIOL3506	Evolutionary biology (6)	
BIOL4302	Environmental impact assessment (6)	
(C) Physiology an	d organismic biology (at least 18 credits with 6 credi	ts from each of List I, II & III)
List I		
BIOL3105	Animal physiology and environmental adaptation (6)	
BIOL3205	Human physiology (6)	
BIOL3403	Immunology (6)	
BIOL3406	Reproduction and reproductive biotechnology (6)	
BIOL3503	Endocrinology: human physiology II (6)	
List II		
BIOL3107	Plant physiology (6)	Take either BIOL3107 or ENVS3202 to fulfill this 6 credits requirement in List II, but not both. BIOL3107 and ENVS3202 are mutually exclusive.
BIOL3314	Plant structure and evolution (6)	
ENV\$3202	Plant physiology and climate change (6)	Take either BIOL3107 or ENVS3202 to fulfill this 6 credits requirement in List II, but not both. BIOL3107 and ENVS3202 are mutually exclusive.
BIOL4411	Plant and food biotechnology (6)	
List III	, ,	
BIOL3109	Environmental microbiology (6)	
BIOL3203	Food microbiology (6)	
BIOL3508	Microbial physiology and biotechnology (6)	
BIOL4401	Medical microbiology and applied immunology (6)	
3. Capstone requi	rement (12 credits)	
BIOL4994	Biological sciences project (12)	
2.02.00	. , , ,	

### Notes:

1. These are core courses in the regular Biological Sciences Major (96 credits) curriculum.

### Remarks:

Major Title Major in Biological Sciences (Intensive)

Offered to students 2018

admitted to Year 1 in

#### **Objectives:**

This major is designed for students seeking a broad-based training in conventional and modern biology. Students are guided in a stimulating learning environment to explore major biological systems at different levels of biological organization. Teaching emphasizes both core concepts and applied aspects in biological sciences. The curriculum allows students to select courses according to their own interests from a wide spectrum of elective courses. At the advanced level, students are further exposed to three fundamental areas of biological sciences (genetics, molecular & cell biology; ecology, systematics and evolution; physiology and organismic biology). Students are engaged in scientific learning through a wide range of laboratory and field work. They will acquire valuable transferable skills in analysis, organization and communication. The Biological Sciences Major prepares graduates for employment as professionals in a variety of careers or for postgraduate study. The intensive major includes additional coursework and a compulsory capstone research project. It is designed for students with a strong desire to acquire knowledge with sufficient depth and breadth in biological sciences.

This intensive major has been accredited by the Royal Society of Biology (RSB), UK, for the purpose of meeting in part the academic and experience requirement for the Membership and Chartered Biologist (CBiol).

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and explain the key concepts in genetics, molecular & cell biology; ecology, systematics and evolution; physiology and organismic biology, and to appraise the related ethical and moral issues (by means of coursework, laboratory- and/or research-based learning in the curriculum)
- PLO 2: equip with sufficient knowledge in chemistry for application within a biological context (by means of coursework, laboratory- and/or research-based learning in the curriculum)
- PLO 3: analyze and interpret quantitative and qualitative biological data to provide scientifically based conclusions and/or judgements (by means of coursework, laboratory- and/or research-based learning in the curriculum)
- PLO 4: tackle biological research problems by formulating hypothesis and designing experimental investigations (by means of coursework, laboratory- and/or research-based learning in the curriculum)
- PLO 5: communicate effectively and professionally with scientists, educators, media, and general public in oral and written forms (by means of coursework, laboratory- and/or research-based learning, and presentation opportunities in the curriculum)

### Impermissible Combinations:

Major in Biological Sciences

Major in Ecology & Biodiversity

Major in Ecology & Biodiversity (Intensive)

Major in Molecular Biology & Biotechnology

Major in Molecular Biology & Biotechnology (Intensive)

# Required courses (144 credits)

ı	Required courses	s (144 Cledits)	
		rel courses (60 credits)	
ı	Disciplinary Core	Courses: Science Foundation Courses (12 credits)	
ı	SCNC1111	Scientific method and reasoning (6)	(Note 1)
l	SCNC1112	Fundamentals of modern science (6)	(Note 1)
	Disciplinary Core	Courses (48 credits)	
	BIOL1110	From molecules to cells (6)	(Note 1)
	BIOL1309	Evolutionary diversity (6)	(Note 1)
	CHEM1042	General chemistry I (6)	
	CHEM1043	General chemistry II (6)	
	BIOL2102	Biostatistics (6)	(Note 1)
	BIOL2103	Biological sciences laboratory course (6)	(Note 1)
	BIOL2220	Principles of biochemistry (6)	Take either BIOL2220 or BIOC2600 to fulfill this 48 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive. (Note 1)
	BIOL2306	Ecology and evolution (6)	(Note 1)
	BIOC2600	Basic biochemistry (6)	Take either BIOL2220 or BIOC2600 to fulfill this 48 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive. (Note 1)
1	0 Advanagallaval	(70dita)	

### 2. Advanced level courses (72 credits)

Disciplinary Electives (72 credits with at least 18 credits of Level 4XXX courses )

(A) Genetics,	molecular and	cell	piolo	gy (at	least 12	credits se	lected fro	m area A

BIOL3401 Molecular biology (6)

BIOL3402 Cell biology and cell technology (6)

BIOL3404 Protein structure and function (6)

BIOL3408 Genetics (6)

BIOL4416 Stem cells and regenerative biology (6)

BIOL4417 'Omics' and systems biology (6)
(B) Ecology, systematics and evolution (at least 12 credits selected from area B)

BIOL3101 Animal behaviour (6)
BIOL3301 Marine biology (6)

BIOL3302 Systematics and phylogenetics (6)

BIOL3303	Conservation biology (6)	
	T : 11 (1) (2)	
BIOL3319	Tropical terrestrial ecology (6)	
BIOL3506	Evolutionary biology (6)	
BIOL4302	Environmental impact assessment (6)	
	organismic biology (at least 18 credits with 6 credit	s from each of List I, II & III)
List I		
BIOL3105	Animal physiology and environmental adaptation (6)	
BIOL3205	Human physiology (6)	
BIOL3403	Immunology (6)	
BIOL3406	Reproduction and reproductive biotechnology (6)	
BIOL3503	Endocrinology: human physiology II (6)	
List II		
BIOL3107	Plant physiology (6)	Take either BIOL3107 or ENVS3202 to fulfill this 6 credits requirement in List II, but not both. BIOL3107 and ENVS3202 are mutually exclusive.
BIOL3314	Plant structure and evolution (6)	
ENVS3202	Plant physiology and climate change (6)	Take either BIOL3107 or ENVS3202 to fulfill this 6 credits requirement in List II, but not both. BIOL3107 and ENVS3202 are mutually exclusive.
BIOL4411	Plant and food biotechnology (6)	
List III	3. · · /	
BIOL3109	Environmental microbiology (6)	
BIOL3203	Food microbiology (6)	
BIOL3508	Microbial physiology and biotechnology (6)	
BIOL4401	Medical microbiology and applied immunology (6)	
3. Capstone require	ment (12 credits)	
BIOL4994	Biological sciences project (12)	

### Notes:

1. These are core courses in the regular Biological Sciences Major (96 credits) curriculum.

### Remarks:

Major Title Major in Biological Sciences (Intensive)

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

This major is designed for students seeking a broad-based training in conventional and modern biology. Students are guided in a stimulating learning environment to explore major biological systems at different levels of biological organization. Teaching emphasizes both core concepts and applied aspects in biological sciences. The curriculum allows students to select courses according to their own interests from a wide spectrum of elective courses. At the advanced level, students are further exposed to three fundamental areas of biological sciences (genetics, molecular & cell biology; ecology, systematics and evolution; physiology and organismic biology). Students are engaged in scientific learning through a wide range of laboratory and field work. They will acquire valuable transferable skills in analysis, organization and communication. The Biological Sciences Major prepares graduates for employment as professionals in a variety of careers or for postgraduate study. The intensive major includes additional coursework and a compulsory capstone research project. It is designed for students with a strong desire to acquire knowledge with sufficient depth and breadth in biological sciences.

This intensive major has been accredited by the Royal Society of Biology (RSB), UK, for the purpose of meeting in part the academic and experience requirement for the Membership and Chartered Biologist (CBiol).

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and explain the key concepts in genetics, molecular & cell biology; ecology, systematics and evolution; physiology and organismic biology, and to appraise the related ethical and moral issues (by means of coursework, laboratory- and/or research-based learning in the curriculum)
- PLO 2: equip with sufficient knowledge in chemistry for application within a biological context (by means of coursework, laboratory- and/or research-based learning in the curriculum)
- PLO 3: analyze and interpret quantitative and qualitative biological data to provide scientifically based conclusions and/or judgements (by means of coursework, laboratory- and/or research-based learning in the curriculum)
- PLO 4: tackle biological research problems by formulating hypothesis and designing experimental investigations (by means of coursework, laboratory- and/or research-based learning in the curriculum)
- PLO 5: communicate effectively and professionally with scientists, educators, media, and general public in oral and written forms (by means of coursework, laboratory- and/or research-based learning, and presentation opportunities in the curriculum)

### Impermissible Combinations:

Major in Biological Sciences

Major in Ecology & Biodiversity

Major in Ecology & Biodiversity (Intensive)

Major in Molecular Biology & Biotechnology

Major in Molecular Biology & Biotechnology (Intensive)

# Required courses (144 credits)

Required Courses (144 Credits)					
1. Introductory level courses (60 credits)					
Disciplinary Core	Courses: Science Foundation Courses (12 credits)				
SCNC1111	Scientific method and reasoning (6)	(Note 1)			
SCNC1112	Fundamentals of modern science (6)	(Note 1)			
Disciplinary Core	Courses (48 credits)				
BIOL1110	From molecules to cells (6)	(Note 1)			
BIOL1309	Evolutionary diversity (6)	(Note 1)			
CHEM1042	General chemistry I (6)				
CHEM1043	General chemistry II (6)				
BIOL2102	Biostatistics (6)	(Note 1)			
BIOL2103	Biological sciences laboratory course (6)	(Note 1)			
BIOL2220	Principles of biochemistry (6)	Take either BIOL2220 or BIOC2600 to fulfill this 48 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive. (Note 1)			
BIOL2306	Ecology and evolution (6)	(Note 1)			
BIOC2600	Basic biochemistry (6)	Take either BIOL2220 or BIOC2600 to fulfill this 48 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive. (Note 1)			
2 Advanced level	courses (72 eredite)				

### 2. Advanced level courses (72 credits)

Disciplinary Electives (72 credits with at least 18 credits of Level 4XXX courses )

(A	A) Gene	etics.	molecular and	cell biology (at least 12 credits selected from area A	)

BIOL3401 Molecular biology (6)
BIOL3402 Cell biology and cell technology (6)
BIOL3404 Protein structure and function (6)
BIOL3408 Genetics (6)
BIOL4416 Stem cells and regenerative biology (6)

BIOL4417 'Omics' and systems biology (6)
(B) Ecology, systematics and evolution (at least 12 credits selected from area B)

BIOL3101 Animal behaviour (6)
BIOL3301 Marine biology (6)

BIOL3302 Systematics and phylogenetics (6)

BIOL 2222	Compounding highers (6)	
BIOL3303	Conservation biology (6)	
BIOL3319	Tropical terrestrial ecology (6)	
BIOL3506	Evolutionary biology (6)	
BIOL4302	Environmental impact assessment (6)	
` ' ' ' '	d organismic biology (at least 18 credits with 6 credit	s from each of List I, II & III)
List I		
BIOL3105	Animal physiology and environmental adaptation (6)	
BIOL3205	Human physiology (6)	
BIOL3403	Immunology (6)	
BIOL3406	Reproduction and reproductive biotechnology (6)	
BIOL3503	Endocrinology: human physiology II (6)	
List II		
BIOL3107	Plant physiology (6)	Take either BIOL3107 or ENVS3202 to fulfill this 6 credits requirement in List II, but not both. BIOL3107 and ENVS3202 are mutually exclusive.
BIOL3314	Plant structure and evolution (6)	
ENVS3202	Plant physiology and climate change (6)	Take either BIOL3107 or ENVS3202 to fulfill this 6 credits requirement in List II, but not both. BIOL3107 and ENVS3202 are mutually exclusive.
BIOL4411	Plant and food biotechnology (6)	
List III	3, ( )	
BIOL3109	Environmental microbiology (6)	
BIOL3203	Food microbiology (6)	
BIOL3508	Microbial physiology and biotechnology (6)	
BIOL4401	Medical microbiology and applied immunology (6)	
3. Capstone require	6, 11	
BIOL4994	Biological sciences project (12)	

### Notes:

1. These are core courses in the regular Biological Sciences Major (96 credits) curriculum.

### Remarks:

Offered to students 2021

admitted to Year 1 in

#### **Objectives:**

The Major in Chemistry aims to provide students with a solid training in major areas of chemistry. The curriculum includes core courses covering topics in physical, inorganic, organic, and analytical chemistry. A wide selection of elective courses in chemical biology, chemical analysis, computational chemistry, environmental chemistry, industrial chemistry, interfacial science, material, and medicinal chemistry, is also available to provide students with knowledge and training to help them meet the dynamic and ever-changing challenges in science and technology. Graduates of the Chemistry Major programme will be proficient in the principles and experimental skills of chemistry. The programme will also equip students with transferable skills in both theoretical and experimental investigations in sciences that are crucial for their future careers in a knowledge-based economy. It is expected that our graduates will be able to meet local and regional requirements in the industrial, commercial, government or education sectors and will become future leaders of these sectors.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: demonstrate an understanding across a wide range of topics in chemistry, from basic areas such as analytical, inorganic, organic & physical chemistry, to advanced topics related to current research in chemistry (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 2: demonstrate an in-depth understanding of fundamental physicochemical principles with the ability to apply that knowledge to the solution of theoretical & practical problems (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 3: have developed an awareness & understanding of scientific and ethical issues where chemistry relates to other disciplines, and an appreciation of the impact of chemistry in the modern world (by means of coursework, laboratorybased and/or research-based learning in the curriculum)
- PLO 4: have substantially developed advanced experimental skills including chemical synthesis, analysis & operation of modern instrumentation, and data analysis skills with the ability to interpret experimental information & infer appropriate conclusions (by requiring of no less than 100 hours of laboratory classes in the curriculum)
- PLO 5: demonstrate problem-solving skills, critical thinking, creativity & effective written & oral communication skills, and to co-operate with other people & participate as an effective team member (by means of coursework, laboratory-based learning, group project & presentation opportunities in the curriculum)
- PLO 6: gain experience in working in the real-life industrial or research environment, and enhance their initiative, interpersonal skills, time management skills & project organization skills (by arrangement for student internship opportunities, directed studies of no less than three weeks with chemistry-related companies or research laboratories, or any other relevant capstone experience in chemistry)

### Impermissible Combinations:

Major in Chemistry (Intensive)

Minor in Chemistry

# Required courses (96 credits)

1. Introductory level courses (48 credits)	
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**Disciplinary Core Courses: Science Foundation Courses (12 credits)** Scientific method and reasoning (6) SCNC1111 **SCNC1112** Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

General chemistry I (6) CHEM1042 General chemistry II (6) CHEM1043 CHEM2241 Analytical chemistry I (6) CHEM2341 Inorganic chemistry I (6) CHFM2441 Organic chemistry I (6)

CHEM2541 Introductory physical chemistry (6)

# 2. Advanced level courses (42 credits)

### **Disciplinary Core Course (30 credits)**

CHEM3241 Analytical chemistry II: chemical instrumentation (6)

CHEM3341 Inorganic chemistry II (6) Organic chemistry II (6) CHEM3441 CHEM3443 Organic chemistry laboratory (6)

Physical chemistry: Introduction to quantum chemistry (6) CHEM3541

### **Disciplinary Electives (12 credits)**

At least 12 credits of any level 4 Chemistry (CHEM4XXX) courses. The current list include courses in List A.

List A

CHEM4142 Symmetry, group theory and applications (6) CHFM4143 Interfacial science and technology (6) Advanced materials (6)

CHEM4144 CHEM4145 Medicinal chemistry (6) Supramolecular chemistry (6) CHEM4147

CHEM4148 Frontiers in Modern Chemical Science (6)

Modern chemical instrumentation and applications (6) CHEM4241

CHEM4242 Analytical chemistry (6) Advanced inorganic chemistry (6) CHEM4341 Organometallic chemistry (6) CHEM4342 CHEM4441 Advanced organic chemistry (6)

CHEM4443 Integrated organic synthesis (6)

CHEM4444 Chemical biology (6)
CHEM4542 Computational chemistry (6)

CHEM4543 Advanced physical chemistry (6)

CHEM4544 Electrochemical science and technology (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

CHEM3999 Directed studies in chemistry (6)
CHEM4910 Chemistry literacy and research (6)

CHEM4911 Capstone experience for chemistry undergraduates: HKUtopia

(6)

CHEM4966 Chemistry internship (6) CHEM4999 Chemistry project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.
- 5. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis
- 6. Candidates who have been admitted to Year 1 in 2021-22 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1112. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Biology, Chemistry, and Physics in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Biology, Chemistry, and Physics Higher Level in International Baccalaureate (IB)
- Grade B or above in Biology, Chemistry, and Physics in General Certificate of Education Advanced Level (GCEAL)
- Biology, Chemistry, and Physics qualification in Gao Kao will be considered on a case-by-case basis

### Remarks:

Offered to students 2020

admitted to Year 1 in

#### **Objectives:**

The Major in Chemistry aims to provide students with a solid training in major areas of chemistry. The curriculum includes core courses covering topics in physical, inorganic, organic, and analytical chemistry. A wide selection of elective courses in chemical biology, chemical analysis, computational chemistry, environmental chemistry, industrial chemistry, interfacial science, material, and medicinal chemistry, is also available to provide students with knowledge and training to help them meet the dynamic and ever-changing challenges in science and technology. Graduates of the Chemistry Major programme will be proficient in the principles and experimental skills of chemistry. The programme will also equip students with transferable skills in both theoretical and experimental investigations in sciences that are crucial for their future careers in a knowledge-based economy. It is expected that our graduates will be able to meet local and regional requirements in the industrial, commercial, government or education sectors and will become future leaders of these sectors.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: demonstrate an understanding across a wide range of topics in chemistry, from basic areas such as analytical, inorganic, organic & physical chemistry, to advanced topics related to current research in chemistry (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 2: demonstrate an in-depth understanding of fundamental physicochemical principles with the ability to apply that knowledge to the solution of theoretical & practical problems (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 3: have developed an awareness & understanding of scientific and ethical issues where chemistry relates to other disciplines, and an appreciation of the impact of chemistry in the modern world (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 4: have substantially developed advanced experimental skills including chemical synthesis, analysis & operation of modern instrumentation, and data analysis skills with the ability to interpret experimental information & infer appropriate conclusions (by requiring of no less than 100 hours of laboratory classes in the curriculum)
- PLO 5: demonstrate problem-solving skills, critical thinking, creativity & effective written & oral communication skills, and to co-operate with other people & participate as an effective team member (by means of coursework, laboratory-based learning, group project & presentation opportunities in the curriculum)
- PLO 6: gain experience in working in the real-life industrial or research environment, and enhance their initiative, interpersonal skills, time management skills & project organization skills (by arrangement for student internship opportunities, directed studies of no less than three weeks with chemistry-related companies or research laboratories, or any other relevant capstone experience in chemistry)

### Impermissible Combinations:

Major in Chemistry (Intensive)

Minor in Chemistry

# Required courses (96 credits)

1. Introductory level courses	(48 credits)
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Disciplinary Core Courses: Science Foundation Courses (12 credits)
SCNC1111 Scientific method and reasoning (6)
SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

CHEM1042 General chemistry I (6)
CHEM1043 General chemistry II (6)
CHEM2241 Analytical chemistry I (6)
CHEM2341 Inorganic chemistry I (6)
CHEM2441 Organic chemistry I (6)
CHEM2541 Introductory physical chemistry (6)

2. Advanced level courses (42 credits)

Disciplinary Core Course (30 credits)

CHEM3241 Analytical chemistry II: chemical instrumentation (6)

CHEM3341 Inorganic chemistry II (6)
CHEM3441 Organic chemistry II (6)
CHEM3443 Organic chemistry laboratory (6)

CHEM3541 Physical chemistry: Introduction to quantum chemistry (6)

**Disciplinary Electives (12 credits)** 

At least 12 credits of any level 4 Chemistry (CHEM4XXX) courses. The current list include courses in List A.

List A

CHEM4142 Symmetry, group theory and applications (6)
CHEM4143 Interfacial science and technology (6)
CHEM4144 Advanced materials (6)

CHEM4145 Medicinal chemistry (6)
CHEM4147 Supramolecular chemistry (6)
CHEM4149 Supramolecular chemistry (6)

CHEM4148 Frontiers in Modern Chemical Science (6)

CHEM4241 Modern chemical instrumentation and applications (6)

CHEM4242 Analytical chemistry (6)
CHEM4341 Advanced inorganic chemistry (6)
CHEM4342 Organometallic chemistry (6)
CHEM4441 Advanced organic chemistry (6)

CHEM4443 Integrated organic synthesis (6)

CHEM4444 Chemical biology (6)

CHEM4542 Computational chemistry (6)
CHEM4543 Advanced physical chemistry (6)

CHEM4544 Electrochemical science and technology (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

CHEM3999 Directed studies in chemistry (6)
CHEM4910 Chemistry literacy and research (6)

CHEM4911 Capstone experience for chemistry undergraduates: HKUtopia

(6)

CHEM4966 Chemistry internship (6) CHEM4999 Chemistry project (12)

### Notes:

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### Remarks:

Offered to students 2019

admitted to Year 1 in

#### **Objectives:**

The Major in Chemistry aims to provide students with a solid training in major areas of chemistry. The curriculum includes core courses covering topics in physical, inorganic, organic, and analytical chemistry. A wide selection of elective courses in chemical biology, chemical analysis, computational chemistry, environmental chemistry, industrial chemistry, interfacial science, material, and medicinal chemistry, is also available to provide students with knowledge and training to help them meet the dynamic and ever-changing challenges in science and technology. Graduates of the Chemistry Major programme will be proficient in the principles and experimental skills of chemistry. The programme will also equip students with transferable skills in both theoretical and experimental investigations in sciences that are crucial for their future careers in a knowledge-based economy. It is expected that our graduates will be able to meet local and regional requirements in the industrial, commercial, government or education sectors and will become future leaders of these sectors.

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### Impermissible Combinations:

Major in Chemistry (Intensive)

Minor in Chemistry

# Required courses (96 credits)

1. Introductory	level courses	(48 credits)

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# 2. Advanced level courses (42 credits)

### **Disciplinary Core Course (30 credits)**

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CHEM4144 Advanced materials (6)
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CHEM4148 Frontiers in Modern Chemical Science (6)

CHEM4241 Modern chemical instrumentation and applications (6)

CHEM4242 Analytical chemistry (6)
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CHEM4443 Integrated organic synthesis (6)

CHEM4444 Chemical biology (6)

CHEM4542 Computational chemistry (6)
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3. Capstone requirement (6 credits)

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- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 5. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.

#### Remarks:

Offered to students 2018

admitted to Year 1 in

#### **Objectives:**

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### Impermissible Combinations:

Major in Chemistry (Intensive)

Minor in Chemistry

# Required courses (96 credits)

1. Introductor	y level courses	(48 credits)
	,	(

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**Disciplinary Core Courses (36 credits)** 

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# 2. Advanced level courses (42 credits)

### **Disciplinary Core Course (30 credits)**

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### **Disciplinary Electives (12 credits)**

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CHEM4145 Medicinal chemistry (6)
CHEM4147 Supramolecular chemistry (6)

CHEM4148 Frontiers in Modern Chemical Science (6)

CHEM4241 Modern chemical instrumentation and applications (6)

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### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

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#### Remarks:

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

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### Impermissible Combinations:

Major in Chemistry (Intensive)

Minor in Chemistry

# Required courses (96 credits)

1. Introductory	y level courses	(48 credits)

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#### Remarks:

Offered to students 2016

admitted to Year 1 in

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### Impermissible Combinations:

Major in Chemistry (Intensive)

Minor in Chemistry

# Required courses (96 credits)

1. Introductory level courses (48 credits)	level courses (48 credits)
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Disciplinary Core Courses: Science Foundation Courses (12 credits)
SCNC1111 Scientific method and reasoning (6)
SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

CHEM1042 General chemistry I (6)
CHEM1043 General chemistry II (6)
CHEM2241 Analytical chemistry I (6)
CHEM2341 Inorganic chemistry I (6)
CHEM2441 Organic chemistry I (6)
CHEM2541 Introductory physical chemistry (6)

2. Advanced level courses (42 credits)

**Disciplinary Core Course (30 credits)** 

CHEM3241 Analytical chemistry II: chemical instrumentation (6)

CHEM3341 Inorganic chemistry II (6)
CHEM3441 Organic chemistry II (6)
CHEM3443 Organic chemistry laboratory (6)

CHEM3541 Physical chemistry: Introduction to quantum chemistry (6)

**Disciplinary Electives (12 credits)** 

At least 12 credits of any level 4 Chemistry (CHEM4XXX) courses. The current list include courses in List A.

List A

CHEM4142 Symmetry, group theory and applications (6)
CHEM4143 Interfacial science and technology (6)
CHEM4144 Advanced materials (6)

CHEM4145 Medicinal chemistry (6)
CHEM4147 Supramolecular chemistry (6)
CHEM4140 Supramolecular chemistry (6)

CHEM4148 Frontiers in Modern Chemical Science (6)

CHEM4241 Modern chemical instrumentation and applications (6)

CHEM4242 Analytical chemistry (6)
CHEM4341 Advanced inorganic chemistry (6)
CHEM4342 Organometallic chemistry (6)
CHEM4441 Advanced organic chemistry (6)

CHEM4443 Integrated organic synthesis (6)

CHEM4444 Chemical biology (6)

CHEM4542 Computational chemistry (6)
CHEM4543 Advanced physical chemistry (6)

CHEM4544 Electrochemical science and technology (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

CHEM3999 Directed studies in chemistry (6)
CHEM4910 Chemistry literacy and research (6)

CHEM4911 Capstone experience for chemistry undergraduates: HKUtopia

(6)

CHEM4966 Chemistry internship (6) CHEM4999 Chemistry project (12)

### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 5. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.

#### Remarks:

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

The Major in Chemistry aims to provide students with a solid training in major areas of chemistry. The curriculum includes core courses covering topics in physical, inorganic, organic, and analytical chemistry. A wide selection of elective courses in chemical biology, chemical analysis, computational chemistry, environmental chemistry, industrial chemistry, interfacial science, material, and medicinal chemistry, is also available to provide students with knowledge and training to help them meet the dynamic and ever-changing challenges in science and technology. Graduates of the Chemistry Major programme will be proficient in the principles and experimental skills of chemistry. The programme will also equip students with transferable skills in both theoretical and experimental investigations in sciences that are crucial for their future careers in a knowledge-based economy. It is expected that our graduates will be able to meet local and regional requirements in the industrial, commercial, government or education sectors and will become future leaders of these sectors.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: demonstrate an understanding across a wide range of topics in chemistry, from basic areas such as analytical, inorganic, organic & physical chemistry, to advanced topics related to current research in chemistry (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 2: demonstrate an in-depth understanding of fundamental physicochemical principles with the ability to apply that knowledge to the solution of theoretical & practical problems (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 3: have developed an awareness & understanding of scientific and ethical issues where chemistry relates to other disciplines, and an appreciation of the impact of chemistry in the modern world (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 4: have substantially developed advanced experimental skills including chemical synthesis, analysis & operation of modern instrumentation, and data analysis skills with the ability to interpret experimental information & infer appropriate conclusions (by requiring of no less than 100 hours of laboratory classes in the curriculum)
- PLO 5: demonstrate problem-solving skills, critical thinking, creativity & effective written & oral communication skills, and to co-operate with other people & participate as an effective team member (by means of coursework, laboratory-based learning, group project & presentation opportunities in the curriculum)
- PLO 6: gain experience in working in the real-life industrial or research environment, and enhance their initiative, interpersonal skills, time management skills & project organization skills (by arrangement for student internship opportunities, directed studies of no less than three weeks with chemistry-related companies or research laboratories, or any other relevant capstone experience in chemistry)

### Impermissible Combinations:

Major in Chemistry (Intensive)

Minor in Chemistry

# Required courses (96 credits)

1. Introductory	level courses	(48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)
SCNC1111 Scientific method and reasoning (6)
SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

CHEM1042 General chemistry I (6)
CHEM1043 General chemistry II (6)
CHEM2241 Analytical chemistry I (6)
CHEM2341 Inorganic chemistry I (6)
CHEM2441 Organic chemistry I (6)
CHEM2541 Introductory physical chemistry (6)

# 2. Advanced level courses (42 credits)

### **Disciplinary Core Course (30 credits)**

CHEM3241 Analytical chemistry II: chemical instrumentation (6)

CHEM3341 Inorganic chemistry II (6)
CHEM3441 Organic chemistry II (6)
CHEM3443 Organic chemistry laboratory (6)

CHEM3541 Physical chemistry: Introduction to quantum chemistry (6)

### **Disciplinary Electives (12 credits)**

At least 12 credits of any level 4 Chemistry (CHEM4XXX) courses. The current list include courses in List A. List A

CHEM4142 Symmetry, group theory and applications (6)
CHEM4143 Interfacial science and technology (6)
CHEM4144 Advanced materials (6)

CHEM4144 Advanced materials (6)
CHEM4145 Medicinal chemistry (6)
CHEM4147 Supramolecular chemistry (6)

CHEM4148 Frontiers in Modern Chemical Science (6)

CHEM4241 Modern chemical instrumentation and applications (6)

CHEM4242 Analytical chemistry (6)
CHEM4341 Advanced inorganic chemistry (6)
CHEM4342 Organometallic chemistry (6)
CHEM4441 Advanced organic chemistry (6)

CHEM4443 Integrated organic synthesis (6)

CHEM4444 Chemical biology (6)

CHEM4542 Computational chemistry (6)
CHEM4543 Advanced physical chemistry (6)

CHEM4544 Electrochemical science and technology (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

CHEM3999 Directed studies in chemistry (6)
CHEM4910 Chemistry literacy and research (6)

CHEM4911 Capstone experience for chemistry undergraduates: HKUtopia

(6)

CHEM4966 Chemistry internship (6) CHEM4999 Chemistry project (12)

### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 5. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.

#### Remarks:

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

The Major in Chemistry aims to provide students with a solid training in major areas of chemistry. The curriculum includes core courses covering topics in physical, inorganic, organic, and analytical chemistry. A wide selection of elective courses in chemical biology, chemical analysis, computational chemistry, environmental chemistry, industrial chemistry, interfacial science, material, and medicinal chemistry, is also available to provide students with knowledge and training to help them meet the dynamic and ever-changing challenges in science and technology. Graduates of the Chemistry Major programme will be proficient in the principles and experimental skills of chemistry. The programme will also equip students with transferable skills in both theoretical and experimental investigations in sciences that are crucial for their future careers in a knowledge-based economy. It is expected that our graduates will be able to meet local and regional requirements in the industrial, commercial, government or education sectors and will become future leaders of these sectors.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: demonstrate an understanding across a wide range of topics in chemistry, from basic areas such as analytical, inorganic, organic & physical chemistry, to advanced topics related to current research in chemistry (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 2: demonstrate an in-depth understanding of fundamental physicochemical principles with the ability to apply that knowledge to the solution of theoretical & practical problems (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 3: have developed an awareness & understanding of scientific and ethical issues where chemistry relates to other disciplines, and an appreciation of the impact of chemistry in the modern world (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 4: have substantially developed advanced experimental skills including chemical synthesis, analysis & operation of modern instrumentation, and data analysis skills with the ability to interpret experimental information & infer appropriate conclusions (by requiring of no less than 100 hours of laboratory classes in the curriculum)
- PLO 5: demonstrate problem-solving skills, critical thinking, creativity & effective written & oral communication skills, and to co-operate with other people & participate as an effective team member (by means of coursework, laboratory-based learning, group project & presentation opportunities in the curriculum)
- PLO 6: gain experience in working in the real-life industrial or research environment, and enhance their initiative, interpersonal skills, time management skills & project organization skills (by arrangement for student internship opportunities or directed studies of no less than three weeks with chemistry-related companies or research laboratories)

### Impermissible Combinations:

Minor in Chemistry

# Required courses (96 credits)

1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

CHEM1042 General chemistry I (6) [previous title: General chemistry (6)]

CHEM2241 Analytical chemistry I (6)
CHEM2341 Inorganic chemistry I (6)
CHEM2441 Organic chemistry I (6)

CHEM2541 Introductory physical chemistry (6) [previous title: Physical chemistry I (6)]

2. Advanced level courses (48 credits)

**Disciplinary Core Course (30 credits)** 

CHEM3146 Principles and applications of spectroscopic and analytical techniques (6)

Analytical chemistry II: chemical instrumentation (6)

CHEM3341 Inorganic chemistry II (6)
CHEM3441 Organic chemistry II (6)

CHEM3541 Physical chemistry: Introduction to quantum [previous title: Physical chemistry II: Introduction to

chemistry (6) quantum chemistry (6) ]

**Disciplinary Electives (12 credits)** 

At least 12 credits selected from the following 18 credits of courses in two different areas in List A:

List A

CHEM3241

CHEM3542 Physical chemistry: statistical

thermodynamics and kinetics theory (6)
CHEM4341 Advanced inorganic chemistry (6)
CHEM4441 Advanced organic chemistry (6)

c chemistry (6) Take either CHEM4443 or CHEM4441 to fulfill this 12

credits requirement, but not both.

CHEM4443 Integrated organic synthesis (6) Take either CHEM4443 or CHEM4441 to fulfill this 12

credits requirement, but not both.

### **Disciplinary Electives (6 credits)**

At least 6 credits of advanced level Chemistry courses (CHEM3XXX or CHEM4XXX level, excluding CHEM3999 Directed studies in chemistry, CHEM4910 Chemistry literacy and research, CHEM4911 Capstone experience for chemistry undergraduates: HKUtopia, CHEM4966 Chemistry internship and CHEM4999 Chemistry project), subject to pre-requisite requirements. The current list inlcude courses in List B and those course not selected to fulfill the requirements in List A.

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CHEM3142 Chemical process industries and analysis (6) CHEM3143 Introduction to materials chemistry (6)

CHEM3242 Food and water analysis (6)
CHEM3342 Bioinorganic chemistry (6)

CHEM3442 Organic chemistry of biomolecules (6)
CHEM3443 Organic chemistry laboratory (6)

CHEM3445 Integrated laboratory (6)

CHEM4142 Symmetry, group theory and applications (6) CHEM4143 Interfacial science and technology (6)

CHEM4144 Advanced materials (6)
CHEM4145 Medicinal chemistry (6)
CHEM4147 Supramolecular chemistry (6)

CHEM4148 Frontiers in Modern Chemical Science (6)
CHEM4241 Modern chemical instrumentation and

applications (6)

CHEM4242 Analytical chemistry (6)
CHEM4342 Organometallic chemistry (6)
CHEM4444 Chemical biology (6)
CHEM4542 Computational chemistry (6)
CHEM4543 Advanced physical chemistry (6)

CHEM4544 Electrochemical science and technology (6)

### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

CHEM3999 Directed studies in chemistry (6)
CHEM4910 Chemistry literacy and research (6)
CHEM4911 Capstone experience for chemistry undergraduates: HKUtopia (6)

CHEM4966 Chemistry internship (6) CHEM4999 Chemistry project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
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- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 5. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.
- 6. CHEM3146 Principles and applications of spectroscopic and analytical techniques is not offered from 2016-17. Students should consult the course selection advisers for course replacement.

### Remarks:

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

The Major in Chemistry aims to provide students with a solid training in major areas of chemistry. The curriculum includes core courses covering topics in physical, inorganic, organic, and analytical chemistry. A wide selection of elective courses in chemical biology, chemical analysis, computational chemistry, environmental chemistry, industrial chemistry, interfacial science, material, and medicinal chemistry, is also available to provide students with knowledge and training to help them meet the dynamic and ever-changing challenges in science and technology. Graduates of the Chemistry Major programme will be proficient in the principles and experimental skills of chemistry. The programme will also equip students with transferable skills in both theoretical and experimental investigations in sciences that are crucial for their future careers in a knowledge-based economy. It is expected that our graduates will be able to meet local and regional requirements in the industrial, commercial, government or education sectors and will become future leaders of these sectors.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: demonstrate an understanding across a wide range of topics in chemistry, from basic areas such as analytical, inorganic, organic & physical chemistry, to advanced topics related to current research in chemistry (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 2: demonstrate an in-depth understanding of fundamental physicochemical principles with the ability to apply that knowledge to the solution of theoretical & practical problems (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 3: have developed an awareness & understanding of scientific and ethical issues where chemistry relates to other disciplines, and an appreciation of the impact of chemistry in the modern world (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 4: have substantially developed advanced experimental skills including chemical synthesis, analysis & operation of modern instrumentation, and data analysis skills with the ability to interpret experimental information & infer appropriate conclusions (by requiring of no less than 100 hours of laboratory classes in the curriculum)
- PLO 5: demonstrate problem-solving skills, critical thinking, creativity & effective written & oral communication skills, and to co-operate with other people & participate as an effective team member (by means of coursework, laboratory-based learning, group project & presentation opportunities in the curriculum)
- PLO 6: gain experience in working in the real-life industrial or research environment, and enhance their initiative, interpersonal skills, time management skills & project organization skills (by arrangement for student internship opportunities or directed studies of no less than three weeks with chemistry-related companies or research laboratories)

### Impermissible Combinations:

Minor in Chemistry

# Required courses (96 credits)

1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

CHEM1042 General chemistry I (6) [previous title: General chemistry (6)]

CHEM2241 Analytical chemistry I (6)
CHEM2341 Inorganic chemistry I (6)
CHEM2441 Organic chemistry I (6)

CHEM2541 Introductory physical chemistry (6) [previous title: Physical chemistry I (6)]

2. Advanced level courses (48 credits) Disciplinary Core Courses (30 credits)

CHEM3146 Principles and applications of spectroscopic

and analytical techniques (6)
Analytical chemistry II: chemical

instrumentation (6)
CHEM3341 Inorganic chemistry II (6)
CHEM3441 Organic chemistry II (6)

CHEM3541 Physical chemistry: Introduction to quantum [previous title: Physical chemistry II: Introduction to

chemistry (6) quantum chemistry (6) ]

**Disciplinary Electives (12 credits)** 

At least 12 credits selected from the following 18 credits of courses in two different areas in List A:

List A

CHEM3241

CHEM3542 Physical chemistry: statistical Take either CHEM3542 or CHEM4541 to fulfill this 12 thermodynamics and kinetics theory (6) credits requirement, but not both.

CHEM4341 Advanced inorganic chemistry (6)
CHEM4441 Advanced organic chemistry (6)
Take either CHEM4443 or CHEM4441 to fulfill this 12

credits requirement, but not both.

CHEM4443 Integrated organic synthesis (6) Take either CHEM4443 or CHEM4441 to fulfill this 12

credits requirement, but not both.

CHEM4541 Physical chemistry III: statistical Take either CHEM3542 or CHEM4541 to fulfill this 12

thermodynamics and kinetics theory (6) credits requirement, but not both.

Disciplinary Electives (6 credits)

At least 6 credits of advanced level Chemistry courses (CHEM3XXX or CHEM4XXX level, excluding CHEM3999 Directed studies in chemistry, CHEM4910 Chemistry literacy and research, CHEM4911 Capstone experience for chemistry undergraduates: HKUtopia, CHEM4966 Chemistry internship and CHEM4999 Chemistry project), subject to pre-requisite requirements. The current list inlcude courses in List B and those courses not selected to fulfill the requirements in List A.

List B

CHEM3141 Environmental chemistry (6)

CHEM3142 Chemical process industries and analysis (6) CHEM3143 Introduction to materials chemistry (6)

CHEM3242 Food and water analysis (6) CHEM3342 Bioinorganic chemistry (6)

CHEM3442 Organic chemistry of biomolecules (6)
CHEM3443 Organic chemistry laboratory (6)

CHEM3445 Integrated laboratory (6)

CHEM4142 Symmetry, group theory and applications (6) CHEM4143 Interfacial science and technology (6)

CHEM4144 Advanced materials (6)
CHEM4145 Medicinal chemistry (6)
CHEM4147 Supramolecular chemistry (6)

CHEM4148 Frontiers in Modern Chemical Science (6)

CHEM4241 Modern chemical instrumentation and

applications (6)
CHEM4242
CHEM4342
CHEM4444
Chemical biology (6)
CHEM4542
CHEM4542
CHEM4543
Advanced physical chemistry (6)

CHEM4544 Electrochemical science and technology (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

CHEM3999 Directed studies in chemistry (6)
CHEM4910 Chemistry literacy and research (6)
CHEM4911 Capstone experience for chemistry undergraduates: HKUtopia (6)

CHEM4966 Chemistry internship (6) CHEM4999 Chemistry project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 5. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.
- 6. CHEM3146 Principles and applications of spectroscopic and analytical techniques is not offered from 2016-17. Students should consult the course selection advisers for course replacement.

### Remarks

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

The Major in Chemistry aims to provide students with a solid training in major areas of chemistry. The curriculum includes core courses covering topics in physical, inorganic, organic, and analytical chemistry. A wide selection of elective courses in chemical biology, chemical analysis, computational chemistry, environmental chemistry, industrial chemistry, interfacial science, material, and medicinal chemistry, is also available to provide students with knowledge and training to help them meet the dynamic and ever-changing challenges in science and technology. Graduates of the Chemistry Major programme will be proficient in the principles and experimental skills of chemistry. The programme will also equip students with transferable skills in both theoretical and experimental investigations in sciences that are crucial for their future careers in a knowledge-based economy. It is expected that our graduates will be able to meet local and regional requirements in the industrial, commercial, government or education sectors and will become future leaders of these sectors.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: demonstrate an understanding across a wide range of topics in chemistry, from basic areas such as analytical, inorganic, organic & physical chemistry, to advanced topics related to current research in chemistry (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
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- PLO 4: have substantially developed advanced experimental skills including chemical synthesis, analysis & operation of modern instrumentation, and data analysis skills with the ability to interpret experimental information & infer appropriate conclusions (by requiring of no less than 100 hours of laboratory classes in the curriculum)
- PLO 5: demonstrate problem-solving skills, critical thinking, creativity & effective written & oral communication skills, and to co-operate with other people & participate as an effective team member (by means of coursework, laboratory-based learning, group project & presentation opportunities in the curriculum)
- PLO 6: gain experience in working in the real-life industrial or research environment, and enhance their initiative, interpersonal skills, time management skills & project organization skills (by arrangement for student internship opportunities or directed studies of no less than three weeks with chemistry-related companies or research laboratories)

### Impermissible Combinations:

Minor in Chemistry

# Required courses (96 credits)

1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

Scientific method and reasoning (6) SCNC1111 Fundamentals of modern science (6) SCNC1112

**Disciplinary Core Courses (30 credits)** 

General chemistry I (6) CHEM1042 [ previous title: General chemistry (6) ]

CHEM2241 Analytical chemistry I (6) Inorganic chemistry I (6) CHEM2341 CHEM2441 Organic chemistry I (6)

CHEM2541 Introductory physical chemistry (6) [ previous title: Physical chemistry I (6) ]

2. Advanced level courses (48 credits) **Disciplinary Core Courses (30 credits)** 

Principles and applications of spectroscopic CHEM3146 and analytical techniques (6)

Analytical chemistry II: chemical instrumentation (6) Inorganic chemistry II (6)

Organic chemistry II (6) CHFM3441 CHEM3541

Physical chemistry: Introduction to quantum [ previous title: Physical chemistry II: Introduction to

chemistry (6) quantum chemistry (6) ]

**Disciplinary Electives (12 credits)** 

At least 12 credits selected from the following 18 credits of courses in two different areas in List A:

List A

CHEM3241

CHEM3341

CHEM4541

CHEM3542 Physical chemistry: statistical thermodynamics and kinetics theory (6) CHEM4341 Advanced inorganic chemistry (6) Advanced organic chemistry (6) CHEM4441

Physical chemistry III: statistical

thermodynamics and kinetics theory (6)

Take either CHEM4443 or CHEM4441 to fulfill this 12

Take either CHEM3542 or CHEM4541 to fulfill this 12

credits requirement, but not both.

credits requirement, but not both.

Take either CHEM4443 or CHEM4441 to fulfill this 12 Integrated organic synthesis (6) CHEM4443 credits requirement, but not both.

Take either CHEM3542 or CHEM4541 to fulfill this 12

credits requirement, but not both.

**Disciplinary Electives (6 credits)** 

At least 6 credits of advanced level Chemistry courses (CHEM3XXX or CHEM4XXX level, excluding CHEM3999 Directed studies in chemistry, CHEM4910 Chemistry literacy and research, CHEM4911 Capstone experience for chemistry undergraduates: HKUtopia, CHEM4966 Chemistry internship and CHEM4999 Chemistry project), subject to pre-requisite requirements. The current list inlcude courses in List B and those courses not selected to fulfill the requirements in List A.

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CHEM3142 Chemical process industries and analysis (6) CHEM3143 Introduction to materials chemistry (6)

CHEM3242 Food and water analysis (6)
CHEM3342 Bioinorganic chemistry (6)

CHEM3442 Organic chemistry of biomolecules (6)
CHEM3443 Organic chemistry laboratory (6)

CHEM3445 Integrated laboratory (6)

CHEM4142 Symmetry, group theory and applications (6) CHEM4143 Interfacial science and technology (6)

CHEM4144 Advanced materials (6)
CHEM4145 Medicinal chemistry (6)
CHEM4147 Supramolecular chemistry (6)

CHEM4148 Frontiers in Modern Chemical Science (6)
CHEM4241 Modern chemical instrumentation and

applications (6)

CHEM4242 Analytical chemistry (6)
CHEM4342 Organometallic chemistry (6)
CHEM4444 Chemical biology (6)
CHEM4542 Computational chemistry (6)
CHEM4543 Advanced physical chemistry (6)

CHEM4544 Electrochemical science and technology (6)

### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

CHEM3999 Directed studies in chemistry (6)
CHEM4910 Chemistry literacy and research (6)
CHEM4911 Capstone experience for chemistry undergraduates: HKUtopia (6)

CHEM4966 Chemistry internship (6) CHEM4999 Chemistry project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 5. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.
- 6. CHEM3146 Principles and applications of spectroscopic and analytical techniques is not offered from 2016-17. Students should consult the course selection advisers for course replacement.

### Remarks

Major Title Major in Chemistry (Intensive)

Offered to students 2021

admitted to Year 1 in

## **Objectives:**

The Intensive Major in Chemistry aims to provide students with a strong foundation on major areas of chemistry. The curriculum includes core courses covering topics in physical, inorganic, organic, and analytical chemistry. The curriculum emphasizes comprehensive coverage in theoretical knowledge, laboratory skills, and research experience. A wide selection of elective courses is also available for student preparation to pursue learning in specializations such as chemical biology, computation chemistry, and materials. Graduates of the Intensive Chemistry Major programme will be proficient in the principles and experimental skills of chemistry. The programme will also equip students with transferable skills in both theoretical and experimental investigations in sciences. Graduates are expected to be well-prepared for further studies in chemistry and related disciplines and to pursue professional careers in scientific and technical fields.

This intensive major has been accredited by the Royal Society of Chemistry (RSC), UK.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: demonstrate an understanding across a wide range of topics in chemistry, from basic areas such as analytical, inorganic, organic & physical chemistry, to advanced topics related to current research in chemistry (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 2: demonstrate an in-depth understanding of fundamental physicochemical principles with the ability to apply that knowledge to the solution of theoretical & practical problems (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 3: have developed an awareness & understanding of scientific and ethical issues where chemistry relates to other disciplines, and an appreciation of the impact of chemistry in the modern world (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 4: have substantially developed advanced experimental skills including chemical synthesis, analysis & operation of modern instrumentation, and data analysis skills with the ability to interpret experimental information & infer appropriate conclusions (by requiring of no less than 300 hours of laboratory classes in the curriculum)
- PLO 5: demonstrate problem-solving skills, critical thinking, creativity & effective written & oral communication skills, and to co-operate with other people & participate as an effective team member (by means of coursework, laboratory-based learning, group project & presentation opportunities in the curriculum)
- PLO 6: gain experience in working in the real-life industrial or research environment, and enhance their initiative, interpersonal skills, time management skills & project organization skills (by arrangement for chemistry research project of no less than 24 weeks, or student internship opportunities plus directed studies of no less than three weeks with chemistry-related companies or research laboratories)

## Impermissible Combinations:

Major in Chemistry Minor in Chemistry

Required courses (144	credits)	
1. Introductory level cour		
Disciplinary Core Course	s: Science Foundation Courses (12 credits)	
SCNC1111	Scientific method and reasoning (6)	(Note 1)
SCNC1112	Fundamentals of modern science (6)	(Note 1)
Disciplinary Core Course	s (36 credits)	
CHEM1042	General chemistry I (6)	(Note 1)
CHEM1043	General chemistry II (6)	(Note 1)
CHEM2241	Analytical chemistry I (6)	(Note 1)
CHEM2341	Inorganic chemistry I (6)	(Note 1)
CHEM2441	Organic chemistry I (6)	(Note 1)
CHEM2541	Introductory physical chemistry (6)	(Note 1)
Disciplinary Electives (6 of	credits)	
(Students are encourage	ed to meet with a Chemistry Course Selection Advisor in the course sel	ection period to discus
which of the following co	ourses they should take based on their previous background in Mathem	atics.)
CHEM1044	Mathematics in chemistry (6)	
COMP1117	Computer programming (6)	
MATH1011	University mathematics I (6)	
MATH1013	University mathematics II (6)	
STAT1601	Elementary statistical methods (6)	
STAT1603	Introductory statistics (6)	
2. Advanced level course	s (78 credits)	
Disciplinary Core Course	(66 credits)	
CHEM3143	Introduction to materials chemistry (6)	
CHEM3241	Analytical chemistry II: chemical instrumentation (6)	(Note 1)
CHEM3341	Inorganic chemistry II (6)	(Note 1)
CHEM3441	Organic chemistry II (6)	(Note 1)
CHEM3443	Organic chemistry laboratory (6)	(Note 1)
CHEM3445	Integrated laboratory (6)	
CHEM3541	Physical chemistry: Introduction to quantum chemistry (6)	(Note 1)
CHEM3542	Physical chemistry: statistical thermodynamics and kinetics theory (6)	

(lab)

CHEM4142 Symmetry, group theory and applications (6)

CHEM4144 Advanced materials (6)

CHEM4241 Modern chemical instrumentation and applications (6)

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

(Note that one of the two elective courses selected must contain a laboratory component. Courses marked with (lab)

have a laboratory component. The list of electives given below may be subject to change.)

CHEM4143 Interfacial science and technology (6)

CHEM4145 Medicinal chemistry (6)
CHEM4147 Supramolecular chemistry (6)

CHEM4148 Frontiers in Modern Chemical Science (6)

CHEM4242 Analytical chemistry (6) (lab)
CHEM4341 Advanced inorganic chemistry (6)
CHEM4342 Organometallic chemistry (6) (lab)

CHEM4441 Advanced organic chemistry (6)
CHEM4443 Integrated organic synthesis (6)

CHEM4444 Chemical biology (6)
CHEM4542 Computational chemistry (6) (lab)

CHEM4543 Advanced physical chemistry (6)
CHEM4544 Electrochemical science and technology (6) (*(lab)* 

3. Capstone requirement (12 credits)

At least 12 credits selected from the following courses:

CHEM3999 Directed studies in chemistry (6)
CHEM4966 Chemistry internship (6)
CHEM4999 Chemistry project (12)

#### Notes:

- 1. These are core courses in the regular Chemistry Major (96 credits) curriculum.
- 2. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.
- 3. As this curriculum is accredited by the Royal Society of Chemistry (RSC), students must follow the curriculum in full (i.e. no replacement courses are possible) in order to graduate with this accredited programme. For students who have credit transfer from exchange studies, for example) a student took CHEM3A and CHEM3B in a host university during his/her exchange studies and these two courses have been approved by the Faculty of Science to be considered equivalent as CHEM3241 and CHEM3341, they will be considered taking those HKU-version courses and in the example shown here, the student is deemed to have taken CHEM3241 and CHEM3341 to fulfil the accredited curriculum
- 4. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis
- 5. Candidates who have been admitted to Year 1 in 2021-22 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1112. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Biology, Chemistry, and Physics in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Biology, Chemistry, and Physics Higher Level in International Baccalaureate (IB)
- Grade B or above in Biology, Chemistry, and Physics in General Certificate of Education Advanced Level (GCEAL)
- Biology, Chemistry, and Physics qualification in Gao Kao will be considered on a case-by-case basis

## Remarks:

Major Title Major in Chemistry (Intensive)

Offered to students 2020

admitted to Year 1 in

### **Objectives:**

The Intensive Major in Chemistry aims to provide students with a strong foundation on major areas of chemistry. The curriculum includes core courses covering topics in physical, inorganic, organic, and analytical chemistry. The curriculum emphasizes comprehensive coverage in theoretical knowledge, laboratory skills, and research experience. A wide selection of elective courses is also available for student preparation to pursue learning in specializations such as chemical biology, computation chemistry, and materials. Graduates of the Intensive Chemistry Major programme will be proficient in the principles and experimental skills of chemistry. The programme will also equip students with transferable skills in both theoretical and experimental investigations in sciences. Graduates are expected to be well-prepared for further studies in chemistry and related disciplines and to pursue professional careers in scientific and technical fields.

This intensive major has been accredited by the Royal Society of Chemistry (RSC), UK.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: demonstrate an understanding across a wide range of topics in chemistry, from basic areas such as analytical, inorganic, organic & physical chemistry, to advanced topics related to current research in chemistry (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 2: demonstrate an in-depth understanding of fundamental physicochemical principles with the ability to apply that knowledge to the solution of theoretical & practical problems (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 3: have developed an awareness & understanding of scientific and ethical issues where chemistry relates to other disciplines, and an appreciation of the impact of chemistry in the modern world (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 4: have substantially developed advanced experimental skills including chemical synthesis, analysis & operation of modern instrumentation, and data analysis skills with the ability to interpret experimental information & infer appropriate conclusions (by requiring of no less than 300 hours of laboratory classes in the curriculum)
- PLO 5: demonstrate problem-solving skills, critical thinking, creativity & effective written & oral communication skills, and to co-operate with other people & participate as an effective team member (by means of coursework, laboratory-based learning, group project & presentation opportunities in the curriculum)
- PLO 6: gain experience in working in the real-life industrial or research environment, and enhance their initiative, interpersonal skills, time management skills & project organization skills (by arrangement for chemistry research project of no less than 24 weeks, or student internship opportunities plus directed studies of no less than three weeks with chemistry-related companies or research laboratories)

## Impermissible Combinations:

Major in Chemistry Minor in Chemistry

equired courses (144	credits)	
I. Introductory level cour		
Disciplinary Core Course	s: Science Foundation Courses (12 credits)	
SCNC1111	Scientific method and reasoning (6)	(Note 1)
SCNC1112	Fundamentals of modern science (6)	(Note 1)
Disciplinary Core Course	s (36 credits)	
CHEM1042	General chemistry I (6)	(Note 1)
CHEM1043	General chemistry II (6)	(Note 1)
CHEM2241	Analytical chemistry I (6)	(Note 1)
CHEM2341	Inorganic chemistry I (6)	(Note 1)
CHEM2441	Organic chemistry I (6)	(Note 1)
CHEM2541	Introductory physical chemistry (6)	(Note 1)
Disciplinary Electives (6	credits)	
(Students are encourage	ed to meet with a Chemistry Course Selection Advisor in the course sel	lection period to discus
which of the following co	ourses they should take based on their previous background in Mathem	atics.)
CHEM1044	Mathematics in chemistry (6)	
COMP1117	Computer programming (6)	
MATH1011	University mathematics I (6)	
MATH1013	University mathematics II (6)	
STAT1601	Elementary statistical methods (6)	
STAT1603	Introductory statistics (6)	
2. Advanced level course	s (78 credits)	
Disciplinary Core Course	(66 credits)	
CHEM3143	Introduction to materials chemistry (6)	
CHEM3241	Analytical chemistry II: chemical instrumentation (6)	(Note 1)
CHEM3341	Inorganic chemistry II (6)	(Note 1)
CHEM3441	Organic chemistry II (6)	(Note 1)
CHEM3443	Organic chemistry laboratory (6)	(Note 1)
CHEM3445	Integrated laboratory (6)	
CHEM3541	Physical chemistry: Introduction to quantum chemistry (6)	(Note 1)
CHEM3542	Physical chemistry: statistical thermodynamics and kinetics	

(lab)

(lab)

(lab)

CHEM4142 Symmetry, group theory and applications (6)

CHEM4144 Advanced materials (6)

CHEM4241 Modern chemical instrumentation and applications (6)

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

(Note that one of the two elective courses selected must contain a laboratory component. Courses marked with (lab)

have a laboratory component. The list of electives given below may be subject to change.)

CHEM4143 Interfacial science and technology (6)

CHEM4145 Medicinal chemistry (6)
CHEM4147 Supramolecular chemistry (6)

CHEM4148 Frontiers in Modern Chemical Science (6)

CHEM4242 Analytical chemistry (6) (lab)
CHEM4341 Advanced inorganic chemistry (6)

CHEM4342 Organometallic chemistry (6)
CHEM4441 Advanced organic chemistry (6)

CHEM4443 Integrated organic synthesis (6)
CHEM4444 Chemical biology (6)

CHEM4542 Computational chemistry (6)
CHEM4543 Advanced physical chemistry (6)

CHEM4544 Electrochemical science and technology (6) (lab)

3. Capstone requirement (12 credits)

At least 12 credits selected from the following courses:

CHEM3999 Directed studies in chemistry (6)
CHEM4966 Chemistry internship (6)
CHEM4999 Chemistry project (12)

#### Notes:

- 1. These are core courses in the regular Chemistry Major (96 credits) curriculum.
- 2. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.
- 3. As this curriculum is accredited by the Royal Society of Chemistry (RSC), students must follow the curriculum in full (i.e. no replacement courses are possible) in order to graduate with this accredited programme. For students who have credit transfer from exchange studies, for example) a student took CHEM3A and CHEM3B in a host university during his/her exchange studies and these two courses have been approved by the Faculty of Science to be considered equivalent as CHEM3241 and CHEM3341, they will be considered taking those HKU-version courses and in the example shown here, the student is deemed to have taken CHEM3241 and CHEM3341 to fulfil the accredited curriculum
- 4. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis

## Remarks

Major Title Major in Chemistry (Intensive)

Offered to students 2019

admitted to Year 1 in

### Objectives:

The Intensive Major in Chemistry aims to provide students with a strong foundation on major areas of chemistry. The curriculum includes core courses covering topics in physical, inorganic, organic, and analytical chemistry. The curriculum emphasizes comprehensive coverage in theoretical knowledge, laboratory skills, and research experience. A wide selection of elective courses is also available for student preparation to pursue learning in specializations such as chemical biology, computation chemistry, and materials. Graduates of the Intensive Chemistry Major programme will be proficient in the principles and experimental skills of chemistry. The programme will also equip students with transferable skills in both theoretical and experimental investigations in sciences. Graduates are expected to be well-prepared for further studies in chemistry and related disciplines and to pursue professional careers in scientific and technical fields.

This intensive major has been accredited by the Royal Society of Chemistry (RSC), UK.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: demonstrate an understanding across a wide range of topics in chemistry, from basic areas such as analytical, inorganic, organic & physical chemistry, to advanced topics related to current research in chemistry (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 2: demonstrate an in-depth understanding of fundamental physicochemical principles with the ability to apply that knowledge to the solution of theoretical & practical problems (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 3: have developed an awareness & understanding of scientific and ethical issues where chemistry relates to other disciplines, and an appreciation of the impact of chemistry in the modern world (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 4: have substantially developed advanced experimental skills including chemical synthesis, analysis & operation of modern instrumentation, and data analysis skills with the ability to interpret experimental information & infer appropriate conclusions (by requiring of no less than 300 hours of laboratory classes in the curriculum)
- PLO 5: demonstrate problem-solving skills, critical thinking, creativity & effective written & oral communication skills, and to co-operate with other people & participate as an effective team member (by means of coursework, laboratory-based learning, group project & presentation opportunities in the curriculum)
- PLO 6: gain experience in working in the real-life industrial or research environment, and enhance their initiative, interpersonal skills, time management skills & project organization skills (by arrangement for chemistry research project of no less than 24 weeks, or student internship opportunities plus directed studies of no less than three weeks with chemistry-related companies or research laboratories)

## Impermissible Combinations:

Major in Chemistry
Minor in Chemistry

Required courses (144 o	credits)	
1. Introductory level cour	ses (54 credits)	
Disciplinary Core Course	s: Science Foundation Courses (12 credits)	
SCNC1111	Scientific method and reasoning (6)	(Note 1)
SCNC1112	Fundamentals of modern science (6)	(Note 1)
Disciplinary Core Course	s (36 credits)	
CHEM1042	General chemistry I (6)	(Note 1)
CHEM1043	General chemistry II (6)	(Note 1)
CHEM2241	Analytical chemistry I (6)	(Note 1)
CHEM2341	Inorganic chemistry I (6)	(Note 1)
CHEM2441	Organic chemistry I (6)	(Note 1)
CHEM2541	Introductory physical chemistry (6)	(Note 1)
Disciplinary Electives (6 o	credits)	
(Students are encourage	ed to meet with a Chemistry Course Selection Advisor in the course sele	ection period to discuss
which of the following co	urses they should take based on their previous background in Mathema	atics.)
CHEM1044	Mathematics in chemistry (6)	
COMP1117	Computer programming (6)	
MATH1011	University mathematics I (6)	
MATH1013	University mathematics II (6)	
STAT1601	Elementary statistical methods (6)	
STAT1603	Introductory statistics (6)	
2. Advanced level course:	s (78 credits)	
Disciplinary Core Course	(66 credits)	
CHEM3143	Introduction to materials chemistry (6)	
CHEM3241	Analytical chemistry II: chemical instrumentation (6)	(Note 1)
CHEM3341	Inorganic chemistry II (6)	(Note 1)
CHEM3441	Organic chemistry II (6)	(Note 1)
CHEM3443	Organic chemistry laboratory (6)	(Note 1)
CHEM3445	Integrated laboratory (6)	
CHEM3541	Physical chemistry: Introduction to quantum chemistry (6)	(Note 1)
CHEM3542	Physical chemistry: statistical thermodynamics and kinetics theory (6)	

(lab)

(lab)

(lab)

(lab)

(lab)

CHEM4142 Symmetry, group theory and applications (6)
CHEM4144 Advanced materials (6)
CHEM4241 Modern chemical instrumentation and applications (6)

**Disciplinary Electives (12 credits)** 

At least 12 credits selected from the following courses:

(Note that one of the two elective courses selected must contain a laboratory component. Courses marked with (lab)

have a laboratory component. The list of electives given below may be subject to change.)

CHEM4143 Interfacial science and technology (6)

CHEM4145 Medicinal chemistry (6)
CHEM4147 Supramolecular chemistry (6)

CHEM4148 Frontiers in Modern Chemical Science (6)

CHEM4242 Analytical chemistry (6)
CHEM4341 Advanced inorganic chemistry (6)
CHEM4342 Organometallic chemistry (6)

CHEM4342 Organometallic chemistry (6)
CHEM4441 Advanced organic chemistry (6)
CHEM4443 Integrated organic synthesis (6)

CHEM4444 Chemical biology (6)
CHEM4542 Computational chemistry (6)
CHEM4543 Advanced physical chemistry (6)

CHEM4544 Electrochemical science and technology (6)

3. Capstone requirement (12 credits)

At least 12 credits selected from the following courses:

CHEM3999 Directed studies in chemistry (6)
CHEM4966 Chemistry internship (6)
CHEM4999 Chemistry project (12)

#### Notes:

- 1. These are core courses in the regular Chemistry Major (96 credits) curriculum.
- 2. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.
- 3. As this curriculum is accredited by the Royal Society of Chemistry (RSC), students must follow the curriculum in full (i.e. no replacement courses are possible) in order to graduate with this accredited programme. For students who have credit transfer from exchange studies, for example) a student took CHEM3A and CHEM3B in a host university during his/her exchange studies and these two courses have been approved by the Faculty of Science to be considered equivalent as CHEM3241 and CHEM3341, they will be considered taking those HKU-version courses and in the example shown here, the student is deemed to have taken CHEM3241 and CHEM3341 to fulfil the accredited curriculum.

## Remarks:

Major Title Major in Chemistry (Intensive)

Offered to students 2018

admitted to Year 1 in

## **Objectives:**

The Intensive Major in Chemistry aims to provide students with a strong foundation on major areas of chemistry. The curriculum includes core courses covering topics in physical, inorganic, organic, and analytical chemistry. The curriculum emphasizes comprehensive coverage in theoretical knowledge, laboratory skills, and research experience. A wide selection of elective courses is also available for student preparation to pursue learning in specializations such as chemical biology, computation chemistry, and materials. Graduates of the Intensive Chemistry Major programme will be proficient in the principles and experimental skills of chemistry. The programme will also equip students with transferable skills in both theoretical and experimental investigations in sciences. Graduates are expected to be well-prepared for further studies in chemistry and related disciplines and to pursue professional careers in scientific and technical fields.

This intensive major has been accredited by the Royal Society of Chemistry (RSC), UK.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: demonstrate an understanding across a wide range of topics in chemistry, from basic areas such as analytical, inorganic, organic & physical chemistry, to advanced topics related to current research in chemistry (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 2: demonstrate an in-depth understanding of fundamental physicochemical principles with the ability to apply that knowledge to the solution of theoretical & practical problems (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 3: have developed an awareness & understanding of scientific and ethical issues where chemistry relates to other disciplines, and an appreciation of the impact of chemistry in the modern world (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 4: have substantially developed advanced experimental skills including chemical synthesis, analysis & operation of modern instrumentation, and data analysis skills with the ability to interpret experimental information & infer appropriate conclusions (by requiring of no less than 300 hours of laboratory classes in the curriculum)
- PLO 5: demonstrate problem-solving skills, critical thinking, creativity & effective written & oral communication skills, and to co-operate with other people & participate as an effective team member (by means of coursework, laboratory-based learning, group project & presentation opportunities in the curriculum)
- PLO 6: gain experience in working in the real-life industrial or research environment, and enhance their initiative, interpersonal skills, time management skills & project organization skills (by arrangement for chemistry research project of no less than 24 weeks, or student internship opportunities plus directed studies of no less than three weeks with chemistry-related companies or research laboratories)

## Impermissible Combinations:

Major in Chemistry Minor in Chemistry

equired courses (144	credits)	
I. Introductory level cour		
Disciplinary Core Course	s: Science Foundation Courses (12 credits)	
SCNC1111	Scientific method and reasoning (6)	(Note 1)
SCNC1112	Fundamentals of modern science (6)	(Note 1)
Disciplinary Core Course	s (36 credits)	
CHEM1042	General chemistry I (6)	(Note 1)
CHEM1043	General chemistry II (6)	(Note 1)
CHEM2241	Analytical chemistry I (6)	(Note 1)
CHEM2341	Inorganic chemistry I (6)	(Note 1)
CHEM2441	Organic chemistry I (6)	(Note 1)
CHEM2541	Introductory physical chemistry (6)	(Note 1)
Disciplinary Electives (6	credits)	
(Students are encourage	ed to meet with a Chemistry Course Selection Advisor in the course sel	lection period to discus
which of the following co	ourses they should take based on their previous background in Mathem	atics.)
CHEM1044	Mathematics in chemistry (6)	
COMP1117	Computer programming (6)	
MATH1011	University mathematics I (6)	
MATH1013	University mathematics II (6)	
STAT1601	Elementary statistical methods (6)	
STAT1603	Introductory statistics (6)	
2. Advanced level course	s (78 credits)	
Disciplinary Core Course	(66 credits)	
CHEM3143	Introduction to materials chemistry (6)	
CHEM3241	Analytical chemistry II: chemical instrumentation (6)	(Note 1)
CHEM3341	Inorganic chemistry II (6)	(Note 1)
CHEM3441	Organic chemistry II (6)	(Note 1)
CHEM3443	Organic chemistry laboratory (6)	(Note 1)
CHEM3445	Integrated laboratory (6)	
CHEM3541	Physical chemistry: Introduction to quantum chemistry (6)	(Note 1)
CHEM3542	Physical chemistry: statistical thermodynamics and kinetics	

(lab)

(lab)

(lab)

(lab)

(lab)

CHEM4142 Symmetry, group theory and applications (6)

CHEM4144 Advanced materials (6)

CHEM4241 Modern chemical instrumentation and applications (6)

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

(Note that one of the two elective courses selected must contain a laboratory component. Courses marked with (lab)

have a laboratory component. The list of electives given below may be subject to change.)

CHEM4143 Interfacial science and technology (6)

CHEM4145 Medicinal chemistry (6)
CHEM4147 Supramolecular chemistry (6)

CHEM4148 Frontiers in Modern Chemical Science (6)

CHEM4242 Analytical chemistry (6)
CHEM4341 Advanced inorganic chemistry (6)

CHEM4342 Organometallic chemistry (6)
CHEM4441 Advanced organic chemistry (6)
CHEM4443 Integrated organic synthesis (6)

CHEM4443 Integrated organic synthetic CHEM4444 Chemical biology (6)

CHEM4542 Computational chemistry (6)
CHEM4543 Advanced physical chemistry (6)

CHEM4544 Electrochemical science and technology (6)

3. Capstone requirement (12 credits)

At least 12 credits selected from the following courses:

CHEM3999 Directed studies in chemistry (6)
CHEM4966 Chemistry internship (6)
CHEM4999 Chemistry project (12)

#### Notes:

- 1. These are core courses in the regular Chemistry Major (96 credits) curriculum.
- 2. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.
- 3. As this curriculum is accredited by the Royal Society of Chemistry (RSC), students must follow the curriculum in full (i.e. no replacement courses are possible) in order to graduate with this accredited programme. For students who have credit transfer from exchange studies, for example) a student took CHEM3A and CHEM3B in a host university during his/her exchange studies and these two courses have been approved by the Faculty of Science to be considered equivalent as CHEM3241 and CHEM3341, they will be considered taking those HKU-version courses and in the example shown here, the student is deemed to have taken CHEM3241 and CHEM3341 to fulfil the accredited curriculum.

## Remarks:

Major Title Major in Chemistry (Intensive)

Offered to students 2017

admitted to Year 1 in

## **Objectives:**

The Intensive Major in Chemistry aims to provide students with a strong foundation on major areas of chemistry. The curriculum includes core courses covering topics in physical, inorganic, organic, and analytical chemistry. The curriculum emphasizes comprehensive coverage in theoretical knowledge, laboratory skills, and research experience. A wide selection of elective courses is also available for student preparation to pursue learning in specializations such as chemical biology, computation chemistry, and materials. Graduates of the Intensive Chemistry Major programme will be proficient in the principles and experimental skills of chemistry. The programme will also equip students with transferable skills in both theoretical and experimental investigations in sciences. Graduates are expected to be well-prepared for further studies in chemistry and related disciplines and to pursue professional careers in scientific and technical fields.

This intensive major has been accredited by the Royal Society of Chemistry (RSC), UK.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: demonstrate an understanding across a wide range of topics in chemistry, from basic areas such as analytical, inorganic, organic & physical chemistry, to advanced topics related to current research in chemistry (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 2: demonstrate an in-depth understanding of fundamental physicochemical principles with the ability to apply that knowledge to the solution of theoretical & practical problems (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 3: have developed an awareness & understanding of scientific and ethical issues where chemistry relates to other disciplines, and an appreciation of the impact of chemistry in the modern world (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 4: have substantially developed advanced experimental skills including chemical synthesis, analysis & operation of modern instrumentation, and data analysis skills with the ability to interpret experimental information & infer appropriate conclusions (by requiring of no less than 300 hours of laboratory classes in the curriculum)
- PLO 5: demonstrate problem-solving skills, critical thinking, creativity & effective written & oral communication skills, and to co-operate with other people & participate as an effective team member (by means of coursework, laboratory-based learning, group project & presentation opportunities in the curriculum)
- PLO 6: gain experience in working in the real-life industrial or research environment, and enhance their initiative, interpersonal skills, time management skills & project organization skills (by arrangement for chemistry research project of no less than 24 weeks, or student internship opportunities plus directed studies of no less than three weeks with chemistry-related companies or research laboratories)

## Impermissible Combinations:

Major in Chemistry
Minor in Chemistry

equired courses (144	credits)	
I. Introductory level cour		
Disciplinary Core Course	s: Science Foundation Courses (12 credits)	
SCNC1111	Scientific method and reasoning (6)	(Note 1)
SCNC1112	Fundamentals of modern science (6)	(Note 1)
Disciplinary Core Course	s (36 credits)	
CHEM1042	General chemistry I (6)	(Note 1)
CHEM1043	General chemistry II (6)	(Note 1)
CHEM2241	Analytical chemistry I (6)	(Note 1)
CHEM2341	Inorganic chemistry I (6)	(Note 1)
CHEM2441	Organic chemistry I (6)	(Note 1)
CHEM2541	Introductory physical chemistry (6)	(Note 1)
Disciplinary Electives (6	credits)	
(Students are encourage	ed to meet with a Chemistry Course Selection Advisor in the course sel	lection period to discus
which of the following co	ourses they should take based on their previous background in Mathem	atics.)
CHEM1044	Mathematics in chemistry (6)	
COMP1117	Computer programming (6)	
MATH1011	University mathematics I (6)	
MATH1013	University mathematics II (6)	
STAT1601	Elementary statistical methods (6)	
STAT1603	Introductory statistics (6)	
2. Advanced level course	s (78 credits)	
Disciplinary Core Course	(66 credits)	
CHEM3143	Introduction to materials chemistry (6)	
CHEM3241	Analytical chemistry II: chemical instrumentation (6)	(Note 1)
CHEM3341	Inorganic chemistry II (6)	(Note 1)
CHEM3441	Organic chemistry II (6)	(Note 1)
CHEM3443	Organic chemistry laboratory (6)	(Note 1)
CHEM3445	Integrated laboratory (6)	
CHEM3541	Physical chemistry: Introduction to quantum chemistry (6)	(Note 1)
CHEM3542	Physical chemistry: statistical thermodynamics and kinetics	

CHEM4142 Symmetry, group theory and applications (6) CHEM4144 Advanced materials (6) CHEM4241 Modern chemical instrumentation and applications (6) **Disciplinary Electives (12 credits)** At least 12 credits selected from the following courses: (Note that one of the two elective courses selected must contain a laboratory component. Courses marked with (lab) have a laboratory component. The list of electives given below may be subject to change.) Interfacial science and technology (6) CHFM4143 CHEM4145 Medicinal chemistry (6) CHEM4147 Supramolecular chemistry (6) Frontiers in Modern Chemical Science (6) CHEM4148 CHEM4242 Analytical chemistry (6) (lab) Advanced inorganic chemistry (6) CHEM4341 CHEM4342 Organometallic chemistry (6) (lab) Advanced organic chemistry (6) CHFM4441 Integrated organic synthesis (6) CHEM4443 (lab) CHEM4444 Chemical biology (6) Computational chemistry (6) (lab) CHEM4542 CHEM4543 Advanced physical chemistry (6) CHEM4544 Electrochemical science and technology (6) (lab)

## 3. Capstone requirement (12 credits)

At least 12 credits selected from the following courses:

CHEM3999 Directed studies in chemistry (6)
CHEM4966 Chemistry internship (6)
CHEM4999 Chemistry project (12)

#### Notes:

- 1. These are core courses in the regular Chemistry Major (96 credits) curriculum.
- 2. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.
- 3. As this curriculum is accredited by the Royal Society of Chemistry (RSC), students must follow the curriculum in full (i.e. no replacement courses are possible) in order to graduate with this accredited programme. For students who have credit transfer from exchange studies, for example) a student took CHEM3A and CHEM3B in a host university during his/her exchange studies and these two courses have been approved by the Faculty of Science to be considered equivalent as CHEM3241 and CHEM3341, they will be considered taking those HKU-version courses and in the example shown here, the student is deemed to have taken CHEM3241 and CHEM3341 to fulfil the accredited curriculum.

## Remarks:

Major Title Major in Chemistry (Intensive)

Offered to students 2016

admitted to Year 1 in

## **Objectives:**

The Intensive Major in Chemistry aims to provide students with a strong foundation on major areas of chemistry. The curriculum includes core courses covering topics in physical, inorganic, organic, and analytical chemistry. The curriculum emphasizes comprehensive coverage in theoretical knowledge, laboratory skills, and research experience. A wide selection of elective courses is also available for student preparation to pursue learning in specializations such as chemical biology, computation chemistry, and materials. Graduates of the Intensive Chemistry Major programme will be proficient in the principles and experimental skills of chemistry. The programme will also equip students with transferable skills in both theoretical and experimental investigations in sciences. Graduates are expected to be well-prepared for further studies in chemistry and related disciplines and to pursue professional careers in scientific and technical fields.

This intensive major has been accredited by the Royal Society of Chemistry (RSC), UK.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: demonstrate an understanding across a wide range of topics in chemistry, from basic areas such as analytical, inorganic, organic & physical chemistry, to advanced topics related to current research in chemistry (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 2: demonstrate an in-depth understanding of fundamental physicochemical principles with the ability to apply that knowledge to the solution of theoretical & practical problems (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 3: have developed an awareness & understanding of scientific and ethical issues where chemistry relates to other disciplines, and an appreciation of the impact of chemistry in the modern world (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 4: have substantially developed advanced experimental skills including chemical synthesis, analysis & operation of modern instrumentation, and data analysis skills with the ability to interpret experimental information & infer appropriate conclusions (by requiring of no less than 300 hours of laboratory classes in the curriculum)
- PLO 5: demonstrate problem-solving skills, critical thinking, creativity & effective written & oral communication skills, and to co-operate with other people & participate as an effective team member (by means of coursework, laboratory-based learning, group project & presentation opportunities in the curriculum)
- PLO 6: gain experience in working in the real-life industrial or research environment, and enhance their initiative, interpersonal skills, time management skills & project organization skills (by arrangement for chemistry research project of no less than 24 weeks, or student internship opportunities plus directed studies of no less than three weeks with chemistry-related companies or research laboratories)

## Impermissible Combinations:

Major in Chemistry
Minor in Chemistry

equired courses (144	credits)	
I. Introductory level cour		
Disciplinary Core Course	s: Science Foundation Courses (12 credits)	
SCNC1111	Scientific method and reasoning (6)	(Note 1)
SCNC1112	Fundamentals of modern science (6)	(Note 1)
Disciplinary Core Course	s (36 credits)	
CHEM1042	General chemistry I (6)	(Note 1)
CHEM1043	General chemistry II (6)	(Note 1)
CHEM2241	Analytical chemistry I (6)	(Note 1)
CHEM2341	Inorganic chemistry I (6)	(Note 1)
CHEM2441	Organic chemistry I (6)	(Note 1)
CHEM2541	Introductory physical chemistry (6)	(Note 1)
Disciplinary Electives (6	credits)	
(Students are encourage	ed to meet with a Chemistry Course Selection Advisor in the course sel	lection period to discus
which of the following co	ourses they should take based on their previous background in Mathem	atics.)
CHEM1044	Mathematics in chemistry (6)	
COMP1117	Computer programming (6)	
MATH1011	University mathematics I (6)	
MATH1013	University mathematics II (6)	
STAT1601	Elementary statistical methods (6)	
STAT1603	Introductory statistics (6)	
2. Advanced level course	s (78 credits)	
Disciplinary Core Course	(66 credits)	
CHEM3143	Introduction to materials chemistry (6)	
CHEM3241	Analytical chemistry II: chemical instrumentation (6)	(Note 1)
CHEM3341	Inorganic chemistry II (6)	(Note 1)
CHEM3441	Organic chemistry II (6)	(Note 1)
CHEM3443	Organic chemistry laboratory (6)	(Note 1)
CHEM3445	Integrated laboratory (6)	
CHEM3541	Physical chemistry: Introduction to quantum chemistry (6)	(Note 1)
CHEM3542	Physical chemistry: statistical thermodynamics and kinetics	

(lab)

(lab)

(lab)

(lab)

CHEM4142 Symmetry, group theory and applications (6) CHEM4144 Advanced materials (6)

CHEM4241 Modern chemical instrumentation and applications (6)

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

(Note that one of the two elective courses selected must contain a laboratory component. Courses marked with (lab)

have a laboratory component. The list of electives given below may be subject to change.)

CHEM4143 Interfacial science and technology (6)

CHEM4145 Medicinal chemistry (6)
CHEM4147 Supramolecular chemistry (6)

CHEM4148 Frontiers in Modern Chemical Science (6)

CHEM4242 Analytical chemistry (6)
CHEM4341 Advanced inorganic chemistry (6)

CHEM4342 Organometallic chemistry (6)
CHEM4441 Advanced organic chemistry (6)
CHEM4443 Integrated organic synthesis (6)

CHEM4444 Chemical biology (6)
CHEM4542 Computational chemistry (6)

CHEM4543 Advanced physical chemistry (6)
CHEM4544 Electrochemical science and technology (6) (*(lab)* 

3. Capstone requirement (12 credits)

At least 12 credits selected from the following courses:

CHEM3999 Directed studies in chemistry (6)
CHEM4966 Chemistry internship (6)
CHEM4999 Chemistry project (12)

#### Notes:

- 1. These are core courses in the regular Chemistry Major (96 credits) curriculum.
- 2. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.
- 3. As this curriculum is accredited by the Royal Society of Chemistry (RSC), students must follow the curriculum in full (i.e. no replacement courses are possible) in order to graduate with this accredited programme. For students who have credit transfer from exchange studies, for example) a student took CHEM3A and CHEM3B in a host university during his/her exchange studies and these two courses have been approved by the Faculty of Science to be considered equivalent as CHEM3241 and CHEM3341, they will be considered taking those HKU-version courses and in the example shown here, the student is deemed to have taken CHEM3241 and CHEM3341 to fulfil the accredited curriculum.

## Remarks:

Major Title Major in Chemistry (Intensive)

Offered to students 2015

admitted to Year 1 in

## **Objectives:**

The Intensive Major in Chemistry aims to provide students with a strong foundation on major areas of chemistry. The curriculum includes core courses covering topics in physical, inorganic, organic, and analytical chemistry. The curriculum emphasizes comprehensive coverage in theoretical knowledge, laboratory skills, and research experience. A wide selection of elective courses is also available for student preparation to pursue learning in specializations such as chemical biology, computation chemistry, and materials. Graduates of the Intensive Chemistry Major programme will be proficient in the principles and experimental skills of chemistry. The programme will also equip students with transferable skills in both theoretical and experimental investigations in sciences. Graduates are expected to be well-prepared for further studies in chemistry and related disciplines and to pursue professional careers in scientific and technical fields.

This intensive major has been accredited by the Royal Society of Chemistry (RSC), UK.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: demonstrate an understanding across a wide range of topics in chemistry, from basic areas such as analytical, inorganic, organic & physical chemistry, to advanced topics related to current research in chemistry (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 2: demonstrate an in-depth understanding of fundamental physicochemical principles with the ability to apply that knowledge to the solution of theoretical & practical problems (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 3: have developed an awareness & understanding of scientific and ethical issues where chemistry relates to other disciplines, and an appreciation of the impact of chemistry in the modern world (by means of coursework, laboratory-based and/or research-based learning in the curriculum)
- PLO 4: have substantially developed advanced experimental skills including chemical synthesis, analysis & operation of modern instrumentation, and data analysis skills with the ability to interpret experimental information & infer appropriate conclusions (by requiring of no less than 300 hours of laboratory classes in the curriculum)
- PLO 5: demonstrate problem-solving skills, critical thinking, creativity & effective written & oral communication skills, and to co-operate with other people & participate as an effective team member (by means of coursework, laboratory-based learning, group project & presentation opportunities in the curriculum)
- PLO 6: gain experience in working in the real-life industrial or research environment, and enhance their initiative, interpersonal skills, time management skills & project organization skills (by arrangement for chemistry research project of no less than 24 weeks, or student internship opportunities plus directed studies of no less than three weeks with chemistry-related companies or research laboratories)

## Impermissible Combinations:

Major in Chemistry
Minor in Chemistry

Required courses (144 o	credits)	
1. Introductory level cour	ses (54 credits)	
Disciplinary Core Course	s: Science Foundation Courses (12 credits)	
SCNC1111	Scientific method and reasoning (6)	(Note 1)
SCNC1112	Fundamentals of modern science (6)	(Note 1)
Disciplinary Core Course	s (36 credits)	
CHEM1042	General chemistry I (6)	(Note 1)
CHEM1043	General chemistry II (6)	(Note 1)
CHEM2241	Analytical chemistry I (6)	(Note 1)
CHEM2341	Inorganic chemistry I (6)	(Note 1)
CHEM2441	Organic chemistry I (6)	(Note 1)
CHEM2541	Introductory physical chemistry (6)	(Note 1)
Disciplinary Electives (6 o	credits)	
(Students are encourage	ed to meet with a Chemistry Course Selection Advisor in the course sele	ection period to discuss
which of the following co	urses they should take based on their previous background in Mathema	atics.)
CHEM1044	Mathematics in chemistry (6)	
COMP1117	Computer programming (6)	
MATH1011	University mathematics I (6)	
MATH1013	University mathematics II (6)	
STAT1601	Elementary statistical methods (6)	
STAT1603	Introductory statistics (6)	
2. Advanced level course:	s (78 credits)	
Disciplinary Core Course	(66 credits)	
CHEM3143	Introduction to materials chemistry (6)	
CHEM3241	Analytical chemistry II: chemical instrumentation (6)	(Note 1)
CHEM3341	Inorganic chemistry II (6)	(Note 1)
CHEM3441	Organic chemistry II (6)	(Note 1)
CHEM3443	Organic chemistry laboratory (6)	(Note 1)
CHEM3445	Integrated laboratory (6)	
CHEM3541	Physical chemistry: Introduction to quantum chemistry (6)	(Note 1)
CHEM3542	Physical chemistry: statistical thermodynamics and kinetics theory (6)	

(lab)

(lab)

(lab)

(lab)

CHEM4142 Symmetry, group theory and applications (6) CHEM4144 Advanced materials (6)

CHEM4241 Modern chemical instrumentation and applications (6)

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

(Note that one of the two elective courses selected must contain a laboratory component. Courses marked with (lab)

have a laboratory component. The list of electives given below may be subject to change.)

CHEM4143 Interfacial science and technology (6)

CHEM4145 Medicinal chemistry (6)
CHEM4147 Supramolecular chemistry (6)

CHEM4148 Frontiers in Modern Chemical Science (6)

CHEM4242 Analytical chemistry (6)
CHEM4341 Advanced inorganic chemistry (6)

CHEM4342 Organometallic chemistry (6)
CHEM4441 Advanced organic chemistry (6)
CHEM4443 Integrated organic synthesis (6)

CHEM4444 Chemical biology (6)
CHEM4542 Computational chemistry (6)

CHEM4543 Advanced physical chemistry (6)
CHEM4544 Electrochemical science and technology (6) (*(lab)* 

3. Capstone requirement (12 credits)

At least 12 credits selected from the following courses:

CHEM3999 Directed studies in chemistry (6)
CHEM4966 Chemistry internship (6)
CHEM4999 Chemistry project (12)

#### Notes:

- 1. These are core courses in the regular Chemistry Major (96 credits) curriculum.
- 2. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.
- 3. As this curriculum is accredited by the Royal Society of Chemistry (RSC), students must follow the curriculum in full (i.e. no replacement courses are possible) in order to graduate with this accredited programme. For students who have credit transfer from exchange studies, for example) a student took CHEM3A and CHEM3B in a host university during his/her exchange studies and these two courses have been approved by the Faculty of Science to be considered equivalent as CHEM3241 and CHEM3341, they will be considered taking those HKU-version courses and in the example shown here, the student is deemed to have taken CHEM3241 and CHEM3341 to fulfil the accredited curriculum.

## Remarks:

Offered to students 2021

admitted to Year 1 in

## **Objectives:**

Amidst an upsurge of digital data produced worldwide nowadays, the Major in Decision Analytics aims to equip students with the skills and expertise in leveraging and managing big data in real time, and provide them with solid training in making digitized information a strategic part of critical decision-making and resource allocation with greater clarity and accuracy. Core courses in the curriculum emphasize the fundamental concepts and methodologies of decision analytics which include but not limited to statistical analysis, data mining and data visualization, programming, data structuring, mathematical and statistical modelling and implementation of database systems. Elective courses focus on diverse and applied techniques of decision analytics in multidisciplinary fields.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: apprehend the concepts of decision analytics and its underlying theory in relation to a broad range of related disciplinary academic or professional areas (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: identify and adopt appropriate analytical techniques and tools to extract and classify critical information from structured or unstructured data (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: be proficient with the design and implementation of advanced modelling techniques and database management, and offer effective recommendations for analytic initiatives and solutions (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: evaluate the quality of information from different sources in support of critical decision making, process streamlining and the optimization of resources, and appraise the related ethical issues (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: communicate to people effectively and efficiently with professionalism and accuracy using interactive and dynamic tools to translate technical information and present collaborative and strategic ideas (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: gain insights into current advances in decision analytics and confidence to solve real-life problems through either project or industrial training (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

## Impermissible Combinations:

BASc in Applied Artificial Intelligence

BEng in Computer Science

Major in Computing and Data Analytics

Major in Computer Science

Minor in Computer Science Major in Risk Management

Major in Statistics

Minor in Statistics

## Required courses (96 credits)

## 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

COMP1117 Computer programming (6)

COMP2119 Introduction to data structures and algorithms (6)

MATH1013 University mathematics II (6)

MATH2014 Multivariable calculus and linear algebra (6)

STAT2601 Probability and statistics I (6) STAT2602 Probability and statistics II (6)

## 2. Advanced level courses (42 credits) Disciplinary Core Courses (30 credits)

COMP3278 Introduction to database management systems (6)

MATH3904 Introduction to optimization (6)
STAT3600 Linear statistical analysis (6)
STAT3612 Statistical machine learning (6)
STAT4609 Big data analytics (6)

Disciplinary Electives (12 credits)

At least 12 credits selected from the following courses:

COMP3250 Design and analysis of algorithms (6)

COMP3270 Artificial intelligence (6)
COMP3323 Advanced database systems (6)

COMP3407 Scientific computing (6)

MATH3408 Computational methods and differential equations with

applications (6)

MATH3600 Discrete mathematics (6)
MATH3601 Numerical analysis (6)
MATH3901 Operations research I (6)

STAT3620 Modern nonparametric statistics (6)
STAT3621 Statistical data analysis (6)
STAT3622 Data visualization (6)
STAT3655 Survival analysis (6)
STAT4601 Time-series analysis (6)
STAT4602 Multivariate data analysis (6)
STAT4610 Bayesian learning (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses: STAT3799 Directed studies in statistics (6)

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6) STAT4799 Statistics project (12)

#### Notes:

1. Students may consider taking the following courses if they wish to pursue a more focused study in the following areas:

a. Biomedical Analytics

BIOL4417 'Omics' and systems biology

STAT3607 Statistics in clinical medicine and bio-medical research

STAT3608 Statistical genetics

STAT3620 Modern nonparametric statistics

STAT3621 Statistical data analysis

STAT4602 Multivariate data analysis

b. Financial and Risk Analytics

STAT3621 Statistical data analysis

STAT4601 Time series analysis

Plus advanced level courses listed for the Major in Risk Management

c. Operational Analytics

COMP3250 Design and analysis of algorithms

MATH3600 Discrete mathematics

MATH3901 Operations research I

MATH3943 Network models in operations research

MATH4902 Operations research II

STAT3606 Business logistics

- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required (disciplinary core) by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses (disciplinary core) in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary elective) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary elective) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 6. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/useful-resources/handbooks (Student Handbook).
- 7. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis
- 8. Candidates who have been admitted to Year 1 in 2021-22 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1112. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Biology, Chemistry, and Physics in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Biology, Chemistry, and Physics Higher Level in International Baccalaureate (IB)
- Grade B or above in Biology, Chemistry, and Physics in General Certificate of Education Advanced Level (GCEAL)
- Biology, Chemistry, and Physics qualification in Gao Kao will be considered on a case-by-case basis

## Remarks:

Offered to students 2020

admitted to Year 1 in

## **Objectives:**

Amidst an upsurge of digital data produced worldwide nowadays, the Major in Decision Analytics aims to equip students with the skills and expertise in leveraging and managing big data in real time, and provide them with solid training in making digitized information a strategic part of critical decision-making and resource allocation with greater clarity and accuracy. Core courses in the curriculum emphasize the fundamental concepts and methodologies of decision analytics which include but not limited to statistical analysis, data mining and data visualization, programming, data structuring, mathematical and statistical modelling and implementation of database systems. Elective courses focus on diverse and applied techniques of decision analytics in multidisciplinary fields.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: apprehend the concepts of decision analytics and its underlying theory in relation to a broad range of related disciplinary academic or professional areas (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: identify and adopt appropriate analytical techniques and tools to extract and classify critical information from structured or unstructured data (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: be proficient with the design and implementation of advanced modelling techniques and database management, and offer effective recommendations for analytic initiatives and solutions (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: evaluate the quality of information from different sources in support of critical decision making, process streamlining and the optimization of resources, and appraise the related ethical issues (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: communicate to people effectively and efficiently with professionalism and accuracy using interactive and dynamic tools to translate technical information and present collaborative and strategic ideas (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: gain insights into current advances in decision analytics and confidence to solve real-life problems through either project or industrial training (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

## Impermissible Combinations:

BASc in Applied Artificial Intelligence

BEng in Computer Science

Major in Computing and Data Analytics

Major in Computer Science

Minor in Computer Science

Major in Risk Management

Major in Statistics

Minor in Statistics

## Required courses (96 credits)

## 1. Introductory level courses (48 credits)

## Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

COMP1117 Computer programming (6)

COMP2119 Introduction to data structures and algorithms (6)

MATH1013 University mathematics II (6)

MATH2014 Multivariable calculus and linear algebra (6)

STAT2601 Probability and statistics I (6) STAT2602 Probability and statistics II (6)

## 2. Advanced level courses (42 credits) Disciplinary Core Courses (30 credits)

COMP3278 Introduction to database management systems (6)

MATH3904 Introduction to optimization (6) STAT3600 Linear statistical analysis (6) STAT3612 Statistical machine learning (6)

STAT4609 Big data analytics (6)

## Disciplinary Electives (12 credits)

At least 12 credits selected from the following courses: COMP3250 Design and analysis of algorithms (6)

COMP3270 Artificial intelligence (6)
COMP3323 Advanced database systems (6)

COMP3407 Scientific computing (6)

MATH3408 Computational methods and differential equations with

applications (6)

MATH3600 Discrete mathematics (6)
MATH3601 Numerical analysis (6)
MATH3901 Operations research I (6)

STAT3620 Modern nonparametric statistics (6)
STAT3621 Statistical data analysis (6)
STAT3622 Data visualization (6)
STAT3655 Survival analysis (6)
STAT4601 Time-series analysis (6)
STAT4602 Multivariate data analysis (6)
STAT4610 Bayesian learning (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses: STAT3799 Directed studies in statistics (6)

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6) STAT4799 Statistics project (12)

#### Notes:

1. Students may consider taking the following courses if they wish to pursue a more focused study in the following areas:

a. Biomedical Analytics

BIOL4417 'Omics' and systems biology

STAT3607 Statistics in clinical medicine and bio-medical research

STAT3608 Statistical genetics

STAT3620 Modern nonparametric statistics

STAT3621 Statistical data analysis

STAT4602 Multivariate data analysis

b. Financial and Risk Analytics

STAT3621 Statistical data analysis

STAT4601 Time series analysis

Plus advanced level courses listed for the Major in Risk Management

c. Operational Analytics

COMP3250 Design and analysis of algorithms

MATH3600 Discrete mathematics

MATH3901 Operations research I

MATH3943 Network models in operations research

MATH4902 Operations research II

STAT3606 Business logistics

- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required (disciplinary core) by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses (disciplinary core) in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary elective) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary elective) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 6. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/useful-resources/handbooks (Student Handbook).
- 7. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis

## Remarks:

Offered to students 2019

admitted to Year 1 in

## **Objectives:**

Amidst an upsurge of digital data produced worldwide nowadays, the Major in Decision Analytics aims to equip students with the skills and expertise in leveraging and managing big data in real time, and provide them with solid training in making digitized information a strategic part of critical decision-making and resource allocation with greater clarity and accuracy. Core courses in the curriculum emphasize the fundamental concepts and methodologies of decision analytics which include but not limited to statistical analysis, data mining and data visualization, programming, data structuring, mathematical and statistical modelling and implementation of database systems. Elective courses focus on diverse and applied techniques of decision analytics in multidisciplinary fields.

## Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: apprehend the concepts of decision analytics and its underlying theory in relation to a broad range of related disciplinary academic or professional areas (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: identify and adopt appropriate analytical techniques and tools to extract and classify critical information from structured or unstructured data (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: be proficient with the design and implementation of advanced modelling techniques and database management, and offer effective recommendations for analytic initiatives and solutions (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: evaluate the quality of information from different sources in support of critical decision making, process streamlining and the optimization of resources, and appraise the related ethical issues (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: communicate to people effectively and efficiently with professionalism and accuracy using interactive and dynamic tools to translate technical information and present collaborative and strategic ideas (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: gain insights into current advances in decision analytics and confidence to solve real-life problems through either project or industrial training (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

## Impermissible Combinations:

BASc in Applied Artificial Intelligence

BEng in Computer Science

Major in Computing and Data Analytics

Major in Computer Science

Minor in Computer Science

Major in Risk Management

Major in Statistics

Minor in Statistics

## Required courses (96 credits)

## 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

COMP1117 Computer programming (6)

COMP2119 Introduction to data structures and algorithms (6)

MATH1013 University mathematics II (6)

MATH2014 Multivariable calculus and linear algebra (6)

STAT2601 Probability and statistics I (6) STAT2602 Probability and statistics II (6)

# 2. Advanced level courses (42 credits)

## Disciplinary Core Courses (30 credits)

COMP3278 Introduction to database management systems (6)

MATH3904 Introduction to optimization (6) STAT3600 Linear statistical analysis (6) STAT3612 Statistical machine learning (6)

STAT4609 Big data analytics (6)

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

COMP3250 Design and analysis of algorithms (6)

COMP3270 Artificial intelligence (6)

COMP3323 Advanced database systems (6)

COMP3407 Scientific computing (6)

MATH3408 Computational methods and differential equations with

applications (6)

MATH3600 Discrete mathematics (6)
MATH3601 Numerical analysis (6)
MATH3901 Operations research I (6)

STAT3620 Modern nonparametric statistics (6)
STAT3621 Statistical data analysis (6)
STAT3622 Data visualization (6)
STAT3655 Survival analysis (6)
STAT4601 Time-series analysis (6)
STAT4602 Multivariate data analysis (6)
STAT4610 Bayesian learning (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses: STAT3799 Directed studies in statistics (6)

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6) STAT4799 Statistics project (12)

#### Notes:

1. Students may consider taking the following courses if they wish to pursue a more focused study in the following areas:

a. Biomedical Analytics

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STAT3608 Statistical genetics

STAT3620 Modern nonparametric statistics

STAT3621 Statistical data analysis

STAT4602 Multivariate data analysis

b. Financial and Risk Analytics

STAT3621 Statistical data analysis

STAT4601 Time series analysis

Plus advanced level courses listed for the Major in Risk Management

c. Operational Analytics

COMP3250 Design and analysis of algorithms

MATH3600 Discrete mathematics

MATH3901 Operations research I

MATH3943 Network models in operations research

MATH4902 Operations research II

STAT3606 Business logistics

- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required (disciplinary core) by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses (disciplinary core) in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary elective) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary elective) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 6. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/useful-resources/handbooks (Student Handbook).

## Remarks:

Offered to students 2018

admitted to Year 1 in

### **Objectives:**

Amidst an upsurge of digital data produced worldwide nowadays, the Major in Decision Analytics aims to equip students with the skills and expertise in leveraging and managing big data in real time, and provide them with solid training in making digitized information a strategic part of critical decision-making and resource allocation with greater clarity and accuracy. Core courses in the curriculum emphasize the fundamental concepts and methodologies of decision analytics which include but not limited to statistical analysis, data mining and data visualization, programming, data structuring, mathematical and statistical modelling and implementation of database systems. Elective courses focus on diverse and applied techniques of decision analytics in multidisciplinary fields.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: apprehend the concepts of decision analytics and its underlying theory in relation to a broad range of related disciplinary academic or professional areas (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
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- PLO 3: be proficient with the design and implementation of advanced modelling techniques and database management, and offer effective recommendations for analytic initiatives and solutions (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: evaluate the quality of information from different sources in support of critical decision making, process streamlining and the optimization of resources, and appraise the related ethical issues (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: communicate to people effectively and efficiently with professionalism and accuracy using interactive and dynamic tools to translate technical information and present collaborative and strategic ideas (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: gain insights into current advances in decision analytics and confidence to solve real-life problems through either project or industrial training (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

## Impermissible Combinations:

BEng in Computer Science

Major in Computing and Data Analytics

Major in Computer Science

Minor in Computer Science

Major in Risk Management

Major in Statistics

Minor in Statistics

## Required courses (96 credits)

## 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

COMP1117 Computer programming (6)

COMP2119 Introduction to data structures and algorithms (6)

MATH1013 University mathematics II (6)

MATH2014 Multivariable calculus and linear algebra (6)

STAT2601 Probability and statistics I (6) STAT2602 Probability and statistics II (6)

## 2. Advanced level courses (42 credits)

## Disciplinary Core Courses (30 credits)

COMP3278 Introduction to database management systems (6)

MATH3904 Introduction to optimization (6) STAT3600 Linear statistical analysis (6) STAT3612 Statistical machine learning (6)

Big data analytics (6)

**Disciplinary Electives (12 credits)** 

STAT4609

At least 12 credits selected from the following courses:

COMP3250 Design and analysis of algorithms (6)

COMP3270 Artificial intelligence (6)
COMP3323 Advanced database systems (6)

COMP3407 Scientific computing (6)
MATH3408 Computational methods and differential equations with

applications (6)

MATH3600 Discrete mathematics (6)
MATH3601 Numerical analysis (6)
MATH3901 Operations research I (6)

STAT3620 Modern nonparametric statistics (6)

[previous title: Data mining (6)]

STAT3621 Statistical data analysis (6)
STAT3622 Data visualization (6)
STAT3655 Survival analysis (6)
STAT4601 Time-series analysis (6)
STAT4602 Multivariate data analysis (6)
STAT4610 Bayesian learning (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses: STAT3799 Directed studies in statistics (6)

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6) STAT4799 Statistics project (12)

#### Notes:

1. Students may consider taking the following courses if they wish to pursue a more focused study in the following areas:

a. Biomedical Analytics

BIOL4417 'Omics' and systems biology

STAT3607 Statistics in clinical medicine and bio-medical research

STAT3608 Statistical genetics

STAT3620 Modern nonparametric statistics

STAT3621 Statistical data analysis

STAT4602 Multivariate data analysis

b. Financial and Risk Analytics

STAT3621 Statistical data analysis

STAT4601 Time series analysis

Plus advanced level courses listed for the Major in Risk Management

c. Operational Analytics

COMP3250 Design and analysis of algorithms

MATH3600 Discrete mathematics

MATH3901 Operations research I

MATH3943 Network models in operations research

MATH4902 Operations research II

STAT3606 Business logistics

- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required (disciplinary core) by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
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- 5. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 6. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/useful-resources/handbooks (Student Handbook).

## Remarks

Offered to students 2017

admitted to Year 1 in

## **Objectives:**

Amidst an upsurge of digital data produced worldwide nowadays, the Major in Decision Analytics aims to equip students with the skills and expertise in leveraging and managing big data in real time, and provide them with solid training in making digitized information a strategic part of critical decision-making and resource allocation with greater clarity and accuracy. Core courses in the curriculum emphasize the fundamental concepts and methodologies of decision analytics which include but not limited to statistical analysis, data mining and data visualization, programming, data structuring, mathematical and statistical modelling and implementation of database systems. Elective courses focus on diverse and applied techniques of decision analytics in multidisciplinary fields.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: apprehend the concepts of decision analytics and its underlying theory in relation to a broad range of related disciplinary academic or professional areas (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: identify and adopt appropriate analytical techniques and tools to extract and classify critical information from structured or unstructured data (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
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- PLO 6: gain insights into current advances in decision analytics and confidence to solve real-life problems through either project or industrial training (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

## Impermissible Combinations:

BEng in Computer Science

Major in Computing and Data Analytics

Major in Computer Science Minor in Computer Science

Major in Risk Management

Major in Statistics

Minor in Statistics

## Required courses (96 credits)

## 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

COMP1117 Computer programming (6)

COMP2119 Introduction to data structures and algorithms (6)

MATH1013 University mathematics II (6)

MATH2014 Multivariable calculus and linear algebra (6)

STAT2601 Probability and statistics I (6) STAT2602 Probability and statistics II (6)

## 2. Advanced level courses (42 credits)

## **Disciplinary Core Courses (30 credits)**

COMP3278 Introduction to database management systems (6)

MATH3904 Introduction to optimization (6) STAT3600 Linear statistical analysis (6) STAT3612 Statistical machine learning (6)

Big data analytics (6)

**Disciplinary Electives (12 credits)** 

STAT4609

At least 12 credits selected from the following courses:

COMP3250 Design and analysis of algorithms (6)

COMP3270 Artificial intelligence (6)
COMP3323 Advanced database systems (6)

COMP3407 Scientific computing (6)
MATH3408 Computational methods and differential equations with

applications (6)

MATH3600 Discrete mathematics (6)
MATH3601 Numerical analysis (6)
MATH3901 Operations research I (6)
STAT3616 Advanced SAS programming (6)

[previous title: Data mining (6)]

STAT3620 Modern nonparametric statistics (6)
STAT3621 Statistical data analysis (6)
STAT3622 Data visualization (6)
STAT3655 Survival analysis (6)
STAT4601 Time-series analysis (6)
STAT4602 Multivariate data analysis (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses: STAT3799 Directed studies in statistics (6)

Bayesian learning (6)

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6) STAT4799 Statistics project (12)

## Notes:

1. Students may consider taking the following courses if they wish to pursue a more focused study in the following areas:

a. Biomedical Analytics

STAT4610

BIOL4417 'Omics' and systems biology

STAT3607 Statistics in clinical medicine and bio-medical research

STAT3608 Statistical genetics

STAT3620 Modern nonparametric statistics

STAT3621 Statistical data analysis

STAT4602 Multivariate data analysis

b. Financial and Risk Analytics

STAT3616 Advanced SAS programming

STAT3621 Statistical data analysis

STAT4601 Time series analysis

Plus advanced level courses listed for the Major in Risk Management

c. Operational Analytics

COMP3250 Design and analysis of algorithms

MATH3600 Discrete mathematics

MATH3901 Operations research I

MATH3943 Network models in operations research

MATH4902 Operations research II

STAT3606 Business logistics

- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required (disciplinary core) by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
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## Remarks:

Offered to students 2016

admitted to Year 1 in

## **Objectives:**

Amidst an upsurge of digital data produced worldwide nowadays, the Major in Decision Analytics aims to equip students with the skills and expertise in leveraging and managing big data in real time, and provide them with solid training in making digitized information a strategic part of critical decision-making and resource allocation with greater clarity and accuracy. Core courses in the curriculum emphasize the fundamental concepts and methodologies of decision analytics which include but not limited to statistical analysis, data mining and data visualization, programming, data structuring, mathematical and statistical modelling and implementation of database systems. Elective courses focus on diverse and applied techniques of decision analytics in multidisciplinary fields.

## Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: apprehend the concepts of decision analytics and its underlying theory in relation to a broad range of related disciplinary academic or professional areas (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
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## Impermissible Combinations:

BEng in Computer Science

Major in Computing and Data Analytics

Major in Computer Science

Minor in Computer Science

Major in Risk Management

Major in Statistics

Minor in Statistics

## Required courses (96 credits)

## 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

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STAT2601 Probability and statistics I (6) STAT2602 Probability and statistics II (6)

# 2. Advanced level courses (42 credits)

# **Disciplinary Core Courses (30 credits)**

COMP3278 Introduction to database management systems (6)

MATH3904 Introduction to optimization (6) STAT3600 Linear statistical analysis (6) STAT3612 Statistical machine learning (6)

Big data analytics (6)

**Disciplinary Electives (12 credits)** 

STAT4609

At least 12 credits selected from the following courses:

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COMP3323 Advanced database systems (6)

COMP3407 Scientific computing (6)
MATH3408 Computational methods and differential equations with

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MATH3600 Discrete mathematics (6)
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STAT3616 Advanced SAS programming (6)

[previous title: Data mining (6)]

STAT3620 Modern nonparametric statistics (6)
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3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses: STAT3799 Directed studies in statistics (6)

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6) STAT4799 Statistics project (12)

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b. Financial and Risk Analytics

STAT3616 Advanced SAS programming

STAT3621 Statistical data analysis

STAT4601 Time series analysis

Plus advanced level courses listed for the Major in Risk Management

c. Operational Analytics

COMP3250 Design and analysis of algorithms

MATH3600 Discrete mathematics

MATH3901 Operations research I

MATH3943 Network models in operations research

MATH4902 Operations research II

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## Remarks:

Offered to students 2015

admitted to Year 1 in

### **Objectives:**

Amidst an upsurge of digital data produced worldwide nowadays, the Major in Decision Analytics aims to equip students with the skills and expertise in leveraging and managing big data in real time, and provide them with solid training in making digitized information a strategic part of critical decision-making and resource allocation with greater clarity and accuracy. Core courses in the curriculum emphasize the fundamental concepts and methodologies of decision analytics which include but not limited to statistical analysis, data mining and data visualization, programming, data structuring, mathematical and statistical modelling and implementation of database systems. Elective courses focus on diverse and applied techniques of decision analytics in multidisciplinary fields.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: apprehend the concepts of decision analytics and its underlying theory in relation to a broad range of related disciplinary academic or professional areas (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
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## Impermissible Combinations:

BEng in Computer Science

Major in Computing and Data Analytics

Major in Computer Science

Minor in Computer Science

Major in Risk Management

Major in Statistics

Minor in Statistics

## Required courses (96 credits)

## 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

COMP1117 Computer programming (6)

COMP2119 Introduction to data structures and algorithms (6)

MATH1013 University mathematics II (6)

MATH2014 Multivariable calculus and linear algebra (6)

STAT2601 Probability and statistics I (6) STAT2602 Probability and statistics II (6)

## 2. Advanced level courses (42 credits)

## **Disciplinary Core Courses (30 credits)**

COMP3278 Introduction to database management systems (6)

MATH3904 Introduction to optimization (6) STAT3600 Linear statistical analysis (6) STAT3612 Statistical machine learning (6)

Big data analytics (6)

**Disciplinary Electives (12 credits)** 

STAT4609

At least 12 credits selected from the following courses:

COMP3250 Design and analysis of algorithms (6)

COMP3270 Artificial intelligence (6)
COMP3323 Advanced database systems (6)

COMP3407 Scientific computing (6)
MATH3408 Computational methods and differential equations with

applications (6)

MATH3600 Discrete mathematics (6)
MATH3601 Numerical analysis (6)
MATH3901 Operations research I (6)
STAT3616 Advanced SAS programming (6)

[previous title: Data mining (6)]

STAT3620 Modern nonparametric statistics (6) Statistical data analysis (6) STAT3621 Data visualization (6) STAT3622

STAT4601 Time-series analysis (6) STAT4602 Multivariate data analysis (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses: Directed studies in statistics (6) STAT3799

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6) Statistics project (12) STAT4799

### Notes:

1. Students may consider taking the following courses if they wish to pursue a more focused study in the following areas:

a. Biomedical Analytics

BIOL4417 'Omics' and systems biology STAT3607 Statistics in clinical medicine and bio-medical research

STAT3608 Statistical genetics

STAT3620 Modern nonparametric statistics

STAT3621 Statistical data analysis

STAT4602 Multivariate data analysis

b. Financial and Risk Analytics

STAT3616 Advanced SAS programming

STAT3621 Statistical data analysis

STAT4601 Time series analysis

Plus advanced level courses listed for the Major in Risk Management

c. Operational Analytics

COMP3250 Design and analysis of algorithms

MATH3600 Discrete mathematics

MATH3901 Operations research I

MATH3943 Network models in operations research

MATH4902 Operations research II

STAT3606 Business logistics

- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 6. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

Offered to students 2014

admitted to Year 1 in

## **Objectives:**

Amidst an upsurge of digital data produced worldwide nowadays, the Major in Decision Analytics aims to equip students with the skills and expertise in leveraging and managing big data in real time, and provide them with solid training in making digitized information a strategic part of critical decision-making and resource allocation with greater clarity and accuracy. Core courses in the curriculum emphasize the fundamental concepts and methodologies of decision analytics which include but not limited to statistical analysis, data mining and data visualization, programming, data structuring, mathematical and statistical modelling and implementation of database systems. Elective courses focus on diverse and applied techniques of decision analytics in multidisciplinary fields.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: apprehend the concepts of decision analytics and its underlying theory in relation to a broad range of related disciplinary academic or professional areas (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: identify and adopt appropriate analytical techniques and tools to extract and classify critical information from structured or unstructured data (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: be proficient with the design and implementation of advanced modelling techniques and database management, and offer effective recommendations for analytic initiatives and solutions (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: evaluate the quality of information from different sources in support of critical decision making, process streamlining and the optimization of resources, and appraise the related ethical issues (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: communicate to people effectively and efficiently with professionalism and accuracy using interactive and dynamic tools to translate technical information and present collaborative and strategic ideas (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: gain insights into current advances in decision analytics and confidence to solve real-life problems through either project or industrial training (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

## Impermissible Combinations:

BEng in Computer Science

Major in Computing and Data Analytics

Major in Computer Science

Minor in Computer Science

Major in Risk Management

Major in Statistics

Minor in Statistics

## Required courses (96 credits)

## 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

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## 2. Advanced level courses (42 credits)

## **Disciplinary Core Courses (30 credits)**

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MATH3904 Introduction to optimization (6) STAT3600 Linear statistical analysis (6) STAT3612 Statistical machine learning (6)

Big data analytics (6)

## **Disciplinary Electives (12 credits)**

STAT4609

At least 12 credits selected from the following courses:

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MATH3600 Discrete mathematics (6)
MATH3601 Numerical analysis (6)
MATH3901 Operations research I (6)
STAT3616 Advanced SAS programming (6)

[previous title: Data mining (6)]

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3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses: Directed studies in statistics (6) STAT3799

STAT4710 Capstone experience for statistics undergraduates (6)

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### Notes:

1. Students may consider taking the following courses if they wish to pursue a more focused study in the following areas:

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STAT3616 Advanced SAS programming

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Plus advanced level courses listed for the Major in Risk Management

c. Operational Analytics

COMP3250 Design and analysis of algorithms

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Offered to students 2013

admitted to Year 1 in

## **Objectives:**

Amidst an upsurge of digital data produced worldwide nowadays, the Major in Decision Analytics aims to equip students with the skills and expertise in leveraging and managing big data in real time, and provide them with solid training in making digitized information a strategic part of critical decision-making and resource allocation with greater clarity and accuracy. Core courses in the curriculum emphasize the fundamental concepts and methodologies of decision analytics which include but not limited to statistical analysis, data mining and data visualization, programming, data structuring, mathematical and statistical modelling and implementation of database systems. Elective courses focus on diverse and applied techniques of decision analytics in multidisciplinary fields.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: apprehend the concepts of decision analytics and its underlying theory in relation to a broad range of related disciplinary academic or professional areas (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
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## Impermissible Combinations:

BEng in Computer Science

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## Required courses (96 credits)

## 1. Introductory level courses (48 credits)

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Offered to students 2012

admitted to Year 1 in

### **Objectives:**

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## Impermissible Combinations:

BEng in Computer Science

Major in Computing and Data Analytics

Major in Computer Science

Minor in Computer Science

Major in Risk Management

Major in Statistics

Minor in Statistics

## Required courses (96 credits)

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STAT4609

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c. Operational Analytics

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MATH3901 Operations research I

MATH3943 Network models in operations research

MATH4902 Operations research II

STAT3606 Business logistics

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Major Title Major in Earth System Science

Offered to students 2021

admitted to Year 1 in

## **Objectives:**

Earth System Science seeks to understand the Earth as an integrated system, including its past, present and future behaviour, from the environments where life evolves on the surface to the interactions between the crust and its fluid envelopes (atmosphere and hydrosphere), with interests extending to the Earth's interior. Core courses in the major focus on understanding the composition, structure and processes of the solid earth, the hydrosphere and the atmosphere, the biosphere, and their interactions. Students will be equipped with knowledge to help manage geological resources and natural hazards. Throughout the curriculum there is consistent emphasis on transferable skills, learning through fieldwork, laboratory studies and research based classes, designed to enhance students' ability to think critically, to communicate effectively and to develop solutions to complex problems. Graduates from the major can pursue further studies in the Earth Sciences and careers in a wide variety of geoscience-related areas including resource management, hazard mitigation, environment and life conservation and teaching.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the key concepts of the Earth System components and processes (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: have acquired the ability to observe, describe, measure and analyze principal phenomena of earth processes and the interactions between different earth components (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: provide expertise to maintain geological environments and prevent severe perturbations due to resource exploitation and water disposal (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: equip with the knowledge and skills to better predict and deal with geological and related hazards such as earthquakes, landslides, tsunamis, floods and volcanic eruptions, and recognize and appraise the related ethical issues (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: identify real life problems pertaining to the physical environment and find solutions to those problems (by means capstone learning experience in the form of internship, field learning, and project-based learning in the curriculum)
- PLO 6: work with other students and possess an adequate level of communication skills (by means of group project learning and presentation opportunities in the curriculum)

## Impermissible Combinations:

Minor in Earth Sciences

#### Required courses (96 credits) 1. Introductory level courses (48 credits) **Disciplinary Core Courses: Science Foundation Courses (12 credits) SCNC1111** Scientific method and reasoning (6) Fundamentals of modern science (6) **SCNC1112 Disciplinary Core Courses (36 credits)** EASC1401 Blue Planet (6) Fluid/solid interactions in earth processes (6) EASC2401 EASC2402 Field and laboratory methods (6) EASC2404 Introduction to atmosphere and hydrosphere (6) Data analysis and modeling in earth sciences (6) EASC2410 EASC2411 Introduction to the Earth-Life system (6) 2. Advanced level courses (42 credits) **Disciplinary Core Courses (6 credits)** Biogeochemical cycles (6) EASC4403 **Disciplinary Electives (36 credits)** At least 36 credits selected from Lists A and B, among which at least 18 credits from List A: List A EASC3410 Hydrogeology (6) EASC3415 Meteorology (6) Coasts and coastal change (6) FASC3418 ENVS3313 Environmental oceanography (6) List B EASC3020 Global change: anthropogenic impacts (6) EASC3403 Sedimentary environments (6) Environmental remote sensing (6) FASC3405 Reconstruction of past climate (6) EASC3406 Earth resources (6) EASC3412 Earth through time (6) FASC3417 **EASC3419** Earth System Science Field Studies (6) EASC3999 Directed studies in earth sciences (6) ENVS3007 Natural hazards and mitigation (6) Special topics in earth sciences (6) EASC4408 EASC4999 Earth sciences project (12) 3. Capstone requirement (6 credits) EASC4911 Earth system: contemporary issues (6)

## Notes:

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- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Students are recommended to take additional chemistry and/or physics courses above the introductory level if they are interested in postgraduate research in Earth System Science.
- 5. Students are recommended to take PHYS1240 Physics by Inquiry and CHEM1041 Foundations of Chemistry if they do not have level 3 or above in HKDSE Physics and Chemistry, respectively, or equivalent.
- 6. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis
- 7. Candidates who have been admitted to Year 1 in 2021-22 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1112. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Biology, Chemistry, and Physics in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Biology, Chemistry, and Physics Higher Level in International Baccalaureate (IB)
- Grade B or above in Biology, Chemistry, and Physics in General Certificate of Education Advanced Level (GCEAL)
- Biology, Chemistry, and Physics qualification in Gao Kao will be considered on a case-by-case basis

#### Remarks:

Major Title Major in Earth System Science

Offered to students 2020

admitted to Year 1 in

#### **Objectives:**

Earth System Science seeks to understand the Earth as an integrated system, including its past, present and future behaviour, from the environments where life evolves on the surface to the interactions between the crust and its fluid envelopes (atmosphere and hydrosphere), with interests extending to the Earth's interior. Core courses in the major focus on understanding the composition, structure and processes of the solid earth, the hydrosphere and the atmosphere, the biosphere, and their interactions. Students will be equipped with knowledge to help manage geological resources and natural hazards. Throughout the curriculum there is consistent emphasis on transferable skills, learning through fieldwork, laboratory studies and research based classes, designed to enhance students' ability to think critically, to communicate effectively and to develop solutions to complex problems. Graduates from the major can pursue further studies in the Earth Sciences and careers in a wide variety of geoscience-related areas including resource management, hazard mitigation, environment and life conservation and teaching.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the key concepts of the Earth System components and processes (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: have acquired the ability to observe, describe, measure and analyze principal phenomena of earth processes and the interactions between different earth components (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: provide expertise to maintain geological environments and prevent severe perturbations due to resource exploitation and water disposal (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: equip with the knowledge and skills to better predict and deal with geological and related hazards such as earthquakes, landslides, tsunamis, floods and volcanic eruptions, and recognize and appraise the related ethical issues (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: identify real life problems pertaining to the physical environment and find solutions to those problems (by means capstone learning experience in the form of internship, field learning, and project-based learning in the curriculum)
- PLO 6: work with other students and possess an adequate level of communication skills (by means of group project learning and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Minor in Earth Sciences

#### Required courses (96 credits)

## 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

Scientific method and reasoning (6) SCNC1111 SCNC1112 Fundamentals of modern science (6)

## **Disciplinary Core Courses (36 credits)**

EASC1401 Blue Planet (6)

Take either EASC1406 or EASC2411 to fulfill Introduction to the earth-life system (6) **EASC1406** this 36 credits requirement, but not both.

EASC1406 and EASC2411 are mutually exclusive.

EASC2401 Fluid/solid interactions in earth processes (6)

EASC2402 Field and laboratory methods (6)

EASC2404 Introduction to atmosphere and hydrosphere (6) Data analysis and modeling in earth sciences (6) EASC2410

EASC2411 Introduction to the Earth-Life system (6) Take either EASC1406 or EASC2411 to fulfill this 36 credits requirement, but not both.

EASC1406 and EASC2411 are mutually

exclusive.

#### 2. Advanced level courses (42 credits)

## **Disciplinary Core Courses (6 credits)**

EASC4403 Biogeochemical cycles (6)

## **Disciplinary Electives (36 credits)**

At least 36 credits selected from Lists A and B, among which at least 18 credits from List A:

List A EASC3410 Hydrogeology (6) EASC3415 Meteorology (6)

Coasts and coastal change (6) **EASC3418** ENVS3313 Environmental oceanography (6)

List B

EASC3020 Global change: anthropogenic impacts (6)

Sedimentary environments (6) EASC3403 EASC3405 Environmental remote sensing (6) Reconstruction of past climate (6) EASC3406

EASC3412 Earth resources (6) EASC3417 Earth through time (6)

EASC3419 Earth System Science Field Studies (6) EASC3999 Directed studies in earth sciences (6) ENVS3007 Natural hazards and mitigation (6)

EASC4408 Special topics in earth sciences (6)
EASC4999 Earth sciences project (12)

3. Capstone requirement (6 credits)

EASC4911 Earth system: contemporary issues (6)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Students are recommended to take additional chemistry and/or physics courses above the introductory level if they are interested in postgraduate research in Earth System Science.
- 5. Students are recommended to take PHYS1240 Physics by Inquiry and CHEM1041 Foundations of Chemistry if they do not have level 3 or above in HKDSE Physics and Chemistry, respectively, or equivalent.
- 6. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis

#### Remarks:

Major Title Major in Earth System Science

Offered to students 2019

admitted to Year 1 in

#### **Objectives:**

Earth System Science seeks to understand the Earth as an integrated system, including its past, present and future behaviour, from the environments where life evolves on the surface to the interactions between the crust and its fluid envelopes (atmosphere and hydrosphere), with interests extending to the Earth's interior. Core courses in the major focus on understanding the composition, structure and processes of the solid earth, the hydrosphere and the atmosphere, the biosphere, and their interactions. Students will be equipped with knowledge to help manage geological resources and natural hazards. Throughout the curriculum there is consistent emphasis on transferable skills, learning through fieldwork, laboratory studies and research based classes, designed to enhance students' ability to think critically, to communicate effectively and to develop solutions to complex problems. Graduates from the major can pursue further studies in the Earth Sciences and careers in a wide variety of geoscience-related areas including resource management, hazard mitigation, environment and life conservation and teaching.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the key concepts of the Earth System components and processes (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: have acquired the ability to observe, describe, measure and analyze principal phenomena of earth processes and the interactions between different earth components (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: provide expertise to maintain geological environments and prevent severe perturbations due to resource exploitation and water disposal (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: equip with the knowledge and skills to better predict and deal with geological and related hazards such as earthquakes, landslides, tsunamis, floods and volcanic eruptions, and recognize and appraise the related ethical issues (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: identify real life problems pertaining to the physical environment and find solutions to those problems (by means capstone learning experience in the form of internship, field learning, and project-based learning in the curriculum)
- PLO 6: work with other students and possess an adequate level of communication skills (by means of group project learning and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Minor in Earth Sciences

#### Required courses (96 credits)

## 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

Disciplinary Core Courses (36 credits) EASC1401 Blue Planet (6)

EASC1406 Introduction to the earth-life system (6)

Take either EASC1406 or EASC2411 to fulfill this 36 credits requirement, but not both. EASC1406 and EASC2411 are mutually

exclusive.

EASC2401 Fluid/solid interactions in earth processes (6)

EASC2402 Field and laboratory methods (6)

EASC2404 Introduction to atmosphere and hydrosphere (6)
EASC2410 Data analysis and modeling in earth sciences (6)

EASC2411 Introduction to the Earth-Life system (6)

Take either EASC1406 or EASC2411 to fulfill this 36 credits requirement, but not both. EASC1406 and EASC2411 are mutually exclusive.

## 2. Advanced level courses (42 credits)

## **Disciplinary Core Courses (6 credits)**

EASC4403 Biogeochemical cycles (6)

## **Disciplinary Electives (36 credits)**

At least 36 credits selected from Lists A and B, among which at least 18 credits from List A:

List A
EASC3410 Hydrogeology (6)
EASC3415 Meteorology (6)

EASC3418 Coasts and coastal change (6) ENVS3313 Environmental oceanography (6)

List B

EASC3020 Global change: anthropogenic impacts (6)

EASC3403 Sedimentary environments (6)
EASC3405 Environmental remote sensing (6)
EASC3406 Reconstruction of past climate (6)

EASC3412 Earth resources (6) EASC3417 Earth through time (6)

EASC3419 Earth System Science Field Studies (6)
EASC3999 Directed studies in earth sciences (6)
ENVS3007 Natural hazards and mitigation (6)

EASC4408 Special topics in earth sciences (6)
EASC4999 Earth sciences project (12)

3. Capstone requirement (6 credits)

EASC4911 Earth system: contemporary issues (6)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details
- 5. Students are recommended to take additional chemistry and/or physics courses above the introductory level if they are interested in postgraduate research in Earth System Science.
- 6. Students are recommended to take PHYS1240 Physics by Inquiry and CHEM1041 Foundations of Chemistry if they do not have level 3 or above in HKDSE Physics and Chemistry, respectively, or equivalent.

#### Remarks

Major Title Major in Earth System Science

Offered to students 2018

admitted to Year 1 in

#### **Objectives:**

Earth System Science seeks to understand the Earth as an integrated system, including its past, present and future behaviour, from the environments where life evolves on the surface to the interactions between the crust and its fluid envelopes (atmosphere and hydrosphere), with interests extending to the Earth's interior. Core courses in the major focus on understanding the composition, structure and processes of the solid earth, the hydrosphere and the atmosphere, the biosphere, and their interactions. Students will be equipped with knowledge to help manage geological resources and natural hazards. Throughout the curriculum there is consistent emphasis on transferable skills, learning through fieldwork, laboratory studies and research based classes, designed to enhance students' ability to think critically, to communicate effectively and to develop solutions to complex problems. Graduates from the major can pursue further studies in the Earth Sciences and careers in a wide variety of geoscience-related areas including resource management, hazard mitigation, environment and life conservation and teaching.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the key concepts of the Earth System components and processes (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: have acquired the ability to observe, describe, measure and analyze principal phenomena of earth processes and the interactions between different earth components (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
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- PLO 4: equip with the knowledge and skills to better predict and deal with geological and related hazards such as earthquakes, landslides, tsunamis, floods and volcanic eruptions, and recognize and appraise the related ethical issues (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: identify real life problems pertaining to the physical environment and find solutions to those problems (by means capstone learning experience in the form of internship, field learning, and project-based learning in the curriculum)
- PLO 6: work with other students and possess an adequate level of communication skills (by means of group project learning and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Minor in Earth Sciences

#### Required courses (96 credits)

## 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

Scientific method and reasoning (6) SCNC1111 SCNC1112 Fundamentals of modern science (6)

## **Disciplinary Core Courses (36 credits)**

EASC1401 Blue Planet (6)

Introduction to the earth-life system (6) Take either EASC1406 or EASC2411 to fulfill **EASC1406** this 36 credits requirement, but not both.

EASC1406 and EASC2411 are mutually

exclusive.

EASC2401 Fluid/solid interactions in earth processes (6)

Field and laboratory methods (6) EASC2402

EASC2404 Introduction to atmosphere and hydrosphere (6) Data analysis and modeling in earth sciences (6) EASC2410

EASC2411 Introduction to the Earth-Life system (6) Take either EASC1406 or EASC2411 to fulfill this 36 credits requirement, but not both.

EASC1406 and EASC2411 are mutually

exclusive.

#### 2. Advanced level courses (42 credits)

## **Disciplinary Core Courses (6 credits)**

Biogeochemical cycles (6) EASC4403

## **Disciplinary Electives (36 credits)**

At least 36 credits selected from Lists A and B, among which at least 18 credits from List A:

List A EASC3410 Hydrogeology (6) Meteorology (6) EASC3415

Coasts and coastal change (6) **EASC3418** ENVS3313 Environmental oceanography (6)

List B

EASC3020 Global change: anthropogenic impacts (6)

Sedimentary environments (6) EASC3403 EASC3405 Environmental remote sensing (6) Reconstruction of past climate (6) EASC3406

EASC3412 Earth resources (6) EASC3417 Earth through time (6)

EASC3419 Earth System Science Field Studies (6) EASC3999 Directed studies in earth sciences (6) Natural hazards and mitigation (6) ENVS3007

EASC4408 Special topics in earth sciences (6) EASC4999 Earth sciences project (12)

3. Capstone requirement (6 credits)

EASC4911 Earth system: contemporary issues (6)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
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- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details
- 5. Students are recommended to take additional chemistry and/or physics courses above the introductory level if they are interested in postgraduate research in Earth System Science.
- 6. Students are recommended to take PHYS1240 Physics by Inquiry and CHEM1041 Foundations of Chemistry if they do not have level 3 or above in HKDSE Physics and Chemistry, respectively, or equivalent.

#### Remarks

Major Title Major in Earth System Science

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

Earth System Science seeks to understand the Earth as an integrated system, including its past, present and future behaviour, from the environments where life evolves on the surface to the interactions between the crust and its fluid envelopes (atmosphere and hydrosphere), with interests extending to the Earth's interior. Core courses in the major focus on understanding the composition, structure and processes of the solid earth, the hydrosphere and the atmosphere, the biosphere, and their interactions. Students will be equipped with knowledge to help manage geological resources and natural hazards. Throughout the curriculum there is consistent emphasis on transferable skills, learning through fieldwork, laboratory studies and research based classes, designed to enhance students' ability to think critically, to communicate effectively and to develop solutions to complex problems. Graduates from the major can pursue further studies in the Earth Sciences and careers in a wide variety of geoscience-related areas including resource management, hazard mitigation, environment and life conservation and teaching.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the key concepts of the Earth System components and processes (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: have acquired the ability to observe, describe, measure and analyze principal phenomena of earth processes and the interactions between different earth components (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
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- PLO 6: work with other students and possess an adequate level of communication skills (by means of group project learning and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Minor in Earth Sciences

#### Required courses (96 credits)

## 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

Scientific method and reasoning (6) SCNC1111 SCNC1112 Fundamentals of modern science (6)

## **Disciplinary Core Courses (36 credits)**

EASC1401 Blue Planet (6)

Introduction to the earth-life system (6) Take either EASC1406 or EASC2411 to fulfill EASC1406 this 36 credits requirement, but not both.

EASC1406 and EASC2411 are mutually exclusive.

EASC2401 Fluid/solid interactions in earth processes (6)

Field and laboratory methods (6) EASC2402

EASC2404 Introduction to atmosphere and hydrosphere (6) Data analysis and modeling in earth sciences (6) EASC2410

EASC2411 Introduction to the Earth-Life system (6) Take either EASC1406 or EASC2411 to fulfill this 36 credits requirement, but not both.

EASC1406 and EASC2411 are mutually

exclusive.

## 2. Advanced level courses (42 credits)

## **Disciplinary Core Courses (6 credits)**

Biogeochemical cycles (6) EASC4403

## **Disciplinary Electives (36 credits)**

At least 36 credits selected from Lists A and B, among which at least 18 credits from List A:

List A EASC3410 Hydrogeology (6) Meteorology (6) EASC3415

Coasts and coastal change (6) **EASC3418** ENVS3313 Environmental oceanography (6)

List B

EASC3020 Global change: anthropogenic impacts (6)

Sedimentary environments (6) EASC3403 EASC3405 Environmental remote sensing (6) Reconstruction of past climate (6) EASC3406

EASC3412 Earth resources (6) EASC3417 Earth through time (6)

Earth System Science Field Studies (6) EASC3419 EASC3999 Directed studies in earth sciences (6) Natural hazards and mitigation (6) ENVS3007

EASC4408 Special topics in earth sciences (6) EASC4999 Earth sciences project (12)

3. Capstone requirement (6 credits)

EASC4911 Earth system: contemporary issues (6)

#### Notes:

1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

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- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 5. Students are recommended to take additional chemistry and/or physics courses above the introductory level if they are interested in postgraduate research in Earth System Science.
- 6. Students are recommended to take PHYS1240 Physics by Inquiry and CHEM1041 Foundations of Chemistry if they do not have level 3 or above in HKDSE Physics and Chemistry, respectively, or equivalent.

#### Remarks

Major Title Major in Earth System Science

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

Earth System Science seeks to understand the Earth as an integrated system, including its past, present and future behaviour, from the environments where life evolves on the surface to the interactions between the crust and its fluid envelopes (atmosphere and hydrosphere), with interests extending to the Earth's interior. Core courses in the major focus on understanding the composition, structure and processes of the solid earth, the hydrosphere and the atmosphere, the biosphere, and their interactions. Students will be equipped with knowledge to help manage geological resources and natural hazards. Throughout the curriculum there is consistent emphasis on transferable skills, learning through fieldwork, laboratory studies and research based classes, designed to enhance students' ability to think critically, to communicate effectively and to develop solutions to complex problems. Graduates from the major can pursue further studies in the Earth Sciences and careers in a wide variety of geoscience-related areas including resource management, hazard mitigation, environment and life conservation and teaching.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the key concepts of the Earth System components and processes (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: have acquired the ability to observe, describe, measure and analyze principal phenomena of earth processes and the interactions between different earth components (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: provide expertise to maintain geological environments and prevent severe perturbations due to resource exploitation and water disposal (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: equip with the knowledge and skills to better predict and deal with geological and related hazards such as earthquakes, landslides, tsunamis, floods and volcanic eruptions, and recognize and appraise the related ethical issues (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: identify real life problems pertaining to the physical environment and find solutions to those problems (by means capstone learning experience in the form of internship, field learning, and project-based learning in the curriculum)
- PLO 6: work with other students and possess an adequate level of communication skills (by means of group project learning and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Minor in Earth Sciences

#### Required courses (96 credits)

## 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

Disciplinary Core Courses (30 credits)

EASC1401 Blue Planet (6)
EASC1402 Principles of geology (6)

EASC2401 Fluid/solid interactions in earth processes (6)

EASC2402 Field and laboratory methods (6)

EASC2404 Introduction to atmosphere and hydrosphere (6)

Disciplinary Electives (6 credits)

BIOL1309 Evolutionary diversity (6)

EASC1406 Introduction to the earth-life system (6)

Take either EASC1406 or EASC2411 to fulfill

this 6 credits requirement, but not both. EASC1406 and EASC2411 are mutually

exclusive.

EASC2411 Introduction to the Earth-Life system (6)

Take either EASC1406 or EASC2411 to fulfill this 6 credits requirement, but not both.

EASC1406 and EASC2411 are mutually

exclusive.

## 2. Advanced level courses (42 credits)

## **Disciplinary Core Courses (6 credits)**

EASC4403 Biogeochemical cycles (6)

## Disciplinary Electives (36 credits)

At least 36 credits selected from Lists A and B, among which at least 12 credits from List A:

List A

EASC3410 Hydrogeology (6) EASC3415 Meteorology (6)

ENVS3313 Environmental oceanography (6)

List B

EASC3403 Sedimentary environments (6)
EASC3405 Environmental remote sensing (6)
EASC3406 Reconstruction of past climate (6)

EASC3408 Geophysics (6) EASC3412 Earth resources (6)

EASC3416 Advanced geochemistry and geochronology (6)

EASC3417 Earth through time (6)

EASC3999 Directed studies in earth sciences (6)

ENVS3007 Natural hazards and mitigation (6)
EASC4408 Special topics in earth sciences (6)
EASC4999 Earth sciences project (12)

3. Capstone requirement (6 credits)

EASC4911 Earth system: contemporary issues (6)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
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- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details
- 5. Students are recommended to take additional chemistry and/or physics courses above the introductory level if they are interested in postgraduate research in Earth System Science.

#### Remarks:

Major Title Major in Earth System Science

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

Earth System Science seeks to understand the Earth as an integrated system, including its past, present and future behaviour, from the environments where life evolves on the surface to the interactions between the crust and its fluid envelopes (atmosphere and hydrosphere), with interests extending to the Earth's interior. Core courses in the major focus on understanding the composition, structure and processes of the solid earth, the hydrosphere and the atmosphere, the biosphere, and their interactions. Students will be equipped with knowledge to help manage geological resources and natural hazards. Throughout the curriculum there is consistent emphasis on transferable skills, learning through fieldwork, laboratory studies and research based classes, designed to enhance students' ability to think critically, to communicate effectively and to develop solutions to complex problems. Graduates from the major can pursue further studies in the Earth Sciences and careers in a wide variety of geoscience-related areas including resource management, hazard mitigation, environment and life conservation and teaching.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the key concepts of the Earth System components and processes (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: have acquired the ability to observe, describe, measure and analyze principal phenomena of earth processes and the interactions between different earth components (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: provide expertise to maintain geological environments and prevent severe perturbations due to resource exploitation and water disposal (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: equip with the knowledge and skills to better predict and deal with geological and related hazards such as earthquakes, landslides, tsunamis, floods and volcanic eruptions, and recognize and appraise the related ethical issues (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: identify real life problems pertaining to the physical environment and find solutions to those problems (by means capstone learning experience in the form of internship, field learning, and project-based learning in the curriculum)
- PLO 6: work with other students and possess an adequate level of communication skills (by means of group project learning and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Minor in Earth Sciences

#### Required courses (96 credits)

## 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

#### **Disciplinary Core Courses (30 credits)**

EASC1401 Blue Planet (6)
EASC1402 Principles of geology (6)

EASC2401 Fluid/solid interactions in earth processes (6)

EASC2402 Field and laboratory methods (6)

EASC2404 Introduction to atmosphere and hydrosphere (6)

Disciplinary Electives (6 credits)

BIOL1309 Evolutionary diversity (6)

EASC1406 Introduction to the earth-life system (6) Take either EASC1406 or EASC2411 to fulfill this 6 credits requirement, but not both.

EASC1406 and EASC2411 are mutually

exclusive.

EASC2411 Introduction to the Earth-Life system (6)

Take either EASC1406 or EASC2411 to fulfill this 6 credits requirement, but not both.

EASC1406 and EASC2411 are mutually

exclusive.

#### 2. Advanced level courses (42 credits)

## **Disciplinary Core Courses (6 credits)**

EASC4403 Biogeochemical cycles (6)

## Disciplinary Electives (36 credits)

At least 36 credits selected from Lists A and B, among which at least 12 credits from List A:

List A

EASC3410 Hydrogeology (6) EASC3415 Meteorology (6)

ENVS3313 Environmental oceanography (6)

List B

EASC3403 Sedimentary environments (6)
EASC3405 Environmental remote sensing (6)
EASC3406 Reconstruction of past climate (6)

EASC3408 Geophysics (6) EASC3412 Earth resources (6)

EASC3416 Advanced geochemistry and geochronology (6)

EASC3417 Earth through time (6)

EASC3999 Directed studies in earth sciences (6)

ENVS3007 Natural hazards and mitigation (6) EASC4408 Special topics in earth sciences (6) EASC4999 Earth sciences project (12)

3. Capstone requirement (6 credits)

EASC4911 Earth system: contemporary issues (6)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details
- 5. Students are recommended to take additional chemistry and/or physics courses above the introductory level if they are interested in postgraduate research in Earth System Science.

#### Remarks:

Major Title Major in Earth System Science

Offered to students 2014

admitted to Year 1 in

#### Objectives:

Earth System Science seeks to understand the Earth as an integrated system, including its past, present and future behaviour, from the environments where life evolves on the surface to the interactions between the crust and its fluid envelopes (atmosphere and hydrosphere), with interests extending to the Earth's interior. Core courses in the major focus on understanding the composition, structure and processes of the solid earth, the hydrosphere and the atmosphere, and their interactions. Students will be equipped with knowledge to help manage geological resources and natural hazards. Throughout the curriculum there is consistent emphasis on transferable skills, learning through fieldwork, laboratory studies and research based classes, designed to enhance students' ability to think critically, to communicate effectively and to develop solutions to complex problems. Graduates from the major can pursue further studies in the Earth Sciences and careers in a wide variety of geoscience-related areas including resource management, hazard mitigation, soil and water conservation and teaching.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the key concepts of the Earth System components and processes (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: have acquired the ability to observe, describe, measure and analyze principal phenomena of earth processes and the interactions between different earth components (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: provide expertise to maintain geological environments and prevent severe perturbations due to resource exploitation and water disposal (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: equip with the knowledge and skills to better predict and deal with geological and related hazards such as earthquakes, landslides, tsunamis, floods and volcanic eruptions, and recognize and appraise the related ethical issues (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: identify real life problems pertaining to the physical environment and find solutions to those problems (by means capstone learning experience in the form of internship, field learning, and project-based learning in the curriculum)
- PLO 6: work with other students and possess an adequate level of communication skills (by means of group project learning and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Minor in Earth Sciences

#### Required courses (96 credits) 1. Introductory level courses (48 credits) **Disciplinary Core Courses: Science Foundation Courses (12 credits)** SCNC1111 Scientific method and reasoning (6) Fundamentals of modern science (6) **SCNC1112 Disciplinary Core Courses (36 credits)** Evolutionary diversity (6) BIOL1309

Blue Planet (6) EASC1401 EASC1402 Principles of geology (6)

EASC2401 Fluid/solid interactions in earth processes (6)

EASC2402 Field and laboratory methods (6)

Introduction to atmosphere and hydrosphere (6) FASC2404

#### 2. Advanced level courses (42 credits) **Disciplinary Core Courses (6 credits)**

EASC4403 Biogeochemical cycles (6)

#### **Disciplinary Electives (36 credits)**

At least 36 credits from Lists A and B, among which at least 12 credits from List A:

List A EASC3410 Hydrogeology (6) Meteorology (6) EASC3415

ENVS3313 Environmental oceanography (6)

List R

EASC3403 Sedimentary environments (6) EASC3405 Environmental remote sensing (6) Reconstruction of past climate (6) EASC3406 EASC3408 Geophysics (6)

Earth resources (6) FASC3412

Advanced geochemistry and geochronology (6) EASC3416

Earth through time (6) EASC3417

Directed studies in earth sciences (6) FASC3999 ENVS3007 Natural hazards and mitigation (6) EASC4408 Special topics in earth sciences (6) EASC4999 Earth sciences project (12)

## 3. Capstone requirement (6 credits)

EASC4911 Earth system: contemporary issues (6)

#### Notes:

1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112

Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details
- 5. Students are recommended to take additional chemistry and/or physics courses above the introductory level if they are interested in postgraduate research in Earth System Science.

#### Remarks:

Major Title Major in Earth System Science

Offered to students 2013

admitted to Year 1 in

#### Objectives:

Earth System Science seeks to understand the Earth as an integrated system, including its past, present and future behaviour, from the environments where life evolves on the surface to the interactions between the crust and its fluid envelopes (atmosphere and hydrosphere), with interests extending to the Earth's interior. Core courses in the major focus on understanding the composition, structure and processes of the solid earth, the hydrosphere and the atmosphere, and their interactions. Students will be equipped with knowledge to help manage geological resources and natural hazards. Throughout the curriculum there is consistent emphasis on transferable skills, learning through fieldwork, laboratory studies and research based classes, designed to enhance students' ability to think critically, to communicate effectively and to develop solutions to complex problems. Graduates from the major can pursue further studies in the Earth Sciences and careers in a wide variety of geoscience-related areas including resource management, hazard mitigation, soil and water conservation and teaching.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the key concepts of the Earth System components and processes (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: have acquired the ability to observe, describe, measure and analyze principal phenomena of earth processes and the interactions between different earth components (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: provide expertise to maintain geological environments and prevent severe perturbations due to resource exploitation and water disposal (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: equip with the knowledge and skills to better predict and deal with geological and related hazards such as earthquakes, landslides, tsunamis, floods and volcanic eruptions, and recognize and appraise the related ethical issues (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: identify real life problems pertaining to the physical environment and find solutions to those problems (by means capstone learning experience in the form of internship, field learning, and project-based learning in the curriculum)
- PLO 6: work with other students and possess an adequate level of communication skills (by means of group project learning and presentation opportunities in the curriculum)

#### Impermissible Combinations:

#### Minor in Earth Sciences Required courses (96 credits) 1. Introductory level courses (48 credits) **Disciplinary Core Courses: Science Foundation Courses (12 credits)** SCNC1111 Scientific method and reasoning (6) Fundamentals of modern science (6) **SCNC1112 Disciplinary Core Courses (36 credits)** Evolutionary diversity (6) BIOL1309 Blue Planet (6) EASC1401 EASC1402 Principles of geology (6) EASC2401 Fluid/solid interactions in earth processes (6) EASC2402 Field and laboratory methods (6) Introduction to atmosphere and hydrosphere (6) FASC2404 2. Advanced level courses (42 credits) **Disciplinary Core Courses (6 credits)** EASC4403 Biogeochemical cycles (6) **Disciplinary Electives (36 credits)**

At least 36 credits from Lists A and B, among which at least 12 credits from List A:

List A EASC3410 Hydrogeology (6) Meteorology (6) EASC3415 ENVS3313 Environmental oceanography (6)

List R Sedimentary environments (6) EASC3403

EASC3405 Environmental remote sensing (6) Reconstruction of past climate (6) EASC3406

EASC3408 Geophysics (6) Earth resources (6) FASC3412 Advanced geochemistry and geochronology (6)

Earth through time (6) EASC3417 Directed studies in earth sciences (6) FASC3999 ENVS3007 Natural hazards and mitigation (6) EASC4408 Special topics in earth sciences (6)

3. Capstone requirement (6 credits)

EASC3416

EASC4999

EASC4911 Earth system: contemporary issues (6)

Earth sciences project (12)

#### Notes:

1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112

Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details
- 5. Students are recommended to take additional chemistry and/or physics courses above the introductory level if they are interested in postgraduate research in Earth System Science.

#### Remarks:

Major Title Major in Earth System Science

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

Earth System Science seeks to understand the Earth as an integrated system, including its past, present and future behaviour, from the environments where life evolves on the surface to the interactions between the crust and its fluid envelopes (atmosphere and hydrosphere), with interests extending to the Earth's interior. Core courses in the major focus on understanding the composition, structure and processes of the solid earth, the hydrosphere and the atmosphere, and their interactions. Students will be equipped with knowledge to help manage geological resources and natural hazards. Throughout the curriculum there is consistent emphasis on transferable skills, learning through fieldwork, laboratory studies and research based classes, designed to enhance students' ability to think critically, to communicate effectively and to develop solutions to complex problems. Graduates from the major can pursue further studies in the Earth Sciences and careers in a wide variety of geoscience-related areas including resource management, hazard mitigation, soil and water conservation and teaching.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the key concepts of the Earth System components and processes (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: have acquired the ability to observe, describe, measure and analyze principal phenomena of earth processes and the interactions between different earth components (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: provide expertise to maintain geological environments and prevent severe perturbations due to resource exploitation and water disposal (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: equip with the knowledge and skills to better predict and deal with geological and related hazards such as earthquakes, landslides, tsunamis, floods and volcanic eruptions, and recognize and appraise the related ethical issues (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: identify real life problems pertaining to the physical environment and find solutions to those problems (by means capstone learning experience in the form of internship, field learning, and project-based learning in the curriculum)
- PLO 6: work with other students and possess an adequate level of communication skills (by means of group project learning and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Minor in Earth Sciences

# Required courses (96 credits) 1. Introductory level courses (48 credits) Disciplinary Core Courses: Science Foundation Courses (12 credits) SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

BIOL1309 Evolutionary diversity (6)
EASC1401 Blue Planet (6)
EASC1402 Principles of geology (6)

EASC2401 Fluid/solid interactions in earth processes (6)

EASC2402 Field and laboratory methods (6)

EASC2404 Introduction to atmosphere and hydrosphere (6)

## 2. Advanced level courses (42 credits) Disciplinary Core Courses (6 credits)

EASC4403 Biogeochemical cycles (6)

#### **Disciplinary Electives (36 credits)**

At least 36 credits from Lists A and B, among which at least 12 credits from List A:

List A:

EASC3410 Hydrogeology (6)

EASC3415 Meteorology (6)

ENVS3313 Environmental oceanography (6)

List B:

EASC3403 Sedimentary environments (6)
EASC3405 Environmental remote sensing (6)
EASC3406 Reconstruction of past climate (6)

EASC3408 Geophysics (6) EASC3412 Earth resources (6)

EASC3416 Advanced geochemistry and geochronology (6)

EASC3417 Earth through time (6)

EASC3999 Directed studies in earth sciences (6)
ENVS3007 Natural hazards and mitigation (6)
EASC4408 Special topics in earth sciences (6)
EASC4999 Earth sciences project (12)

#### 3. Capstone requirement (6 credits)

EASC4911 Earth system: contemporary issues (6)

#### Notes:

1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112

Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details
- 5. Students are recommended to take additional chemistry and/or physics courses above the introductory level if they are interested in postgraduate research in Earth System Science.

#### Remarks:

Major Title Major in Ecology & Biodiversity

Offered to students 2021

admitted to Year 1 in

#### **Objectives:**

This major is directed at teaching students: (1) how organisms interact with each other and their environments, (2) how species are distributed throughout the world, and (3) key threats and approaches to conserving biodiversity. Special reference is made to Hong Kong and Asia; the ways in which humans have impacted upon natural environments; and, the approaches used to manage or ameliorate those impacts. This major is based around an introductory core, which emphasizes plant and animal biology and includes a compulsory week-long residential field trip. Advanced courses in the major teach students about the ecology and biodiversity of different ecosystems (e.g. marine, terrestrial and freshwater environments) with an emphasis on field work, introduces the use of statistical and molecular techniques in ecology, and focuses on certain applied topics such as environmental impact assessment, ecotoxicology, fisheries and mariculture, and biodiversity conservation. Students have an opportunity to conduct independent research in ecology and biodiversity as a final year project or a dissertation under the close supervision of an individual staff member. Apart from the fundamental knowledge and skills in understanding and managing biodiversity offered in the core courses of this major, strong emphasis is placed upon experiential learning such as overseas field expedition and work placement in the environmental sector. Biodiversity conservation requires scientific input as well as passion. Through the range of formal field-based courses as well as extra-curricular activities offered, students taking this major will have opportunities to participate in research, field conservation and education projects both locally and internationally. Assistance will be provided so that students can develop expertise in one or a few groups of plants or animals, as familiarity with species identification is an essential prerequisite for biodiversity scientists or conservation biologists.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and appreciate the major living and non-living components of the regional and global environment, and how they interact; identify threats to them; and know how these threats can be mitigated (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: understand and appreciate the variety of life in Hong Kong's and Southeast Asia's natural habitats, become equipped to understand, study, manage and protect that diversity, and appraise the related moral and ethical issues (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: have sufficient experience of the basic techniques of modern ecological science and prepare to learn new ones for specific tasks (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: use IT tools appropriately, and access and evaluate materials from libraries, archives and the Internet (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: demonstrate original, independent and critical thinking, with mastery of a range of communication skills (by means of coursework, project-based and presentation opportunities in the curriculum)
- PLO 6: have the skill and knowledge to pursue postgraduate ecological research or to develop a career in nature conservation and environmental education, especially in Hong Kong and southern China (by means of coursework, tutorial classes, project-based and research-based learning in the curriculum)
- PLO 7: be motivated and sufficiently equipped to apply the knowledge solve local, regional and global environmental problems (by means of coursework, laboratory-based, tutorial classes, capstone learning and/or project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Biological Sciences (Intensive)

Major in Ecology & Biodiversity (Intensive)

Minor in Ecology & Biodiversity

## Required courses (96 credits)

## 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6)

SCNC1112 Fundamentals of modern science (6)

## **Disciplinary Core Courses (36 credits)**

BIOL1110 From molecules to cells (6)
BIOL1309 Evolutionary diversity (6)
BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2306 Ecology and evolution (6) ENVS2002 Environmental data analysis (6)

#### 2. Advanced level courses (36 credits) Disciplinary Core Courses (18 credits)

BIOL3301 Marine biology (6)

BIOL 3302 Systematics and phylogenetics (6) BIOL 3319 Tropical terrestrial ecology (6)

#### **Disciplinary Electives (18 credits)**

At least 18 credits selected from the following courses:

BIOL3101 Animal behaviour (6) BIOL3303 Conservation biology (6)

BIOL3305 Tropical and temperate marine ecology field course (6)

BIOL3313 Freshwater ecology (6)
BIOL3314 Plant structure and evolution (6)
BIOL3318 Experimental intertidal ecology (6)

BIOL3322	Marine invertebrate zoology (6)	
BIOL3328	Nearshore marine and estuarine ecology (6)	
BIOL3419	Insect ecology: the little things that run the world (6)	
BIOL3506	Evolutionary biology (6)	
BIOL4301	Fish and fisheries (6)	
BIOL4302	Environmental impact assessment (6)	
BIOL4304	Ecosystem functioning and services (6)	
BIOL4505	Oyster aquaculture: business and technology (6)	
BIOL4861	Ecology & biodiversity internship (6)	
ENVS3019	Urban ecology (6)	
ENVS3020	Global change ecology (6)	
3. Capstone requirement (12 credits)		
BIOL4991	Ecology & biodiversity project (12)	

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, two 6-credit or a 12-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis
- 5. Candidates who have been admitted to Year 1 in 2021-22 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1112. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Biology, Chemistry, and Physics in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Biology, Chemistry, and Physics Higher Level in International Baccalaureate (IB)
   Grade B or above in Biology, Chemistry, and Physics in General Certificate of Education Advanced Level (GCEAL)
- Biology, Chemistry, and Physics qualification in Gao Kao will be considered on a case-by-case basis

## Remarks:

Major Title Major in Ecology & Biodiversity

Offered to students 2020

admitted to Year 1 in

#### Objectives:

This major is directed at teaching students: (1) how organisms interact with each other and their environments, (2) how species are distributed throughout the world, and (3) key threats and approaches to conserving biodiversity. Special reference is made to Hong Kong and Asia; the ways in which humans have impacted upon natural environments; and, the approaches used to manage or ameliorate those impacts. This major is based around an introductory core, which emphasizes plant and animal biology and includes a compulsory week-long residential field trip. Advanced courses in the major teach students about the ecology and biodiversity of different ecosystems (e.g. marine, terrestrial and freshwater environments) with an emphasis on field work, introduces the use of statistical and molecular techniques in ecology, and focuses on certain applied topics such as environmental impact assessment, ecotoxicology, fisheries and mariculture, and biodiversity conservation. Students have an opportunity to conduct independent research in ecology and biodiversity as a final year project or a dissertation under the close supervision of an individual staff member. Apart from the fundamental knowledge and skills in understanding and managing biodiversity offered in the core courses of this major, strong emphasis is placed upon experiential learning such as overseas field expedition and work placement in the environmental sector. Biodiversity conservation requires scientific input as well as passion. Through the range of formal field-based courses as well as extra-curricular activities offered, students taking this major will have opportunities to participate in research, field conservation and education projects both locally and internationally. Assistance will be provided so that students can develop expertise in one or a few groups of plants or animals, as familiarity with species identification is an essential prerequisite for biodiversity scientists or conservation biologists.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and appreciate the major living and non-living components of the regional and global environment, and how they interact; identify threats to them; and know how these threats can be mitigated (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: understand and appreciate the variety of life in Hong Kong's and Southeast Asia's natural habitats, become equipped to understand, study, manage and protect that diversity, and appraise the related moral and ethical issues (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: have sufficient experience of the basic techniques of modern ecological science and prepare to learn new ones for specific tasks (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: use IT tools appropriately, and access and evaluate materials from libraries, archives and the Internet (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: demonstrate original, independent and critical thinking, with mastery of a range of communication skills (by means of coursework, project-based and presentation opportunities in the curriculum)
- PLO 6: have the skill and knowledge to pursue postgraduate ecological research or to develop a career in nature conservation and environmental education, especially in Hong Kong and southern China (by means of coursework, tutorial classes, project-based and research-based learning in the curriculum)
- PLO 7: be motivated and sufficiently equipped to apply the knowledge solve local, regional and global environmental problems (by means of coursework, laboratory-based, tutorial classes, capstone learning and/or project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Biological Sciences (Intensive)

Major in Ecology & Biodiversity (Intensive)

Minor in Ecology & Biodiversity

## Required courses (96 credits)

## 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6)

SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

BIOL1110 From molecules to cells (6)
BIOL1309 Evolutionary diversity (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2306 Ecology and evolution (6) ENVS2002 Environmental data analysis (6)

#### 2. Advanced level courses (36 credits) Disciplinary Core Courses (18 credits)

BIOL3301 Marine biology (6)

BIOL3302 Systematics and phylogenetics (6) BIOL3319 Tropical terrestrial ecology (6)

#### **Disciplinary Electives (18 credits)**

At least 18 credits selected from the following courses:

BIOL3101 Animal behaviour (6) BIOL3303 Conservation biology (6)

BIOL3305 Tropical and temperate marine ecology field course (6)

BIOL3313 Freshwater ecology (6)
BIOL3314 Plant structure and evolution (6)
BIOL3318 Experimental intertidal ecology (6)

BIOL3322	Marine invertebrate zoology (6)	
BIOL3328	Nearshore marine and estuarine ecology (6)	
BIOL3419	Insect ecology: the little things that run the world (6)	
BIOL3506	Evolutionary biology (6)	
BIOL4301	Fish and fisheries (6)	
BIOL4302	Environmental impact assessment (6)	
BIOL4304	Ecosystem functioning and services (6)	
BIOL4505	Oyster aquaculture: business and technology (6)	[ previous title: Oyster aquaculture (6) ]
BIOL4861	Ecology & biodiversity internship (6)	
ENVS3019	Urban ecology (6)	
ENVS3020	Global change ecology (6)	
3. Capstone requir	rement (12 credits)	
BIOL4991	Ecology & biodiversity project (12)	

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, two 6-credit or a 12-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis

#### Remarks:

Major Title Major in Ecology & Biodiversity

Offered to students 2019

admitted to Year 1 in

#### Objectives:

This major is directed at teaching students: (1) how organisms interact with each other and their environments, (2) how species are distributed throughout the world, and (3) key threats and approaches to conserving biodiversity. Special reference is made to Hong Kong and Asia; the ways in which humans have impacted upon natural environments; and, the approaches used to manage or ameliorate those impacts. This major is based around an introductory core, which emphasizes plant and animal biology and includes a compulsory week-long residential field trip. Advanced courses in the major teach students about the ecology and biodiversity of different ecosystems (e.g. marine, terrestrial and freshwater environments) with an emphasis on field work, introduces the use of statistical and molecular techniques in ecology, and focuses on certain applied topics such as environmental impact assessment, ecotoxicology, fisheries and mariculture, and biodiversity conservation. Students have an opportunity to conduct independent research in ecology and biodiversity as a final year project or a dissertation under the close supervision of an individual staff member. Apart from the fundamental knowledge and skills in understanding and managing biodiversity offered in the core courses of this major, strong emphasis is placed upon experiential learning such as overseas field expedition and work placement in the environmental sector. Biodiversity conservation requires scientific input as well as passion. Through the range of formal field-based courses as well as extra-curricular activities offered, students taking this major will have opportunities to participate in research, field conservation and education projects both locally and internationally. Assistance will be provided so that students can develop expertise in one or a few groups of plants or animals, as familiarity with species identification is an essential prerequisite for biodiversity scientists or conservation biologists.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and appreciate the major living and non-living components of the regional and global environment, and how they interact; identify threats to them; and know how these threats can be mitigated (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: understand and appreciate the variety of life in Hong Kong's and Southeast Asia's natural habitats, become equipped to understand, study, manage and protect that diversity, and appraise the related moral and ethical issues (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: have sufficient experience of the basic techniques of modern ecological science and prepare to learn new ones for specific tasks (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: use IT tools appropriately, and access and evaluate materials from libraries, archives and the Internet (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: demonstrate original, independent and critical thinking, with mastery of a range of communication skills (by means of coursework, project-based and presentation opportunities in the curriculum)
- PLO 6: have the skill and knowledge to pursue postgraduate ecological research or to develop a career in nature conservation and environmental education, especially in Hong Kong and southern China (by means of coursework, tutorial classes, project-based and research-based learning in the curriculum)
- PLO 7: be motivated and sufficiently equipped to apply the knowledge solve local, regional and global environmental problems (by means of coursework, laboratory-based, tutorial classes, capstone learning and/or project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Biological Sciences (Intensive)

Major in Ecology & Biodiversity (Intensive)

Minor in Ecology & Biodiversity

## Required courses (96 credits)

## 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6)

SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

BIOL1110 From molecules to cells (6)
BIOL1309 Evolutionary diversity (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2306 Ecology and evolution (6) ENVS2002 Environmental data analysis (6)

#### 2. Advanced level courses (36 credits) Disciplinary Core Courses (18 credits)

BIOL3301 Marine biology (6)

BIOL3302 Systematics and phylogenetics (6) BIOL3319 Tropical terrestrial ecology (6)

#### **Disciplinary Electives (18 credits)**

At least 18 credits selected from the following courses:

BIOL3101 Animal behaviour (6) BIOL3303 Conservation biology (6)

BIOL3305 Tropical and temperate marine ecology field course (6)

BIOL3313 Freshwater ecology (6)
BIOL3314 Plant structure and evolution (6)
BIOL3318 Experimental intertidal ecology (6)

BIOL3322	Marine invertebrate zoology (6)	
BIOL3328	Nearshore marine and estuarine ecology (6)	
BIOL3419	Insect ecology: the little things that run the world (6)	
BIOL3506	Evolutionary biology (6)	
BIOL4301	Fish and fisheries (6)	
BIOL4302	Environmental impact assessment (6)	
BIOL4304	Ecosystem functioning and services (6)	
BIOL4505	Oyster aquaculture: business and technology (6)	[ previous title: Oyster aquaculture (6) ]
BIOL4861	Ecology & biodiversity internship (6)	
ENVS3019	Urban ecology (6)	
ENVS3020	Global change ecology (6)	
3. Capstone requir	rement (12 credits)	
BIOL4991	Ecology & biodiversity project (12)	

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, two 6-credit or a 12-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional two 6-credit or a 12-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

#### Remarks:

Major Title Major in Ecology & Biodiversity

Offered to students 2018

admitted to Year 1 in

#### Objectives:

This major is directed at teaching students: (1) how organisms interact with each other and their environments, (2) how species are distributed throughout the world, and (3) key threats and approaches to conserving biodiversity. Special reference is made to Hong Kong and Asia; the ways in which humans have impacted upon natural environments; and, the approaches used to manage or ameliorate those impacts. This major is based around an introductory core, which emphasizes plant and animal biology and includes a compulsory week-long residential field trip. Advanced courses in the major teach students about the ecology and biodiversity of different ecosystems (e.g. marine, terrestrial and freshwater environments) with an emphasis on field work, introduces the use of statistical and molecular techniques in ecology, and focuses on certain applied topics such as environmental impact assessment, ecotoxicology, fisheries and mariculture, and biodiversity conservation. Students have an opportunity to conduct independent research in ecology and biodiversity as a final year project or a dissertation under the close supervision of an individual staff member. Apart from the fundamental knowledge and skills in understanding and managing biodiversity offered in the core courses of this major, strong emphasis is placed upon experiential learning such as overseas field expedition and work placement in the environmental sector. Biodiversity conservation requires scientific input as well as passion. Through the range of formal field-based courses as well as extra-curricular activities offered, students taking this major will have opportunities to participate in research, field conservation and education projects both locally and internationally. Assistance will be provided so that students can develop expertise in one or a few groups of plants or animals, as familiarity with species identification is an essential prerequisite for biodiversity scientists or conservation biologists.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and appreciate the major living and non-living components of the regional and global environment, and how they interact; identify threats to them; and know how these threats can be mitigated (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: understand and appreciate the variety of life in Hong Kong's and Southeast Asia's natural habitats, become equipped to understand, study, manage and protect that diversity, and appraise the related moral and ethical issues (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: have sufficient experience of the basic techniques of modern ecological science and prepare to learn new ones for specific tasks (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: use IT tools appropriately, and access and evaluate materials from libraries, archives and the Internet (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: demonstrate original, independent and critical thinking, with mastery of a range of communication skills (by means of coursework, project-based and presentation opportunities in the curriculum)
- PLO 6: have the skill and knowledge to pursue postgraduate ecological research or to develop a career in nature conservation and environmental education, especially in Hong Kong and southern China (by means of coursework, tutorial classes, project-based and research-based learning in the curriculum)
- PLO 7: be motivated and sufficiently equipped to apply the knowledge solve local, regional and global environmental problems (by means of coursework, laboratory-based, tutorial classes, capstone learning and/or project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Biological Sciences (Intensive)

Major in Ecology & Biodiversity (Intensive)

Minor in Ecology & Biodiversity

## Required courses (96 credits)

## 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6)

SCNC1112 Fundamentals of modern science (6)

## **Disciplinary Core Courses (36 credits)**

BIOL1110 From molecules to cells (6)
BIOL1309 Evolutionary diversity (6)
BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2306 Ecology and evolution (6) ENVS2002 Environmental data analysis (6)

#### 2. Advanced level courses (42 credits) Disciplinary Core Courses (18 credits)

BIOL3301 Marine biology (6)

BIOL 3302 Systematics and phylogenetics (6) BIOL 3319 Tropical terrestrial ecology (6)

#### **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

BIOL3101 Animal behaviour (6) BIOL3303 Conservation biology (6)

BIOL3305 Tropical and temperate marine ecology field course (6)

BIOL3313 Freshwater ecology (6)
BIOL3314 Plant structure and evolution (6)
BIOL3318 Experimental intertidal ecology (6)

BIOL3322	Marine invertebrate zoology (6)		
BIOL3328	Nearshore marine and estuarine ecology (6)		
BIOL3419	Insect ecology: the little things that run the world (6)		
BIOL3506	Evolutionary biology (6)		
BIOL4301	Fish and fisheries (6)		
BIOL4302	Environmental impact assessment (6)		
BIOL4304	Ecosystem functioning and services (6)		
BIOL4505	Oyster aquaculture: business and technology (6)	[ previous title: Oyster aquaculture (6) ]	
BIOL4861	Ecology & biodiversity internship (6)		
ENVS3019	Urban ecology (6)		
ENVS3020	Global change ecology (6)		
3. Capstone requir	3. Capstone requirement (6 credits)		
At least 6 credits	selected from the following courses:		
BIOL3991	Directed studies in ecology & biodiversity (6)		
BIOL4911	Conservation science in practice (6)		
BIOL4991	Ecology & biodiversity project (12)		

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

#### Remarks:

Major Title Major in Ecology & Biodiversity

Offered to students 2017

admitted to Year 1 in

#### Objectives:

This major is directed at teaching students: (1) how organisms interact with each other and their environments, (2) how species are distributed throughout the world, and (3) key threats and approaches to conserving biodiversity. Special reference is made to Hong Kong and Asia; the ways in which humans have impacted upon natural environments; and, the approaches used to manage or ameliorate those impacts. This major is based around an introductory core, which emphasizes plant and animal biology and includes a compulsory week-long residential field trip. Advanced courses in the major teach students about the ecology and biodiversity of different ecosystems (e.g. marine, terrestrial and freshwater environments) with an emphasis on field work, introduces the use of statistical and molecular techniques in ecology, and focuses on certain applied topics such as environmental impact assessment, ecotoxicology, fisheries and mariculture, and biodiversity conservation. Students have an opportunity to conduct independent research in ecology and biodiversity as a final year project or a dissertation under the close supervision of an individual staff member. Apart from the fundamental knowledge and skills in understanding and managing biodiversity offered in the core courses of this major, strong emphasis is placed upon experiential learning such as overseas field expedition and work placement in the environmental sector. Biodiversity conservation requires scientific input as well as passion. Through the range of formal field-based courses as well as extra-curricular activities offered, students taking this major will have opportunities to participate in research, field conservation and education projects both locally and internationally. Assistance will be provided so that students can develop expertise in one or a few groups of plants or animals, as familiarity with species identification is an essential prerequisite for biodiversity scientists or conservation biologists.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and appreciate the major living and non-living components of the regional and global environment, and how they interact; identify threats to them; and know how these threats can be mitigated (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: understand and appreciate the variety of life in Hong Kong's and Southeast Asia's natural habitats, become equipped to understand, study, manage and protect that diversity, and appraise the related moral and ethical issues (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: have sufficient experience of the basic techniques of modern ecological science and prepare to learn new ones for specific tasks (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: use IT tools appropriately, and access and evaluate materials from libraries, archives and the Internet (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: demonstrate original, independent and critical thinking, with mastery of a range of communication skills (by means of coursework, project-based and presentation opportunities in the curriculum)
- PLO 6: have the skill and knowledge to pursue postgraduate ecological research or to develop a career in nature conservation and environmental education, especially in Hong Kong and southern China (by means of coursework, tutorial classes, project-based and research-based learning in the curriculum)
- PLO 7: be motivated and sufficiently equipped to apply the knowledge solve local, regional and global environmental problems (by means of coursework, laboratory-based, tutorial classes, capstone learning and/or project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Biological Sciences (Intensive)

Major in Ecology & Biodiversity (Intensive)

Minor in Ecology & Biodiversity

## Required courses (96 credits)

## 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

BIOL1110 From molecules to cells (6)
BIOL1309 Evolutionary diversity (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2306 Ecology and evolution (6) ENVS2002 Environmental data analysis (6)

#### 2. Advanced level courses (42 credits) Disciplinary Core Courses (18 credits)

BIOL3301 Marine biology (6)

BIOL3302 Systematics and phylogenetics (6) BIOL3319 Tropical terrestrial ecology (6)

#### **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

BIOL3101 Animal behaviour (6) BIOL3303 Conservation biology (6)

BIOL3305 Tropical and temperate marine ecology field course (6)

BIOL3313 Freshwater ecology (6)
BIOL3314 Plant structure and evolution (6)
BIOL3318 Experimental intertidal ecology (6)

BIOL3322	Marine invertebrate zoology (6)		
BIOL3328	Nearshore marine and estuarine ecology (6)		
BIOL3419	Insect ecology: the little things that run the world (6)		
BIOL3506	Evolutionary biology (6)		
BIOL4301	Fish and fisheries (6)		
BIOL4302	Environmental impact assessment (6)		
BIOL4304	Ecosystem functioning and services (6)		
BIOL4505	Oyster aquaculture: business and technology (6)	[ previous title: Oyster aquaculture (6) ]	
BIOL4861	Ecology & biodiversity internship (6)		
ENVS3019	Urban ecology (6)		
ENVS3020	Global change ecology (6)		
3. Capstone requir	3. Capstone requirement (6 credits)		
At least 6 credits	selected from the following courses:		
BIOL3991	Directed studies in ecology & biodiversity (6)		
BIOL4911	Conservation science in practice (6)		
BIOL4991	Ecology & biodiversity project (12)		

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

#### Remarks:

Major Title Major in Ecology & Biodiversity

Offered to students 2016

admitted to Year 1 in

#### Objectives:

This major is directed at teaching students: (1) how organisms interact with each other and their environments, (2) how species are distributed throughout the world, and (3) key threats and approaches to conserving biodiversity. Special reference is made to Hong Kong and Asia; the ways in which humans have impacted upon natural environments; and, the approaches used to manage or ameliorate those impacts. This major is based around an introductory core, which emphasizes plant and animal biology and includes a compulsory week-long residential field trip. Advanced courses in the major teach students about the ecology and biodiversity of different ecosystems (e.g. marine, terrestrial and freshwater environments) with an emphasis on field work, introduces the use of statistical and molecular techniques in ecology, and focuses on certain applied topics such as environmental impact assessment, ecotoxicology, fisheries and mariculture, and biodiversity conservation. Students have an opportunity to conduct independent research in ecology and biodiversity as a final year project or a dissertation under the close supervision of an individual staff member. Apart from the fundamental knowledge and skills in understanding and managing biodiversity offered in the core courses of this major, strong emphasis is placed upon experiential learning such as overseas field expedition and work placement in the environmental sector. Biodiversity conservation requires scientific input as well as passion. Through the range of formal field-based courses as well as extra-curricular activities offered, students taking this major will have opportunities to participate in research, field conservation and education projects both locally and internationally. Assistance will be provided so that students can develop expertise in one or a few groups of plants or animals, as familiarity with species identification is an essential prerequisite for biodiversity scientists or conservation biologists.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and appreciate the major living and non-living components of the regional and global environment, and how they interact; identify threats to them; and know how these threats can be mitigated (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: understand and appreciate the variety of life in Hong Kong's and Southeast Asia's natural habitats, become equipped to understand, study, manage and protect that diversity, and appraise the related moral and ethical issues (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: have sufficient experience of the basic techniques of modern ecological science and prepare to learn new ones for specific tasks (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: use IT tools appropriately, and access and evaluate materials from libraries, archives and the Internet (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: demonstrate original, independent and critical thinking, with mastery of a range of communication skills (by means of coursework, project-based and presentation opportunities in the curriculum)
- PLO 6: have the skill and knowledge to pursue postgraduate ecological research or to develop a career in nature conservation and environmental education, especially in Hong Kong and southern China (by means of coursework, tutorial classes, project-based and research-based learning in the curriculum)
- PLO 7: be motivated and sufficiently equipped to apply the knowledge solve local, regional and global environmental problems (by means of coursework, laboratory-based, tutorial classes, capstone learning and/or project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Ecology & Biodiversity (Intensive)

Minor in Ecology & Biodiversity

#### Required courses (96 credits) 1. Introductory level courses (48 credits) Disciplinary Core Courses: Science Foundation Courses (12 credits) Scientific method and reasoning (6) SCNC1111 SCNC1112 Fundamentals of modern science (6) **Disciplinary Core Courses (36 credits)** From molecules to cells (6) BIOL1110 BIOL1309 Evolutionary diversity (6) BIOL2102 Biostatistics (6) Biological sciences laboratory course (6) BIOL2103 Ecology and evolution (6) **BIOL2306** Environmental data analysis (6) ENVS2002 2. Advanced level courses (42 credits) **Disciplinary Core Courses (12 credits)** BIOL3302 Systematics and phylogenetics (6) **BIOL3303** Conservation biology (6) [previous title: Conservation ecology (6)] **Disciplinary Electives (30 credits)** At least 30 credits selected from the following courses: **BIOI 3101** Animal behaviour (6) Environmental microbiology (6) BIOL3109 Marine biology (6) BIOL3301 Tropical and temperate marine ecology field course (6) **BIOL3305** Freshwater ecology (6) BIOL3313 Plant structure and evolution (6) BIOL3314 Experimental intertidal ecology (6) **BIOL3318 BIOL3319** Tropical terrestrial ecology (6) [previous title: Terrestrail ecology (6)]

	BIOL3320 BIOL3322	The biology of marine mammals (6) Marine invertebrate zoology (6)	
	BIOL3328	Nearshore marine and estuarine ecology (6)	
	BIOL3328	Insect ecology: the little things that run the world (6)	
	BIOL3505	Oyster aguaculture and restoration (6)	Take either BIOL3505 or BIOL4505 to fulfill
	BIOLOGO	cycler aquaculture and rectoration (c)	this 30 credits requirement, but not both.
			BIOL3505 and BIOL4505 are mutually
			exclusive.
	BIOL3506	Evolutionary biology (6)	
	BIOL4301	Fish and fisheries (6)	
	BIOL4302	Environmental impact assessment (6)	
	BIOL4304	Ecosystem functioning and services (6)	
	BIOL4451	Cetacean behaviour, ecology and conservation: field research experience (6)	
	BIOL4505	Oyster aquaculture: business and technology (6)	Take either BIOL3505 or BIOL4505 to fulfill this 30 credits requirement, but not both. BIOL3505 and BIOL4505 are mutually exclusive. [ previous title: Oyster aquaculture (6) ]
	BIOL4861	Ecology & biodiversity internship (6)	
	ENVS3019	Urban ecology (6)	
	ENVS3020	Global change ecology (6)	
	3. Capstone requirement (6 credits)		
At least 6 credits selected from the following courses:			
	BIOL3991	Directed studies in ecology & biodiversity (6)	
	BIOL4911	Conservation science in practice (6)	
	BIOL4921	Animal behaviour and behavioural ecology: field course (6)	
	BIOL4991	Ecology & biodiversity project (12)	

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

## Remarks:

Major Title Major in Ecology & Biodiversity

Offered to students 2015

admitted to Year 1 in

#### Objectives:

This major is directed at teaching students: (1) how organisms interact with each other and their environments, (2) how species are distributed throughout the world, and (3) key threats and approaches to conserving biodiversity. Special reference is made to Hong Kong and Asia; the ways in which humans have impacted upon natural environments; and, the approaches used to manage or ameliorate those impacts. This major is based around an introductory core, which emphasizes plant and animal biology and includes a compulsory week-long residential field trip. Advanced courses in the major teach students about the ecology and biodiversity of different ecosystems (e.g. marine, terrestrial and freshwater environments) with an emphasis on field work, introduces the use of statistical and molecular techniques in ecology, and focuses on certain applied topics such as environmental impact assessment, ecotoxicology, fisheries and mariculture, and biodiversity conservation. Students have an opportunity to conduct independent research in ecology and biodiversity as a final year project or a dissertation under the close supervision of an individual staff member. Apart from the fundamental knowledge and skills in understanding and managing biodiversity offered in the core courses of this major, strong emphasis is placed upon experiential learning such as overseas field expedition and work placement in the environmental sector. Biodiversity conservation requires scientific input as well as passion. Through the range of formal field-based courses as well as extra-curricular activities offered, students taking this major will have opportunities to participate in research, field conservation and education projects both locally and internationally. Assistance will be provided so that students can develop expertise in one or a few groups of plants or animals, as familiarity with species identification is an essential prerequisite for biodiversity scientists or conservation biologists.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and appreciate the major living and non-living components of the regional and global environment, and how they interact; identify threats to them; and know how these threats can be mitigated (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: understand and appreciate the variety of life in Hong Kong's and Southeast Asia's natural habitats, become equipped to understand, study, manage and protect that diversity, and appraise the related moral and ethical issues (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: have sufficient experience of the basic techniques of modern ecological science and prepare to learn new ones for specific tasks (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: use IT tools appropriately, and access and evaluate materials from libraries, archives and the Internet (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: demonstrate original, independent and critical thinking, with mastery of a range of communication skills (by means of coursework, project-based and presentation opportunities in the curriculum)
- PLO 6: have the skill and knowledge to pursue postgraduate ecological research or to develop a career in nature conservation and environmental education, especially in Hong Kong and southern China (by means of coursework, tutorial classes, project-based and research-based learning in the curriculum)
- PLO 7: be motivated and sufficiently equipped to apply the knowledge solve local, regional and global environmental problems (by means of coursework, laboratory-based, tutorial classes, capstone learning and/or project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Ecology & Biodiversity (Intensive)

Minor in Ecology & Biodiversity

## Required courses (96 credits)

## 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

Scientific method and reasoning (6) SCNC1111 SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

From molecules to cells (6) BIOL1110 BIOL1309 Evolutionary diversity (6) BIOL2102 Biostatistics (6)

Biological sciences laboratory course (6) BIOL2103

Ecology and evolution (6) BIOL2306 Environmental data analysis (6) ENVS2002

2. Advanced level courses (42 credits) **Disciplinary Core Courses (12 credits)** 

BIOL3302 Systematics and phylogenetics (6) **BIOL3303** Conservation biology (6)

**Disciplinary Electives (30 credits)** 

At least 30 credits selected from the following courses:

BIOL3101 Animal behaviour (6) Take either BIOL3101 or BIOL4303 to fulfill this 30 credits requirement, but not both. BIOL3101 and BIOL4303 are mutually

BIOL3109 Environmental microbiology (6)

Marine biology (6) BIOL3301

**BIOL3305** Tropical and temperate marine ecology field course (6)

Freshwater ecology (6) BIOL3313

exclusive

[previous title: Conservation ecology (6)]

BIOL3314 BIOL3318 BIOL3319 BIOL3320 BIOL3322 BIOL3328	Plant structure and evolution (6) Experimental intertidal ecology (6) Tropical terrestrial ecology (6) The biology of marine mammals (6) Marine invertebrate zoology (6) Nearshore marine and estuarine ecology (6)	[previous title: Terrestrail ecology (6) ]
BIOL3419 BIOL3505	Insect ecology: the little things that run the world (6) Oyster aquaculture and restoration (6)	Take either BIOL3505 or BIOL4505 to fulfill this 30 credits requirement, but not both. BIOL3505 and BIOL4505 are mutually exclusive.
BIOL3506	Evolutionary biology (6)	
BIOL4301	Fish and fisheries (6)	
BIOL4302	Environmental impact assessment (6)	
BIOL4303	Animal behaviour (6)	Take either BIOL3101 or BIOL4303 to fulfill this 30 credits requirement, but not both. BIOL3101 and BIOL4303 are mutually exclusive.
BIOL4304	Ecosystem functioning and services (6)	
BIOL4451	Cetacean behaviour, ecology and conservation: field research	
BIOL4505	experience (6) Oyster aquaculture: business and technology (6)	Take either BIOL3505 or BIOL4505 to fulfill this 30 credits requirement, but not both. BIOL3505 and BIOL4505 are mutually exclusive. [previous title: Oyster aquaculture
BIOL4861	Ecology & biodiversity internship (6)	(6) ]
ENVS3019	Urban ecology (6)	
ENVS3019	Global change ecology (6)	
3. Capstone requir	S	
	selected from the following courses:	
BIOL3951	Ecology & biodiversity field course (6)	Take either BIOL3951 (subclass B) or BIOL4921 to fulfill this 6 credits requirement, but not both. BIOL3951 (subclass B) and BIOL4921 are mutually exclusive.
BIOL3991	Directed studies in ecology & biodiversity (6)	2.02 102 1 dro Maladily Oxoldolvo.
BIOL4911	Conservation science in practice (6)	
BIOL4921	Animal behaviour and behavioural ecology: field course (6)	Take either BIOL3951 (subclass B) or BIOL4921 to fulfill this 6 credits requirement, but not both. BIOL3951 (subclass B) and BIOL4921 are mutually exclusive.
BIOL4991	Ecology & biodiversity project (12)	DIGETOL Falo maturity exclusive.

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

## Remarks:

Major Title Major in Ecology & Biodiversity

2014

Offered to students

admitted to Year 1 in

#### Objectives:

This major is directed at teaching students: (1) how organisms interact with each other and their environments, (2) how species are distributed throughout the world, and (3) key threats and approaches to conserving biodiversity. Special reference is made to Hong Kong and Asia; the ways in which humans have impacted upon natural environments; and, the approaches used to manage or ameliorate those impacts. This major is based around an introductory core, which emphasizes plant and animal biology and includes a compulsory week-long residential field trip. Advanced courses in the major teach students about the ecology and biodiversity of different ecosystems (e.g. marine, terrestrial and freshwater environments) with an emphasis on field work, introduces the use of statistical and molecular techniques in ecology, and focuses on certain applied topics such as environmental impact assessment, ecotoxicology, fisheries and mariculture, and biodiversity conservation. Students have an opportunity to conduct independent research in ecology and biodiversity as a final year project or a dissertation under the close supervision of an individual staff member. Apart from the fundamental knowledge and skills in understanding and managing biodiversity offered in the core courses of this major, strong emphasis is placed upon experiential learning such as overseas field expedition and work placement in the environmental sector. Biodiversity conservation requires scientific input as well as passion. Through the range of formal field-based courses as well as extra-curricular activities offered, students taking this major will have opportunities to participate in research, field conservation and education projects both locally and internationally. Assistance will be provided so that students can develop expertise in one or a few groups of plants or animals, as familiarity with species identification is an essential prerequisite for biodiversity scientists or conservation biologists.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and appreciate the major living and non-living components of the regional and global environment, and how they interact; identify threats to them; and know how these threats can be mitigated (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: understand and appreciate the variety of life in Hong Kong's and Southeast Asia's natural habitats, become equipped to understand, study, manage and protect that diversity, and appraise the related moral and ethical issues (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: have sufficient experience of the basic techniques of modern ecological science and prepare to learn new ones for specific tasks (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: use IT tools appropriately, and access and evaluate materials from libraries, archives and the Internet (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: demonstrate original, independent and critical thinking, with mastery of a range of communication skills (by means of coursework, project-based and presentation opportunities in the curriculum)
- PLO 6: have the skill and knowledge to pursue postgraduate ecological research or to develop a career in nature conservation and environmental education, especially in Hong Kong and southern China (by means of coursework, tutorial classes, project-based and research-based learning in the curriculum)
- PLO 7: be motivated and sufficiently equipped to apply the knowledge solve local, regional and global environmental problems (by means of coursework, laboratory-based, tutorial classes, capstone learning and/or project-based learning in the curriculum)

#### Impermissible Combinations:

Minor in Ecology & Biodiversity

## Required courses (96 credits) 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

Scientific method and reasoning (6) SCNC1111 SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

From molecules to cells (6) BIOL1110 Evolutionary diversity (6) BIOL1309 BIOL2102 Biostatistics (6)

Biological sciences laboratory course (6) **BIOI 2103** 

Ecology and evolution (6) BIOL2306 Environmental data analysis (6) ENVS2002

2. Advanced level courses (42 credits) **Disciplinary Core Courses (12 credits)** 

BIOL3302 Systematics and phylogenetics (6)

Conservation biology (6) **BIOL3303** 

**Disciplinary Electives (30 credits)** 

At least 30 credits selected from the following courses:

BIOL3101 Animal behaviour (6)

Take either BIOI 3101 or BIOI 4303 to fulfill this 30 credits requirement, but not both. BIOL3101 and BIOL4303 are mutually exclusive.

[previous title: Conservation ecology (6) ]

BIOL3109 Environmental microbiology (6)

BIOL3301 Marine biology (6)

Tropical and temperate marine ecology field course (6) **BIOL3305** 

Freshwater ecology (6) BIOL3313 Plant structure and evolution (6) **BIOL3314** 

BIOL3318 BIOL3319 BIOL3320 BIOL3322 BIOL3328 BIOL3419	Experimental intertidal ecology (6) Tropical terrestrial ecology (6) The biology of marine mammals (6) Marine invertebrate zoology (6) Nearshore marine and estuarine ecology (6) Insect ecology: the little things that run the world (6)	[previous title: Terrestrial ecology (6) ]
BIOL3505	Oyster aquaculture and restoration (6)	Take either BIOL3505 or BIOL4505 to fulfill this 30 credits requirement, but not both. BIOL3505 and BIOL4505 are mutually exclusive.
BIOL4301	Fish and fisheries (6)	
BIOL4302	Environmental impact assessment (6)	
BIOL4303	Animal behaviour (6)	Take either BIOL3101 or BIOL4303 to fulfill this 30 credits requirement, but not both. BIOL3101 and BIOL4303 are mutually exclusive.
BIOL4304	Ecosystem functioning and services (6)	
BIOL4451	Cetacean behaviour, ecology and conservation: field research experience (6)	
BIOL4505	Oyster aquaculture: business and technology (6)	Take either BIOL3505 or BIOL4505 to fulfill this 30 credits requirement, but not both. BIOL3505 and BIOL4505 are mutually exclusive. [ previous title: Oyster aquaculture (6) ]
BIOL4861	Ecology & biodiversity internship (6)	( / 2
ENVS3019	Urban ecology (6)	
ENVS3020	Global change ecology (6)	
3. Capstone requir	rement (6 credits)	
At least 6 credits	selected from the following courses:	
BIOL3951	Ecology & biodiversity field course (6)	Take either BIOL3951 (subclass B) or BIOL4921 to fulfill this 6 credits requirement, but not both. BIOL3951 (subclass B) and BIOL4921 are mutually exclusive.
BIOL3991	Directed studies in ecology & biodiversity (6)	2.02.02. dio matadily oxoldolivo.
BIOL4911	Conservation science in practice (6)	
BIOL4921	Animal behaviour and behavioural ecology: field course (6)	Take either BIOL3951 (subclass B) or BIOL4921 to fulfill this 6 credits requirement, but not both. BIOL3951 (subclass B) and BIOL4921 are mutually exclusive.
BIOL4991	Ecology & biodiversity project (12)	•

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

## Remarks:

Major Title Major in Ecology & Biodiversity

Offered to students 2013

admitted to Year 1 in

#### Objectives:

This major is directed at teaching students: (1) how organisms interact with each other and their environments, (2) how species are distributed throughout the world, and (3) key threats and approaches to conserving biodiversity. Special reference is made to Hong Kong and Asia; the ways in which humans have impacted upon natural environments; and, the approaches used to manage or ameliorate those impacts. This major is based around an introductory core, which emphasizes plant and animal biology and includes a compulsory week-long residential field trip. Advanced courses in the major teach students about the ecology and biodiversity of different ecosystems (e.g. marine, terrestrial and freshwater environments) with an emphasis on field work, introduces the use of statistical and molecular techniques in ecology, and focuses on certain applied topics such as environmental impact assessment, ecotoxicology, fisheries and mariculture, and biodiversity conservation. Students have an opportunity to conduct independent research in ecology and biodiversity as a final year project or a dissertation under the close supervision of an individual staff member. Apart from the fundamental knowledge and skills in understanding and managing biodiversity offered in the core courses of this major, strong emphasis is placed upon experiential learning such as overseas field expedition and work placement in the environmental sector. Biodiversity conservation requires scientific input as well as passion. Through the range of formal field-based courses as well as extra-curricular activities offered, students taking this major will have opportunities to participate in research, field conservation and education projects both locally and internationally. Assistance will be provided so that students can develop expertise in one or a few groups of plants or animals, as familiarity with species identification is an essential prerequisite for biodiversity scientists or conservation biologists.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and appreciate the major living and non-living components of the regional and global environment, and how they interact; identify threats to them; and know how these threats can be mitigated (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: understand and appreciate the variety of life in Hong Kong's and Southeast Asia's natural habitats, become equipped to understand, study, manage and protect that diversity, and appraise the related moral and ethical issues (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: have sufficient experience of the basic techniques of modern ecological science and prepare to learn new ones for specific tasks (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: use IT tools appropriately, and access and evaluate materials from libraries, archives and the Internet (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: demonstrate original, independent and critical thinking, with mastery of a range of communication skills (by means of coursework, project-based and presentation opportunities in the curriculum)
- PLO 6: have the skill and knowledge to pursue postgraduate ecological research or to develop a career in nature conservation and environmental education, especially in Hong Kong and southern China (by means of coursework, tutorial classes, project-based and research-based learning in the curriculum)
- PLO 7: be motivated and sufficiently equipped to apply the knowledge solve local, regional and global environmental problems (by means of coursework, laboratory-based, tutorial classes, capstone learning and/or project-based learning in the curriculum)

#### Impermissible Combinations:

Minor in Ecology & Biodiversity

# Required courses (96 credits) 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

BIOL1110 From molecules to cells (6) BIOL1309 Evolutionary diversity (6)

BIOL2102 Biostatistics (6)
BIOL2103 Biological sciences laboratory course (6)

BIOL2306 Ecology and evolution (6)
ENVS2002 Environmental data analysis (6)

2. Advanced level courses (42 credits) Disciplinary Core Courses (12 credits)

BIOL3302 Systematics and phylogenetics (6)

BIOL3303 Conservation biology (6)

Disciplinary Electives (30 credits)

At least 30 credits selected from the following courses:

BIOL3101 Animal behaviour (6)

Take either BIOL3101 or BIOL4303 to fulfill this 30 credits requirement, but not both. BIOL3101 and BIOL4303 are mutually exclusive.

[previous title: Conservation ecology (6) ]

BIOL3109 Environmental microbiology (6)

BIOL3301 Marine biology (6)

BIOL3305 Tropical and temperate marine ecology field course (6)

BIOL3313 Freshwater ecology (6)
BIOL3314 Plant structure and evolution (6)

BIOL3318 BIOL3319 BIOL3320 BIOL3322 BIOL3328 BIOL3419	Experimental intertidal ecology (6) Tropical terrestrial ecology (6) The biology of marine mammals (6) Marine invertebrate zoology (6) Nearshore marine and estuarine ecology (6) Insect ecology: the little things that run the world (6)	[previous title: Terrestrail ecology (6) ]
BIOL3505	Oyster aquaculture and restoration (6)	Take either BIOL3505 or BIOL4505 to fulfill this 30 credits requirement, but not both. BIOL3505 and BIOL4505 are mutually exclusive.
BIOL4301	Fish and fisheries (6)	
BIOL4302	Environmental impact assessment (6)	
BIOL4303	Animal behaviour (6)	Take either BIOL3101 or BIOL4303 to fulfill this 30 credits requirement, but not both. BIOL3101 and BIOL4303 are mutually exclusive.
BIOL4304	Ecosystem functioning and services (6)	
BIOL4451	Cetacean behaviour, ecology and conservation: field research experience (6)	
BIOL4505	Oyster aquaculture: business and technology (6)	Take either BIOL3505 or BIOL4505 to fulfill this 30 credits requirement, but not both. BIOL3505 and BIOL4505 are mutually exclusive. [ previous title: Oyster aquaculture (6) ]
BIOL4861	Ecology & biodiversity internship (6)	\ / ·
ENVS3019	Urban ecology (6)	
ENVS3020	Global change ecology (6)	
3. Capstone requir	rement (6 credits)	
	selected from the following courses:	
BIOL3951	Ecology & biodiversity field course (6)	Take either BIOL3951 (subclass B) or BIOL4921 to fulfill this 6 credits requirement, but not both. BIOL3951 (subclass B) and BIOL4921 are mutually exclusive.
BIOL3991	Directed studies in ecology & biodiversity (6)	,
BIOL4911	Conservation science in practice (6)	
BIOL4921	Animal behaviour and behavioural ecology: field course (6)	Take either BIOL3951 (subclass B) or BIOL4921 to fulfill this 6 credits requirement, but not both. BIOL3951 (subclass B) and BIOL4921 are mutually exclusive.
BIOL4991	Ecology & biodiversity project (12)	, and the second

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

## Remarks:

Major Title Major in Ecology & Biodiversity

Offered to students 2012

admitted to Year 1 in

#### Objectives:

This major is directed at teaching students: (1) how organisms interact with each other and their environments, (2) how species are distributed throughout the world, and (3) key threats and approaches to conserving biodiversity. Special reference is made to Hong Kong and Asia; the ways in which humans have impacted upon natural environments; and, the approaches used to manage or ameliorate those impacts. This major is based around an introductory core, which emphasizes plant and animal biology and includes a compulsory week-long residential field trip. Advanced courses in the major teach students about the ecology and biodiversity of different ecosystems (e.g. marine, terrestrial and freshwater environments) with an emphasis on field work, introduces the use of statistical and molecular techniques in ecology, and focuses on certain applied topics such as environmental impact assessment, ecotoxicology, fisheries and mariculture, and biodiversity conservation. Students have an opportunity to conduct independent research in ecology and biodiversity as a final year project or a dissertation under the close supervision of an individual staff member. Apart from the fundamental knowledge and skills in understanding and managing biodiversity offered in the core courses of this major, strong emphasis is placed upon experiential learning such as overseas field expedition and work placement in the environmental sector. Biodiversity conservation requires scientific input as well as passion. Through the range of formal field-based courses as well as extra-curricular activities offered, students taking this major will have opportunities to participate in research, field conservation and education projects both locally and internationally. Assistance will be provided so that students can develop expertise in one or a few groups of plants or animals, as familiarity with species identification is an essential prerequisite for biodiversity scientists or conservation biologists.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and appreciate the major living and non-living components of the regional and global environment, and how they interact; identify threats to them; and know how these threats can be mitigated (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: understand and appreciate the variety of life in Hong Kong's and Southeast Asia's natural habitats, become equipped to understand, study, manage and protect that diversity, and appraise the related moral and ethical issues (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: have sufficient experience of the basic techniques of modern ecological science and prepare to learn new ones for specific tasks (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: use IT tools appropriately, and access and evaluate materials from libraries, archives and the Internet (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: demonstrate original, independent and critical thinking, with mastery of a range of communication skills (by means of coursework, project-based and presentation opportunities in the curriculum)
- PLO 6: have the skill and knowledge to pursue postgraduate ecological research or to develop a career in nature conservation and environmental education, especially in Hong Kong and southern China (by means of coursework, tutorial classes, project-based and research-based learning in the curriculum)
- PLO 7: be motivated and sufficiently equipped to apply the knowledge solve local, regional and global environmental problems (by means of coursework, laboratory-based, tutorial classes, capstone learning and/or project-based learning in the curriculum)

#### Impermissible Combinations:

diversity			
Required courses (96 credits)			
l courses (42 credits) ourses: Science Foundation Courses (12 credits)			
Scientific method and reasoning (6)			
Fundamentals of modern science (6)			
ourses (30 credits)			
From molecules to cells (6)			
Evolutionary diversity (6)			
Biostatistics (6)			
Biological sciences laboratory course (6)			
6,7			
ourses (48 credits)			
<b>3</b> , ( )	[previous title: Conservation ecology (6)]		
Disciplinary Electives (36 credits)			
· · · · · · · · · · · · · · · · · · ·			
Animal behaviour (6)	Take either BIOL3101 or BIOL4303 to fulfill this 36 credits requirement, but not both. BIOL3101 and BIOL4303 are mutually exclusive.		
Environmental microbiology (6)			
Marine biology (6)			
Tropical and temperate marine ecology field course (6)			
3, ( )			
Plant structure and evolution (6)			
Experimental intertidal ecology (6)			
	(96 credits) I courses (42 credits) ourses: Science Foundation Courses (12 credits) Scientific method and reasoning (6) Fundamentals of modern science (6) ourses (30 credits) From molecules to cells (6) Evolutionary diversity (6) Biostatistics (6) Biological sciences laboratory course (6) Ecology and evolution (6) ourses (48 credits) ourses (48 credits) ourses (12 credits) Systematics and phylogenetics (6) Conservation biology (6) es (36 credits) selected from the following courses: Animal behaviour (6)  Environmental microbiology (6) Marine biology (6) Tropical and temperate marine ecology field course (6) Freshwater ecology (6) Plant structure and evolution (6)		

BIOL3319 BIOL3320 BIOL3322 BIOL3328 BIOL3419	Tropical terrestrial ecology (6) The biology of marine mammals (6) Marine invertebrate zoology (6) Nearshore marine and estuarine ecology (6) Insect ecology: the little things that run the world (6)	[previous title: Terrestrial ecology (6) ]
BIOL3505	Oyster aquaculture and restoration (6)	Take either BIOL3505 or BIOL4505 to fulfill this 36 credits requirement, but not both. BIOL3505 and BIOL4505 are mutually exclusive.
BIOL4301	Fish and fisheries (6)	
BIOL4302	Environmental impact assessment (6)	T
BIOL4303	Animal behaviour (6)	Take either BIOL3101 or BIOL4303 to fulfill this 36 credits requirement, but not both. BIOL3101 and BIOL4303 are mutually exclusive.
BIOL4304	Ecosystem functioning and services (6)	ололиот от
BIOL4451	Cetacean behaviour, ecology and conservation: field research experience (6)	
BIOL4505	Oyster aquaculture: business and technology (6)	Take either BIOL3505 or BIOL4505 to fulfill this 36 credits requirement, but not both. BIOL3505 and BIOL4505 are mutually exclusive. [ previous title: Oyster aquaculture (6) ]
BIOL4861	Ecology & biodiversity internship (6)	(-7)
ENVS3019	Urban ecology (6)	
ENVS3020	Global change ecology (6)	
3. Capstone require	ement (6 credits)	
At least 6 credits	selected from the following courses:	
BIOL3951	Ecology & biodiversity field course (6)	Take either BIOL3951 (subclass B) or BIOL4921 to fulfill this 6 credits requirement, but not both. BIOL3951 (subclass B) and BIOL4921 are mutually exclusive.
BIOL3991	Directed studies in ecology & biodiversity (6)	, , , , , , , , , , , , , , , , , , , ,
BIOL4911	Conservation science in practice (6)	
BIOL4921	Animal behaviour and behavioural ecology: field course (6)	Take either BIOL3951 (subclass B) or BIOL4921 to fulfill this 6 credits requirement, but not both. BIOL3951 (subclass B) and BIOL4921 are mutually exclusive.
BIOL4991	Ecology & biodiversity project (12)	•

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

#### Remarks:

Major Title Major in Ecology & Biodiversity (Intensive)

2021

Offered to students

admitted to Year 1 in

#### **Objectives:**

This intensive major is directed at teaching students the 'rules of existence' for organisms in natural and human-modified environments, including major threats to biodiversity and the approaches adopted to conserve species and habitats. Special reference is made to the plants, animals and habitats of Hong Kong and Asia, the ways in which humans have altered the region's ecosystems, and the management or mitigation of those impacts. The range and scope of courses offered will provide students with a firm foundation in ecology, biodiversity and related disciplines, and equip them with the skills required for postgraduate research or employment with government and non-government organizations concerned with biodiversity conservation, nature preservation or habitat assessment and management.

The intensive major is based around an introductory core that emphasizes biology, ecology and evolution of plants and animals; it includes a compulsory residential field trip (as part of the Ecology and Evolution course), as well as instruction in data analysis and biostatistics. Many of the advanced courses in the major have a strong emphasis on field-work and on small projects performed by students. They teach students about the ecology and biodiversity of different ecosystems (e.g. marine, terrestrial, freshwater and urban) and taxa (e.g. flowering plants, insects, fishes, marine mammals). Other courses focus on more applied topics, such as environmental impact assessment, conservation, and provide an opportunity for students to become familiar with specialised topics ranging from systematics to animal behaviour.

During their final year, students have an opportunity to conduct independent research in the form of an ecology and biodiversity research project or a directed-studies dissertation under the close supervision of an individual staff member. Students are able to make use of the facilities of the Swire Institute of Marine Science for such work. Strong emphasis is also placed upon experiential learning during overseas field trips that can be taken as part of the capstone requirement of this intensive major.

Ecology and biodiversity research requires extensive scientific knowledge as well as passion, and students are encouraged to take more than the requisite 12-credit minimum of capstone courses. Through these courses, and the range of formal field-based options as well as various extra-curricular activities offered, students will be expected to develop expertise in one or a few groups of plants or animals; this is an important skill since an ability to identify species and major taxa is an essential prerequisite for biodiversity scientists or conservation biologists.

This intensive major has been accredited by the Royal Society of Biology (RSB), UK, for the purpose of meeting in part the academic and experience requirement for the Membership and Chartered Biologist (CBiol).

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and appreciate the major living and non-living components of the local, regional and global environment, and how they interact; evaluate their role in ecosystem functioning and identify threats to them; and know how these threats can be mitigated (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: assess, understand and appreciate the variety of life in Hong Kong's and Southeast Asia's natural habitats, become equipped to assess, study, manage and protect that diversity, and appraise the related moral and ethical issues (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: have sufficient experience of the basic techniques of modern ecological science and prepare to learn new ones for specific tasks (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: use IT tools appropriately, and access and evaluate materials from libraries, archives and the Internet (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: demonstrate original, independent and critical thinking, with mastery of a range of communication skills (by means of coursework, project-based and presentation opportunities in the curriculum)
- PLO 6: have the skill and knowledge to pursue postgraduate ecological research in top-level Universities around the world or to develop a career in nature conservation and environmental education, especially in Hong Kong and southern China (by means of coursework, tutorial classes, project-based and research-based learning in the curriculum)
- PLO 7: be motivated and sufficiently equipped to apply the knowledge solve local, regional and global environmental problems in a changing world. (by means of coursework, laboratory-based, tutorial classes, capstone learning and/or project-based learning in the curriculum)

## Impermissible Combinations:

Major in Biological Sciences

Major in Biological Sciences (Intensive)

Major in Ecology & Biodiversity

Minor in Ecology & Biodiversity

#### Required courses (144 credits)

# 1. Introductory level courses (60 credits) Disciplinary Core Courses: Science Foundation Courses (12 credits)

,		
SCNC1111	Scientific method and reasoning (6)	(Note 1)
SCNC1112	Fundamentals of modern science (6)	(Note 1)
Disciplinary Core Courses (42 credits)		
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BIOL1110 From molecules to cells (6) (Note 1)
BIOL1309 Evolutionary diversity (6) (Note 1)
BIOL2102 Biostatistics (6) (Note 1)
BIOL2103 Biological sciences laboratory course (6) (Note 1)

BIOL2306 Ecology and evolution (6) (Note 1)

EASC1401 Blue Planet (6)

ENVS2002 Environmental data analysis (6) (Note 1)

**Disciplinary Electives (6 credits)** 

Plus at least 6 credits selected from the following courses:

CHEM1041 Foundations of chemistry (6) Take either CHEM1041 or CHEM1042 to fulfill this 6 credits requirement, but not both.

CHEM1042 General chemistry I (6) Take either CHEM1041 or CHEM1042 to

(Note 1)

fulfill this 6 credits requirement, but not both.

## 2. Advanced level courses (66 to 72 credits) (Note 2)

Disciplinary Core Courses (30 credits)

BIOL3101 Animal behaviour (6)

BIOL3301 Marine biology (6) (Note 1)
BIOL3302 Systematics and phylogenetics (6) (Note 1)
BIOL3303 Conservation biology (6)

BIOL3319 Tropical terrestrial ecology (6)
Disciplinary Electives (36 to 42 credits) (Note 2)

Plus at least 36 or 42 credits selected from the following courses:

BIOL3305 Tropical and temperate marine ecology field course (6)
BIOL3313 Freshwater ecology (6)

BIOL3313 Freshwater ecology (6)
BIOL3314 Plant structure and evolution (6)
BIOL3318 Experimental intertidal ecology (6)
BIOL3322 Marine invertebrate zoology (6)

BIOL3328 Nearshore marine and estuarine ecology (6)

BIOL3408 Genetics (6)

BIOL3419 Insect ecology: the little things that run the world (6)

BIOL3506 Evolutionary biology (6) BIOL4301 Fish and fisheries (6)

BIOL4302 Environmental impact assessment (6)
BIOL4304 Ecosystem functioning and services (6)
BIOL4505 Oyster aquaculture: business and technology (6)

ENVS3019 Urban ecology (6) ENVS3020 Global change ecology (6)

#### 3. Capstone requirement (12 to 18 credits) (Note 2)

Disciplinary Core Courses (12 credits)

BIOL4991 Ecology & biodiversity project (12)

Disciplinary Electives (6 credits)

BIOL3991 Directed studies in ecology & biodiversity (6)
BIOL4911 Conservation science in practice (6)

#### Notes:

1. These are core courses in the regular Ecology & Biodiversity Major (96 credits) curriculum.

2. Within the E&B accredited curriculum, students have to pass a total of 60 credits within the Introductory Level Courses spread across two Science Foundation Courses (Level 1; 12 credits), seven Disciplinary Core Courses (Levels 1 & 2; 42 credits) and one chemistry (Level 1; 6 credits). For the chemistry course, students will have the choice between CHEM1041 and CHEM1042 in function of their prior chemistry background acquired during their upper secondary education. Students with no chemistry background should follow CHEM1041, while students with previous chemistry background should take CHEM1042.

Advanced Level Courses cover a total of 66 to 72 credits. Those are divided between five Disciplinary Core Courses (Level 3; 30 credits) and 6 to 7 Disciplinary Elective Courses (Level 3 & 4; 36 to 42 credits) among a choice of fourteen different courses. As eight of the Disciplinary Elective courses are being taught every other year, students must pay attention to the year during which these courses are taught and ensure that they have fulfilled the necessary requirements. There is a student mentorship programme in place that can assist them in this.

During their final year, students should complete a minimum of 12 credits as Capstone Courses (maximum of 18). The Ecology & Biodiversity Project (12 credits) is mandatory and students can choose to complete one of the other two Elective Capstone Courses (6 credits). If students choose to complete 18 credits of Capstone Courses, then they are required to complete only 36 credits of Disciplinary Elective Courses within the Advanced Level Courses (instead of 42 credits)

Finally, students who participate in student exchange programme are expected to enquire, prior to their departure from HKU, about potential equivalences with the courses taken during exchange programmes to ensure that they match requirements for obtaining the RSB accredited programme.

- 3. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis
- 4. Candidates who have been admitted to Year 1 in 2021-22 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1112. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Biology, Chemistry, and Physics in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Biology, Chemistry, and Physics Higher Level in International Baccalaureate (IB)
- Grade B or above in Biology, Chemistry, and Physics in General Certificate of Education Advanced Level (GCEAL)
- Biology, Chemistry, and Physics qualification in Gao Kao will be considered on a case-by-case basis
- 5. As this curriculum is accredited by the Royal Society of Biology (RSB), students must follow the curriculum in full (i.e. no replacement courses

are possible) in order to graduate with this accredited programme.

Major Title Major in Ecology & Biodiversity (Intensive)

2020

Offered to students

admitted to Year 1 in

#### **Objectives:**

This intensive major is directed at teaching students the 'rules of existence' for organisms in natural and human-modified environments, including major threats to biodiversity and the approaches adopted to conserve species and habitats. Special reference is made to the plants, animals and habitats of Hong Kong and Asia, the ways in which humans have altered the region's ecosystems, and the management or mitigation of those impacts. The range and scope of courses offered will provide students with a firm foundation in ecology, biodiversity and related disciplines, and equip them with the skills required for postgraduate research or employment with government and non-government organizations concerned with biodiversity conservation, nature preservation or habitat assessment and management.

The intensive major is based around an introductory core that emphasizes biology, ecology and evolution of plants and animals; it includes a compulsory residential field trip (as part of the Ecology and Evolution course), as well as instruction in data analysis and biostatistics. Many of the advanced courses in the major have a strong emphasis on field-work and on small projects performed by students. They teach students about the ecology and biodiversity of different ecosystems (e.g. marine, terrestrial, freshwater and urban) and taxa (e.g. flowering plants, insects, fishes, marine mammals). Other courses focus on more applied topics, such as environmental impact assessment, conservation, and provide an opportunity for students to become familiar with specialised topics ranging from systematics to animal behaviour.

During their final year, students have an opportunity to conduct independent research in the form of an ecology and biodiversity research project or a directed-studies dissertation under the close supervision of an individual staff member. Students are able to make use of the facilities of the Swire Institute of Marine Science for such work. Strong emphasis is also placed upon experiential learning during overseas field trips that can be taken as part of the capstone requirement of this intensive major.

Ecology and biodiversity research requires extensive scientific knowledge as well as passion, and students are encouraged to take more than the requisite 12-credit minimum of capstone courses. Through these courses, and the range of formal field-based options as well as various extra-curricular activities offered, students will be expected to develop expertise in one or a few groups of plants or animals; this is an important skill since an ability to identify species and major taxa is an essential prerequisite for biodiversity scientists or conservation biologists.

This intensive major has been accredited by the Royal Society of Biology (RSB), UK, for the purpose of meeting in part the academic and experience requirement for the Membership and Chartered Biologist (CBiol).

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and appreciate the major living and non-living components of the local, regional and global environment, and how they interact; evaluate their role in ecosystem functioning and identify threats to them; and know how these threats can be mitigated (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: assess, understand and appreciate the variety of life in Hong Kong's and Southeast Asia's natural habitats, become equipped to assess, study, manage and protect that diversity, and appraise the related moral and ethical issues (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: have sufficient experience of the basic techniques of modern ecological science and prepare to learn new ones for specific tasks (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
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- PLO 7: be motivated and sufficiently equipped to apply the knowledge solve local, regional and global environmental problems in a changing world. (by means of coursework, laboratory-based, tutorial classes, capstone learning and/or project-based learning in the curriculum)

## Impermissible Combinations:

Major in Biological Sciences

Major in Biological Sciences (Intensive)

Major in Ecology & Biodiversity

Minor in Ecology & Biodiversity

#### Required courses (144 credits)

# 1. Introductory level courses (60 credits) Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111	Scientific method and reasoning (6)	(Note 1)
SCNC1112	Fundamentals of modern science (6)	(Note 1)
Disciplinary Core Courses (42 credits)		

BIOL1110 From molecules to cells (6) (Note 1)
BIOL1309 Evolutionary diversity (6) (Note 1)
BIOL2102 Biostatistics (6) (Note 1)
BIOL2103 Biological sciences laboratory course (6) (Note 1)

BIOL2306 Ecology and evolution (6) (Note 1) EASC1401 Blue Planet (6) Environmental data analysis (6) (Note 1) ENVS2002 **Disciplinary Electives (6 credits)** Plus at least 6 credits selected from the following courses: CHEM1041 Foundations of chemistry (6) Take either CHEM1041 or CHEM1042 to fulfill this 6 credits requirement, but not both. CHEM1042 General chemistry I (6) Take either CHEM1041 or CHEM1042 to fulfill this 6 credits requirement, but not both. 2. Advanced level courses (66 to 72 credits) (Note 2) **Disciplinary Core Courses (30 credits)** Animal behaviour (6) BIOL3101 BIOL3301 Marine biology (6) (Note 1) BIOL3302 Systematics and phylogenetics (6) (Note 1) Conservation biology (6) BIOL3303 BIOL3319 Tropical terrestrial ecology (6) (Note 1) Disciplinary Electives (36 to 42 credits) (Note 2) Plus at least 36 or 42 credits selected from the following courses: Tropical and temperate marine ecology field course (6) **BIOL3305 BIOL3313** Freshwater ecology (6) **BIOL3314** Plant structure and evolution (6) Experimental intertidal ecology (6) **BIOL3318 BIOL3322** Marine invertebrate zoology (6) **BIOL3328** Nearshore marine and estuarine ecology (6) BIOL3408 Genetics (6) Insect ecology: the little things that run the world (6) BIOL3419 BIOL3506 Evolutionary biology (6) BIOL4301 Fish and fisheries (6) BIOL4302 Environmental impact assessment (6) Ecosystem functioning and services (6) BIOL4304 BIOL4505 Oyster aquaculture: business and technology (6) [ previous title: Oyster aquaculture (6) ] Urban ecology (6) ENVS3019 ENVS3020 Global change ecology (6) 3. Capstone requirement (12 to 18 credits) (Note 2) Disciplinary Core Courses (12 credits) **BIOI 4991** Ecology & biodiversity project (12) Disciplinary Electives (6 credits) BIOL3991 Directed studies in ecology & biodiversity (6) Conservation science in practice (6) BIOL4911

#### Notes:

- 1. These are core courses in the regular Ecology & Biodiversity Major (96 credits) curriculum.
- 2. Within the E&B accredited curriculum, students have to pass a total of 60 credits within the Introductory Level Courses spread across two Science Foundation Courses (Level 1; 12 credits), seven Disciplinary Core Courses (Levels 1 & 2; 42 credits) and one chemistry (Level 1; 6 credits). For the chemistry course, students will have the choice between CHEM1041 and CHEM1042 in function of their prior chemistry background acquired during their upper secondary education. Students with no chemistry background should follow CHEM1041, while students with previous chemistry background should take CHEM1042.

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- 4. As this curriculum is accredited by the Royal Society of Biology (RSB), students must follow the curriculum in full (i.e. no replacement courses are possible) in order to graduate with this accredited programme.

#### Remarks:

Major Title Major in Ecology & Biodiversity (Intensive)

2019

Offered to students

admitted to Year 1 in

#### **Objectives:**

This intensive major is directed at teaching students the 'rules of existence' for organisms in natural and human-modified environments, including major threats to biodiversity and the approaches adopted to conserve species and habitats. Special reference is made to the plants, animals and habitats of Hong Kong and Asia, the ways in which humans have altered the region's ecosystems, and the management or mitigation of those impacts. The range and scope of courses offered will provide students with a firm foundation in ecology, biodiversity and related disciplines, and equip them with the skills required for postgraduate research or employment with government and non-government organizations concerned with biodiversity conservation, nature preservation or habitat assessment and management.

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#### **Learning Outcomes:**

By the end of this programme, students should be able to:

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- PLO 2: assess, understand and appreciate the variety of life in Hong Kong's and Southeast Asia's natural habitats, become equipped to assess, study, manage and protect that diversity, and appraise the related moral and ethical issues (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: have sufficient experience of the basic techniques of modern ecological science and prepare to learn new ones for specific tasks (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: use IT tools appropriately, and access and evaluate materials from libraries, archives and the Internet (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
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- PLO 6: have the skill and knowledge to pursue postgraduate ecological research in top-level Universities around the world or to develop a career in nature conservation and environmental education, especially in Hong Kong and southern China (by means of coursework, tutorial classes, project-based and research-based learning in the curriculum)
- PLO 7: be motivated and sufficiently equipped to apply the knowledge solve local, regional and global environmental problems in a changing world. (by means of coursework, laboratory-based, tutorial classes, capstone learning and/or project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Biological Sciences

Major in Biological Sciences (Intensive)

Major in Ecology & Biodiversity

Minor in Ecology & Biodiversity

#### Required courses (144 credits)

# 1. Introductory level courses (60 credits) Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111	Scientific method and reasoning (6)	(Note 1)
SCNC1112	Fundamentals of modern science (6)	(Note 1)
Disciplinary Core Courses (42 credits)		
BIOI 1110	From molecules to cells (6)	(Note 1)

BIOL1110 From molecules to cells (6) (Note 1)
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BIOL2102 Biostatistics (6) (Note 1)
BIOL2103 Biological sciences laboratory course (6) (Note 1)

BIOL2306 Ecology and evolution (6) (Note 1) EASC1401 Blue Planet (6) Environmental data analysis (6) (Note 1) ENVS2002 **Disciplinary Electives (6 credits)** Plus at least 6 credits selected from the following courses: CHEM1041 Foundations of chemistry (6) Take either CHEM1041 or CHEM1042 to fulfill this 6 credits requirement, but not both. CHEM1042 General chemistry I (6) Take either CHEM1041 or CHEM1042 to fulfill this 6 credits requirement, but not both. 2. Advanced level courses (66 to 72 credits) (Note 2) **Disciplinary Core Courses (30 credits)** Animal behaviour (6) BIOL3101 BIOL3301 Marine biology (6) (Note 1) BIOL3302 Systematics and phylogenetics (6) (Note 1) BIOL3303 Conservation biology (6) BIOL3319 Tropical terrestrial ecology (6) (Note 1) Disciplinary Electives (36 to 42 credits) (Note 2) Plus at least 36 or 42 credits selected from the following courses: Tropical and temperate marine ecology field course (6) **BIOL3305 BIOL3313** Freshwater ecology (6) **BIOL3314** Plant structure and evolution (6) Experimental intertidal ecology (6) BIOL3318 **BIOL3322** Marine invertebrate zoology (6) BIOL3328 Nearshore marine and estuarine ecology (6) BIOL3408 Genetics (6) Insect ecology: the little things that run the world (6) BIOL3419 BIOL3506 Evolutionary biology (6) BIOL4301 Fish and fisheries (6) BIOL4302 Environmental impact assessment (6) Ecosystem functioning and services (6) BIOL4304 BIOL4505 Oyster aquaculture: business and technology (6) [ previous title: Oyster aquaculture (6) ] Urban ecology (6) ENVS3019 ENVS3020 Global change ecology (6) 3. Capstone requirement (12 to 18 credits) (Note 2) Disciplinary Core Courses (12 credits) **BIOI 4991** Ecology & biodiversity project (12) Disciplinary Electives (6 credits) BIOL3991 Directed studies in ecology & biodiversity (6) BIOL4911 Conservation science in practice (6)

#### Notes:

1. These are core courses in the regular Ecology & Biodiversity Major (96 credits) curriculum.

2. Within the E&B accredited curriculum, students have to pass a total of 60 credits within the Introductory Level Courses spread across two Science Foundation Courses (Level 1; 12 credits), seven Disciplinary Core Courses (Levels 1 & 2; 42 credits) and one chemistry (Level 1; 6 credits). For the chemistry course, students will have the choice between CHEM1041 and CHEM1042 in function of their prior chemistry background acquired during their upper secondary education. Students with no chemistry background should follow CHEM1041, while students with previous chemistry background should take CHEM1042.

Advanced Level Courses cover a total of 66 to 72 credits. Those are divided between five Disciplinary Core Courses (Level 3; 30 credits) and 6 to 7 Disciplinary Elective Courses (Level 3 & 4; 36 to 42 credits) among a choice of fourteen different courses. As eight of the Disciplinary Elective courses are being taught every other year, students must pay attention to the year during which these courses are taught and ensure that they have fulfilled the necessary requirements. There is a student mentorship programme in place that can assist them in this.

During their final year, students should complete a minimum of 12 credits as Capstone Courses (maximum of 18). The Ecology & Biodiversity Project (12 credits) is mandatory and students can choose to complete one of the other two Elective Capstone Courses (6 credits). If students choose to complete 18 credits of Capstone Courses, then they are required to complete only 36 credits of Disciplinary Elective Courses within the Advanced Level Courses (instead of 42 credits)

Finally, students who participate in student exchange programme are expected to enquire, prior to their departure from HKU, about potential equivalences with the courses taken during exchange programmes to ensure that they match requirements for obtaining the RSB accredited programme.

#### Remarks:

Major Title Major in Ecology & Biodiversity (Intensive)

2018

Offered to students

admitted to Year 1 in

#### **Objectives:**

This intensive major is directed at teaching students the 'rules of existence' for organisms in natural and human-modified environments, including major threats to biodiversity and the approaches adopted to conserve species and habitats. Special reference is made to the plants, animals and habitats of Hong Kong and Asia, the ways in which humans have altered the region's ecosystems, and the management or mitigation of those impacts. The range and scope of courses offered will provide students with a firm foundation in ecology, biodiversity and related disciplines, and equip them with the skills required for postgraduate research or employment with government and non-government organizations concerned with biodiversity conservation, nature preservation or habitat assessment and management.

The intensive major is based around an introductory core that emphasizes biology, ecology and evolution of plants and animals; it includes a compulsory residential field trip (as part of the Ecology and Evolution course), as well as instruction in data analysis and biostatistics. Many of the advanced courses in the major have a strong emphasis on field-work and on small projects performed by students. They teach students about the ecology and biodiversity of different ecosystems (e.g. marine, terrestrial, freshwater and urban) and taxa (e.g. flowering plants, insects, fishes, marine mammals). Other courses focus on more applied topics, such as environmental impact assessment, conservation, and provide an opportunity for students to become familiar with specialised topics ranging from systematics to animal behaviour.

During their final year, students have an opportunity to conduct independent research in the form of an ecology and biodiversity research project or a directed-studies dissertation under the close supervision of an individual staff member. Students are able to make use of the facilities of the Swire Institute of Marine Science for such work. Strong emphasis is also placed upon experiential learning during overseas field trips that can be taken as part of the capstone requirement of this intensive major.

Ecology and biodiversity research requires extensive scientific knowledge as well as passion, and students are encouraged to take more than the requisite 12-credit minimum of capstone courses. Through these courses, and the range of formal field-based options as well as various extra-curricular activities offered, students will be expected to develop expertise in one or a few groups of plants or animals; this is an important skill since an ability to identify species and major taxa is an essential prerequisite for biodiversity scientists or conservation biologists.

This intensive major has been accredited by the Royal Society of Biology (RSB), UK, for the purpose of meeting in part the academic and experience requirement for the Membership and Chartered Biologist (CBiol).

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and appreciate the major living and non-living components of the local, regional and global environment, and how they interact; evaluate their role in ecosystem functioning and identify threats to them; and know how these threats can be mitigated (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: assess, understand and appreciate the variety of life in Hong Kong's and Southeast Asia's natural habitats, become equipped to assess, study, manage and protect that diversity, and appraise the related moral and ethical issues (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: have sufficient experience of the basic techniques of modern ecological science and prepare to learn new ones for specific tasks (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: use IT tools appropriately, and access and evaluate materials from libraries, archives and the Internet (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: demonstrate original, independent and critical thinking, with mastery of a range of communication skills (by means of coursework, project-based and presentation opportunities in the curriculum)
- PLO 6: have the skill and knowledge to pursue postgraduate ecological research in top-level Universities around the world or to develop a career in nature conservation and environmental education, especially in Hong Kong and southern China (by means of coursework, tutorial classes, project-based and research-based learning in the curriculum)
- PLO 7: be motivated and sufficiently equipped to apply the knowledge solve local, regional and global environmental problems in a changing world. (by means of coursework, laboratory-based, tutorial classes, capstone learning and/or project-based learning in the curriculum)

## Impermissible Combinations:

Major in Biological Sciences

Major in Biological Sciences (Intensive)

Major in Ecology & Biodiversity

Minor in Ecology & Biodiversity

#### Required courses (144 credits)

# 1. Introductory level courses (60 credits) Disciplinary Core Courses: Science Foundation Courses (12 credits)

Disciplinary Core Courses (42 credits)		
SCNC1112	Fundamentals of modern science (6)	(Note 1)
SCNC1111	Scientific method and reasoning (6)	(Note 1)

BIOL1110 From molecules to cells (6) (Note 1)
BIOL1309 Evolutionary diversity (6) (Note 1)
BIOL2102 Biostatistics (6) (Note 1)
BIOL2103 Biological sciences laboratory course (6) (Note 1)

BIOL2306 Ecology and evolution (6) (Note 1) EASC1401 Blue Planet (6) Environmental data analysis (6) (Note 1) ENVS2002 **Disciplinary Electives (6 credits)** Plus at least 6 credits selected from the following courses: CHEM1041 Foundations of chemistry (6) Take either CHEM1041 or CHEM1042 to fulfill this 6 credits requirement, but not both. CHEM1042 General chemistry I (6) Take either CHEM1041 or CHEM1042 to fulfill this 6 credits requirement, but not both. 2. Advanced level courses (66 to 72 credits) (Note 2) **Disciplinary Core Courses (30 credits)** Animal behaviour (6) BIOL3101 BIOL3301 Marine biology (6) (Note 1) BIOL3302 Systematics and phylogenetics (6) (Note 1) BIOL3303 Conservation biology (6) BIOL3319 Tropical terrestrial ecology (6) (Note 1) Disciplinary Electives (36 to 42 credits) (Note 2) Plus at least 36 or 42 credits selected from the following courses: Tropical and temperate marine ecology field course (6) **BIOL3305 BIOL3313** Freshwater ecology (6) **BIOL3314** Plant structure and evolution (6) Experimental intertidal ecology (6) **BIOL3318 BIOL3322** Marine invertebrate zoology (6) BIOL3328 Nearshore marine and estuarine ecology (6) BIOL3408 Genetics (6) Insect ecology: the little things that run the world (6) BIOL3419 BIOL3506 Evolutionary biology (6) BIOL4301 Fish and fisheries (6) BIOL4302 Environmental impact assessment (6) Ecosystem functioning and services (6) BIOL4304 BIOL4505 Oyster aquaculture: business and technology (6) [ previous title: Oyster aquaculture (6) ] Urban ecology (6) ENVS3019 ENVS3020 Global change ecology (6) 3. Capstone requirement (12 to 18 credits) (Note 2) Disciplinary Core Courses (12 credits) **BIOI 4991** Ecology & biodiversity project (12) Disciplinary Electives (6 credits) BIOL3991 Directed studies in ecology & biodiversity (6) BIOL4911 Conservation science in practice (6)

#### Notes:

1. These are core courses in the regular Ecology & Biodiversity Major (96 credits) curriculum.

2. Within the E&B accredited curriculum, students have to pass a total of 60 credits within the Introductory Level Courses spread across two Science Foundation Courses (Level 1; 12 credits), seven Disciplinary Core Courses (Levels 1 & 2; 42 credits) and one chemistry (Level 1; 6 credits). For the chemistry course, students will have the choice between CHEM1041 and CHEM1042 in function of their prior chemistry background acquired during their upper secondary education. Students with no chemistry background should follow CHEM1041, while students with previous chemistry background should take CHEM1042.

Advanced Level Courses cover a total of 66 to 72 credits. Those are divided between five Disciplinary Core Courses (Level 3; 30 credits) and 6 to 7 Disciplinary Elective Courses (Level 3 & 4; 36 to 42 credits) among a choice of fourteen different courses. As eight of the Disciplinary Elective courses are being taught every other year, students must pay attention to the year during which these courses are taught and ensure that they have fulfilled the necessary requirements. There is a student mentorship programme in place that can assist them in this.

During their final year, students should complete a minimum of 12 credits as Capstone Courses (maximum of 18). The Ecology & Biodiversity Project (12 credits) is mandatory and students can choose to complete one of the other two Elective Capstone Courses (6 credits). If students choose to complete 18 credits of Capstone Courses, then they are required to complete only 36 credits of Disciplinary Elective Courses within the Advanced Level Courses (instead of 42 credits)

Finally, students who participate in student exchange programme are expected to enquire, prior to their departure from HKU, about potential equivalences with the courses taken during exchange programmes to ensure that they match requirements for obtaining the RSB accredited programme.

#### Remarks:

Major Title Major in Ecology & Biodiversity (Intensive)

2017

Offered to students

admitted to Year 1 in

#### **Objectives:**

This intensive major is directed at teaching students the 'rules of existence' for organisms in natural and human-modified environments, including major threats to biodiversity and the approaches adopted to conserve species and habitats. Special reference is made to the plants, animals and habitats of Hong Kong and Asia, the ways in which humans have altered the region's ecosystems, and the management or mitigation of those impacts. The range and scope of courses offered will provide students with a firm foundation in ecology, biodiversity and related disciplines, and equip them with the skills required for postgraduate research or employment with government and non-government organizations concerned with biodiversity conservation, nature preservation or habitat assessment and management.

The intensive major is based around an introductory core that emphasizes biology, ecology and evolution of plants and animals; it includes a compulsory residential field trip (as part of the Ecology and Evolution course), as well as instruction in data analysis and biostatistics. Many of the advanced courses in the major have a strong emphasis on field-work and on small projects performed by students. They teach students about the ecology and biodiversity of different ecosystems (e.g. marine, terrestrial, freshwater and urban) and taxa (e.g. flowering plants, insects, fishes, marine mammals). Other courses focus on more applied topics, such as environmental impact assessment, conservation, and provide an opportunity for students to become familiar with specialised topics ranging from systematics to animal behaviour.

During their final year, students have an opportunity to conduct independent research in the form of an ecology and biodiversity research project or a directed-studies dissertation under the close supervision of an individual staff member. Students are able to make use of the facilities of the Swire Institute of Marine Science for such work. Strong emphasis is also placed upon experiential learning during overseas field trips that can be taken as part of the capstone requirement of this intensive major.

Ecology and biodiversity research requires extensive scientific knowledge as well as passion, and students are encouraged to take more than the requisite 12-credit minimum of capstone courses. Through these courses, and the range of formal field-based options as well as various extra-curricular activities offered, students will be expected to develop expertise in one or a few groups of plants or animals; this is an important skill since an ability to identify species and major taxa is an essential prerequisite for biodiversity scientists or conservation biologists.

This intensive major has been accredited by the Royal Society of Biology (RSB), UK, for the purpose of meeting in part the academic and experience requirement for the Membership and Chartered Biologist (CBiol).

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and appreciate the major living and non-living components of the local, regional and global environment, and how they interact; evaluate their role in ecosystem functioning and identify threats to them; and know how these threats can be mitigated (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: assess, understand and appreciate the variety of life in Hong Kong's and Southeast Asia's natural habitats, become equipped to assess, study, manage and protect that diversity, and appraise the related moral and ethical issues (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: have sufficient experience of the basic techniques of modern ecological science and prepare to learn new ones for specific tasks (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: use IT tools appropriately, and access and evaluate materials from libraries, archives and the Internet (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: demonstrate original, independent and critical thinking, with mastery of a range of communication skills (by means of coursework, project-based and presentation opportunities in the curriculum)
- PLO 6: have the skill and knowledge to pursue postgraduate ecological research in top-level Universities around the world or to develop a career in nature conservation and environmental education, especially in Hong Kong and southern China (by means of coursework, tutorial classes, project-based and research-based learning in the curriculum)
- PLO 7: be motivated and sufficiently equipped to apply the knowledge solve local, regional and global environmental problems in a changing world. (by means of coursework, laboratory-based, tutorial classes, capstone learning and/or project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Biological Sciences

Major in Biological Sciences (Intensive)

Major in Ecology & Biodiversity

Minor in Ecology & Biodiversity

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## Required courses (144 credits)

## 1. Introductory level courses (60 credits) Disciplinary Core Courses: Science Foundation Courses (12 credits)

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SCNC1111	Scientific method and reasoning (6)	(Note 1)
SCNC1112	Fundamentals of modern science (6)	(Note 1)
isciplinary Core	Courses (42 credits)	
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BIOL 1110 From molecules to cells (6) (Note 1)
BIOL 1309 Evolutionary diversity (6) (Note 1)
BIOL 2102 Biostatistics (6) (Note 1)
BIOL 2103 Biological sciences laboratory course (6) (Note 1)

BIOL2306 Ecology and evolution (6) (Note 1) EASC1401 Blue Planet (6) Environmental data analysis (6) (Note 1) ENVS2002 **Disciplinary Electives (6 credits)** Plus at least 6 credits selected from the following courses: CHEM1041 Foundations of chemistry (6) Take either CHEM1041 or CHEM1042 to fulfill this 6 credits requirement, but not both. CHEM1042 General chemistry I (6) Take either CHEM1041 or CHEM1042 to fulfill this 6 credits requirement, but not both. 2. Advanced level courses (66 to 72 credits) (Note 2) **Disciplinary Core Courses (30 credits)** Animal behaviour (6) BIOL3101 BIOL3301 Marine biology (6) (Note 1) BIOL3302 Systematics and phylogenetics (6) (Note 1) BIOL3303 Conservation biology (6) BIOL3319 Tropical terrestrial ecology (6) (Note 1) Disciplinary Electives (36 to 42 credits) (Note 2) Plus at least 36 or 42 credits selected from the following courses: Tropical and temperate marine ecology field course (6) **BIOL3305 BIOL3313** Freshwater ecology (6) **BIOL3314** Plant structure and evolution (6) Experimental intertidal ecology (6) **BIOL3318 BIOL3322** Marine invertebrate zoology (6) BIOL3328 Nearshore marine and estuarine ecology (6) BIOL3408 Genetics (6) Insect ecology: the little things that run the world (6) BIOL3419 BIOL3506 Evolutionary biology (6) BIOL4301 Fish and fisheries (6) BIOL4302 Environmental impact assessment (6) Ecosystem functioning and services (6) BIOL4304 BIOL4505 Oyster aquaculture: business and technology (6) [ previous title: Oyster aquaculture (6) ] Urban ecology (6) ENVS3019 ENVS3020 Global change ecology (6) 3. Capstone requirement (12 to 18 credits) (Note 2) Disciplinary Core Courses (12 credits) **BIOI 4991** Ecology & biodiversity project (12) Disciplinary Electives (6 credits) BIOL3991 Directed studies in ecology & biodiversity (6) Conservation science in practice (6) BIOL4911

#### Notes:

1. These are core courses in the regular Ecology & Biodiversity Major (96 credits) curriculum.

2. Within the E&B accredited curriculum, students have to pass a total of 60 credits within the Introductory Level Courses spread across two Science Foundation Courses (Level 1; 12 credits), seven Disciplinary Core Courses (Levels 1 & 2; 42 credits) and one chemistry (Level 1; 6 credits). For the chemistry course, students will have the choice between CHEM1041 and CHEM1042 in function of their prior chemistry background acquired during their upper secondary education. Students with no chemistry background should follow CHEM1041, while students with previous chemistry background should take CHEM1042.

Advanced Level Courses cover a total of 66 to 72 credits. Those are divided between five Disciplinary Core Courses (Level 3; 30 credits) and 6 to 7 Disciplinary Elective Courses (Level 3 & 4; 36 to 42 credits) among a choice of fourteen different courses. As eight of the Disciplinary Elective courses are being taught every other year, students must pay attention to the year during which these courses are taught and ensure that they have fulfilled the necessary requirements. There is a student mentorship programme in place that can assist them in this.

During their final year, students should complete a minimum of 12 credits as Capstone Courses (maximum of 18). The Ecology & Biodiversity Project (12 credits) is mandatory and students can choose to complete one of the other two Elective Capstone Courses (6 credits). If students choose to complete 18 credits of Capstone Courses, then they are required to complete only 36 credits of Disciplinary Elective Courses within the Advanced Level Courses (instead of 42 credits)

Finally, students who participate in student exchange programme are expected to enquire, prior to their departure from HKU, about potential equivalences with the courses taken during exchange programmes to ensure that they match requirements for obtaining the RSB accredited programme.

#### Remarks:

Major Title Major in Ecology & Biodiversity (Intensive)

Offered to students

2016 admitted to Year 1 in

#### **Objectives:**

This intensive major is directed at teaching students the 'rules of existence' for organisms in natural and human-modified environments, including major threats to biodiversity and the approaches adopted to conserve species and habitats. Special reference is made to the plants, animals and habitats of Hong Kong and Asia, the ways in which humans have altered the region's ecosystems, and the management or mitigation of those impacts. The range and scope of courses offered will provide students with a firm foundation in ecology, biodiversity and related disciplines, and equip them with the skills required for postgraduate research or employment with government and non-government organizations concerned with biodiversity conservation, nature preservation or habitat assessment and management.

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During their final year, students have an opportunity to conduct independent research in the form of an ecology and biodiversity research project or a directed-studies dissertation under the close supervision of an individual staff member. Students are able to make use of the facilities of the Swire Institute of Marine Science for such work. Strong emphasis is also placed upon experiential learning during overseas field trips that can be taken as part of the capstone requirement of this intensive major.

Ecology and biodiversity research requires extensive scientific knowledge as well as passion, and students are encouraged to take more than the requisite 12-credit minimum of capstone courses. Through these courses, and the range of formal fieldbased options as well as various extra-curricular activities offered, students will be expected to develop expertise in one or a few groups of plants or animals; this is an important skill since an ability to identify species and major taxa is an essential prerequisite for biodiversity scientists or conservation biologists.

This intensive major has been accredited by the Royal Society of Biology (RSB), UK, for the purpose of meeting in part the academic and experience requirement for the Membership and Chartered Biologist (CBiol).

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and appreciate the major living and non-living components of the local, regional and global environment, and how they interact; evaluate their role in ecosystem functioning and identify threats to them; and know how these threats can be mitigated (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: assess, understand and appreciate the variety of life in Hong Kong's and Southeast Asia's natural habitats, become equipped to assess, study, manage and protect that diversity, and appraise the related moral and ethical issues (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: have sufficient experience of the basic techniques of modern ecological science and prepare to learn new ones for specific tasks (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the
- PLO 4: use IT tools appropriately, and access and evaluate materials from libraries, archives and the Internet (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: demonstrate original, independent and critical thinking, with mastery of a range of communication skills (by means of coursework, project-based and presentation opportunities in the curriculum)
- PLO 6: have the skill and knowledge to pursue postgraduate ecological research in top-level Universities around the world or to develop a career in nature conservation and environmental education, especially in Hong Kong and southern China (by means of coursework, tutorial classes, project-based and research-based learning in the curriculum)
- PLO 7: be motivated and sufficiently equipped to apply the knowledge solve local, regional and global environmental problems in a changing world. (by means of coursework, laboratory-based, tutorial classes, capstone learning and/or project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Biological Sciences

Major in Ecology & Biodiversity

Minor in Ecology & Biodiversity

#### Required courses (144 credits) 1. Introductory level courses (60 credits) Disciplinary Core Courses: Science Foundation Courses (12 credits) SCNC1111 Scientific method and reasoning (6) (Note 1) Fundamentals of modern science (6) **SCNC1112** (Note 1) **Disciplinary Core Courses (42 credits)** From molecules to cells (6) (Note 1) BIOL1110 Evolutionary diversity (6) BIOL1309 (Note 1) BIOL2102 Biostatistics (6) (Note 1) (Note 1) BIOL2103 Biological sciences laboratory course (6) Ecology and evolution (6) (Note 1) **BIOL2306**

EASC1401 Blue Planet (6)

ENVS2002 Environmental data analysis (6) (Note 1)

**Disciplinary Electives (6 credits)** 

Plus at least 6 credits selected from the following courses:

CHEM1041 Foundations of chemistry (6) Take either CHEM1041 or CHEM1042 to fulfill this 6 credits requirement, but not both.

CHEM1042 General chemistry I (6) Take either CHEM1041 or CHEM1042 to fulfill this 6 credits requirement, but not both.

2. Advanced level courses (66 to 72 credits) (Note 2)

Disciplinary Core Courses (30 credits)

BIOL3101 Animal behaviour (6)

BIOL3301 Marine biology (6) (Note 1)

BIOL3302 Systematics and phylogenetics (6) (Note 1)

BIOL3303 Conservation biology (6)

BIOL3319 Tropical terrestrial ecology (6) (Note 1)

Disciplinary Electives (36 to 42 credits) (Note 2)

Plus at least 36 or 42 credits selected from the following courses:

BIOL3305 Tropical and temperate marine ecology field course (6) BIOL3313 Freshwater ecology (6)

BIOL3314 Plant structure and evolution (6)
BIOL3318 Experimental intertidal ecology (6)
BIOL3322 Marine invertebrate zoology (6)

BIOL3328 Nearshore marine and estuarine ecology (6)

BIOL3408 Genetics (6)

BIOL3419 Insect ecology: the little things that run the world (6)

BIOL3506 Evolutionary biology (6) BIOL4301 Fish and fisheries (6)

BIOL4302 Environmental impact assessment (6)
BIOL4304 Ecosystem functioning and services (6)

BIOL4505 Oyster aquaculture: business and technology (6) [previous title: Oyster aquaculture (6)]

ENVS3019 Urban ecology (6) ENVS3020 Global change ecology (6) 3. Capstone requirement (12 to 18 credits) (Note 2)

Disciplinary Core Courses (12 credits)

BIOL4991 Ecology & biodiversity project (12)

Disciplinary Electives (6 credits)

BIOL3991 Directed studies in ecology & biodiversity (6)

BIOL4911 Conservation science in practice (6)

#### Notes:

1. These are core courses in the regular Ecology & Biodiversity Major (96 credits) curriculum.

2. Within the E&B accredited curriculum, students have to pass a total of 60 credits within the Introductory Level Courses spread across two Science Foundation Courses (Level 1; 12 credits), seven Disciplinary Core Courses (Levels 1 & 2; 42 credits) and one chemistry (Level 1; 6 credits). For the chemistry course, students will have the choice between CHEM1041 and CHEM1042 in function of their prior chemistry background acquired during their upper secondary education. Students with no chemistry background should follow CHEM1041, while students with previous chemistry background should take CHEM1042.

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Finally, students who participate in student exchange programme are expected to enquire, prior to their departure from HKU, about potential equivalences with the courses taken during exchange programmes to ensure that they match requirements for obtaining the RSB accredited programme.

#### Remarks:

Major Title Major in Ecology & Biodiversity (Intensive)

2015

Offered to students

admitted to Year 1 in

#### **Objectives:**

This intensive major is directed at teaching students the 'rules of existence' for organisms in natural and human-modified environments, including major threats to biodiversity and the approaches adopted to conserve species and habitats. Special reference is made to the plants, animals and habitats of Hong Kong and Asia, the ways in which humans have altered the region's ecosystems, and the management or mitigation of those impacts. The range and scope of courses offered will provide students with a firm foundation in ecology, biodiversity and related disciplines, and equip them with the skills required for postgraduate research or employment with government and non-government organizations concerned with biodiversity conservation, nature preservation or habitat assessment and management.

The intensive major is based around an introductory core that emphasizes biology, ecology and evolution of plants and animals; it includes a compulsory residential field trip (as part of the Ecology and Evolution course), as well as instruction in data analysis and biostatistics. Many of the advanced courses in the major have a strong emphasis on field-work and on small projects performed by students. They teach students about the ecology and biodiversity of different ecosystems (e.g. marine, terrestrial, freshwater and urban) and taxa (e.g. flowering plants, insects, fishes, marine mammals). Other courses focus on more applied topics, such as environmental impact assessment, conservation, and provide an opportunity for students to become familiar with specialised topics ranging from systematics to animal behaviour.

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Ecology and biodiversity research requires extensive scientific knowledge as well as passion, and students are encouraged to take more than the requisite 12-credit minimum of capstone courses. Through these courses, and the range of formal field-based options as well as various extra-curricular activities offered, students will be expected to develop expertise in one or a few groups of plants or animals; this is an important skill since an ability to identify species and major taxa is an essential prerequisite for biodiversity scientists or conservation biologists.

This intensive major has been accredited by the Royal Society of Biology (RSB), UK, for the purpose of meeting in part the academic and experience requirement for the Membership and Chartered Biologist (CBiol).

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and appreciate the major living and non-living components of the local, regional and global environment, and how they interact; evaluate their role in ecosystem functioning and identify threats to them; and know how these threats can be mitigated (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: assess, understand and appreciate the variety of life in Hong Kong's and Southeast Asia's natural habitats, become equipped to assess, study, manage and protect that diversity, and appraise the related moral and ethical issues (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: have sufficient experience of the basic techniques of modern ecological science and prepare to learn new ones for specific tasks (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: use IT tools appropriately, and access and evaluate materials from libraries, archives and the Internet (by means of coursework, laboratory-based, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: demonstrate original, independent and critical thinking, with mastery of a range of communication skills (by means of coursework, project-based and presentation opportunities in the curriculum)
- PLO 6: have the skill and knowledge to pursue postgraduate ecological research in top-level Universities around the world or to develop a career in nature conservation and environmental education, especially in Hong Kong and southern China (by means of coursework, tutorial classes, project-based and research-based learning in the curriculum)
- PLO 7: be motivated and sufficiently equipped to apply the knowledge solve local, regional and global environmental problems in a changing world. (by means of coursework, laboratory-based, tutorial classes, capstone learning and/or project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Biological Sciences

Major in Ecology & Biodiversity

Minor in Ecology & Biodiversity

# Required courses (144 credits) 1. Introductory level courses (60 credits) Disciplinary Core Courses: Science Foundation Courses (12 credits) SCNC1111 Scientific method and reasoning (6) (Note 1) SCNC1112 Fundamentals of modern science (6) (Note 1)

Disciplinary Core	Courses (42 credits)	
BİOL1110	From molecules to cells (6)	(Note 1)
BIOL1309	Evolutionary diversity (6)	(Note 1)
BIOL2102	Biostatistics (6)	(Note 1)
BIOL2103	Biological sciences laboratory course (6)	(Note 1)
BIOL2306	Ecology and evolution (6)	(Note 1)

EASC1401 Blue Planet (6)

ENVS2002 Environmental data analysis (6) (Note 1)

**Disciplinary Electives (6 credits)** 

BIOL3319

Plus at least 6 credits selected from the following courses:

CHEM1041 Foundations of chemistry (6) Take either CHEM1041 or CHEM1042 to fulfill this 6 credits requirement, but not both.

CHEM1042 General chemistry I (6) Take either CHEM1041 or CHEM1042 to fulfill this 6 credits requirement, but not both.

#### 2. Advanced level courses (66 to 72 credits) (Note 2)

#### Disciplinary Core Courses (30 credits)

BIOL3101 Animal behaviour (6)
BIOL3301 Marine biology (6)
BIOL3302 Systematics and phylogenetics (6) (Note 1)
BIOL3303 Conservation biology (6) (Note 1)

#### Disciplinary Electives (36 to 42 credits) (Note 2)

Plus at least 36 or 42 credits selected from the following courses:

BIOL3305 Tropical and temperate marine ecology field course (6)
BIOL3313 Freshwater ecology (6)

Tropical terrestrial ecology (6)

BIOL3314 Plant structure and evolution (6)
BIOL3318 Experimental intertidal ecology (6)
BIOL3322 Marine invertebrate zoology (6)

BIOL3328 Nearshore marine and estuarine ecology (6)
BIOL3419 Insect ecology: the little things that run the world (6)

BIOL3506 Evolutionary biology (6) BIOL4301 Fish and fisheries (6)

BIOL4302 Environmental impact assessment (6)
BIOL4304 Ecosystem functioning and services (6)

BIOL4505 Oyster aquaculture: business and technology (6) [previous title: Oyster aquaculture (6)]

ENVS3019 Urban ecology (6)
ENVS3020 Global change ecology (6)
Capatana requirement (12 to 18 gradita) (Note 1

## 3. Capstone requirement (12 to 18 credits) (Note 2)

Disciplinary Core Courses (12 credits)

BIOL4991 Ecology & biodiversity project (12)

Disciplinary Electives (6 credits)

BIOL3991 Directed studies in ecology & biodiversity (6)
BIOL4911 Conservation science in practice (6)

#### Notes:

1. These are core courses in the regular Ecology & Biodiversity Major (96 credits) curriculum.

2. Within the E&B accredited curriculum, students have to pass a total of 60 credits within the Introductory Level Courses spread across two Science Foundation Courses (Level 1; 12 credits), seven Disciplinary Core Courses (Levels 1 & 2; 42 credits) and one chemistry (Level 1; 6 credits). For the chemistry course, students will have the choice between CHEM1041 and CHEM1042 in function of their prior chemistry background acquired during their upper secondary education. Students with no chemistry background should follow CHEM1041, while students with previous chemistry background should take CHEM1042.

Advanced Level Courses cover a total of 66 to 72 credits. Those are divided between five Disciplinary Core Courses (Level 3; 30 credits) and 6 to 7 Disciplinary Elective Courses (Level 3 & 4; 36 to 42 credits) among a choice of fourteen different courses. As eight of the Disciplinary Elective courses are being taught every other year, students must pay attention to the year during which these courses are taught and ensure that they have fulfilled the necessary requirements. There is a student mentorship programme in place that can assist them in this.

During their final year, students should complete a minimum of 12 credits as Capstone Courses (maximum of 18). The Ecology & Biodiversity Project (12 credits) is mandatory and students can choose to complete one of the other two Elective Capstone Courses (6 credits). If students choose to complete 18 credits of Capstone Courses, then they are required to complete only 36 credits of Disciplinary Elective Courses within the Advanced Level Courses (instead of 42 credits)

Finally, students who participate in student exchange programme are expected to enquire, prior to their departure from HKU, about potential equivalences with the courses taken during exchange programmes to ensure that they match requirements for obtaining the RSB accredited programme.

#### Remarks:

Offered to students 2021

admitted to Year 1 in

#### **Objectives:**

The Major in Environmental Science aims to provide students with a strong scientific and technological background for understanding and addressing the environmental issues faced by humankind. This includes a flexible teaching and learning programme so that students can explore environmental issues from a range of aspects. Core courses in the curriculum emphasize fundamental knowledge in life and environment, physical and sustainable environment, pollution, monitoring and management. Throughout the curriculum, students are encouraged to undertake their own independent study from primary and secondary sources to incorporate critical thinking, field and laboratory work, documentary and archive scholarship, as integrated elements of relevant courses. By completing the curriculum, students are expected to have enhanced their knowledge in environmental science and have improved their problem-solving ability, communication and social skills. Students will be prepared to work in industries and government agencies, where they will help manage wisely the resources for which they are responsible.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe different components of the environmental systems and key issues in environmental science (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 2: observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 3: appropriately use and critically analyze a range of forms and sources of environmental data, and assess environmental problems (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 4: gain an advanced level of skills in scientific inquiry and effective communication of global environmental problems, issues of resource management, policies and management methods and appreciation of the related ethical issues (by means of field/ laboratory/ team-based learning, research projects, presentation opportunities and capstone experiences in the curriculum)

#### Impermissible Combinations:

Minor in Environmental Science

#### Required courses (96 credits)

#### 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (24 credits)** 

CHEM1042 General chemistry I (6)

ENVS1401 Introduction to environmental science (6)
ENVS2001 Methods in environmental science (6)
ENVS2002 Environmental data analysis (6)

**Disciplinary Electives (12 credits)** 

At least 12 credits selected from the following courses (Level 1 & 2):

EASC1020 Introduction to climate science (6)

EASC1401 Blue Planet (6)

ENVS1301 Environmental life science (6)

BIOL2102 Biostatistics (6)

BIOL2306 Ecology and evolution (6)

CHEM2241 Analytical chemistry I (6)

# 2. Advanced level courses (42 credits) Disciplinary Core Courses (6 credits)

ENVS3004 Environment, society and economics (6)

#### **Disciplinary Electives (36 credits)**

At least 36 credits selected from the following courses:

BIOL3109 Environmental microbiology (6)
BIOL3110 Environmental toxicology (6)
BIOL3216 Food waste management (6)
BIOL3217 Food, environment and health (6)
BIOL3303 Conservation biology (6)
CHEM3141 Environmental chemistry (6)

CHEM3241 Analytical chemistry II: chemical instrumentation (6) EASC3020 Global change: anthropogenic impacts (6)

EASC3405 Environmental remote sensing (6)
EASC3419 Earth System Science Field Studies (6)
ENVS3007 Natural hazards and mitigation (6)
ENVS3010 Sustainable energy and environment (6)

ENVS3019 Urban ecology (6)
ENVS3020 Global change ecology (6)

ENVS3022 Environmental science field course (6)

ENVS3028 Coastal Sustainability (6)

May take either ENVS1301 or BIOL2306 to fulfill this 12 credits requirement, but not both.

May take either ENVS1301 or BIOL2306 to fulfill this 12 credits requirement, but not both.

ENVS3042 Pollution (6)

ENVS3202 Plant physiology and climate change (6)

ENVS3313 Environmental oceanography (6)

ENVS3401 Understanding tropical ecosystems in a changing world (6)
ENVS3402 Qualitative data, social science methods and decision-making

in environmental science (6)
BIOL4302 Environmental impact assessment (6)
ENVS4110 Environmental remediation (6)

#### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

ENVS3999 Directed studies in environmental science (6)

ENVS4966 Environmental science internship (6) ENVS4999 Environmental science project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis
- 5. Candidates who have been admitted to Year 1 in 2021-22 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1112. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Biology, Chemistry, and Physics in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Biology, Chemistry, and Physics Higher Level in International Baccalaureate (IB)
- Grade B or above in Biology, Chemistry, and Physics in General Certificate of Education Advanced Level (GCEAL)
- Biology, Chemistry, and Physics qualification in Gao Kao will be considered on a case-by-case basis

#### Remarks:

Offered to students 2020

admitted to Year 1 in

#### **Objectives:**

The Major in Environmental Science aims to provide students with a strong scientific and technological background for understanding and addressing the environmental issues faced by humankind. This includes a flexible teaching and learning programme so that students can explore environmental issues from a range of aspects. Core courses in the curriculum emphasize fundamental knowledge in life and environment, physical and sustainable environment, pollution, monitoring and management. Throughout the curriculum, students are encouraged to undertake their own independent study from primary and secondary sources to incorporate critical thinking, field and laboratory work, documentary and archive scholarship, as integrated elements of relevant courses. By completing the curriculum, students are expected to have enhanced their knowledge in environmental science and have improved their problem-solving ability, communication and social skills. Students will be prepared to work in industries and government agencies, where they will help manage wisely the resources for which they are responsible.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe different components of the environmental systems and key issues in environmental science (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 2: observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 3: appropriately use and critically analyze a range of forms and sources of environmental data, and assess environmental problems (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 4: gain an advanced level of skills in scientific inquiry and effective communication of global environmental problems, issues of resource management, policies and management methods and appreciation of the related ethical issues (by means of field/ laboratory/ team-based learning, research projects, presentation opportunities and capstone experiences in the curriculum)

#### Impermissible Combinations:

Minor in Environmental Science

#### Required courses (96 credits)

#### 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (24 credits)** 

CHEM1042 General chemistry I (6)

ENVS1401 Introduction to environmental science (6)
ENVS2001 Methods in environmental science (6)
ENVS2002 Environmental data analysis (6)

**Disciplinary Electives (12 credits)** 

At least 12 credits selected from the following courses (Level 1 & 2):

EASC1020 Introduction to climate science (6)

EASC1401 Blue Planet (6)

ENVS1301 Environmental life science (6)

BIOL2102 Biostatistics (6)

BIOL2306 Ecology and evolution (6)

CHEM2241 Analytical chemistry I (6)

# 2. Advanced level courses (42 credits) Disciplinary Core Courses (6 credits)

ENVS3004 Environment, society and economics (6)

#### **Disciplinary Electives (36 credits)**

At least 36 credits selected from the following courses:

BIOL3109 Environmental microbiology (6)
BIOL3110 Environmental toxicology (6)
BIOL3216 Food waste management (6)
BIOL3217 Food, environment and health (6)
BIOL3303 Conservation biology (6)
CHEM3141 Environmental chemistry (6)

CHEM3241 Analytical chemistry II: chemical instrumentation (6) EASC3020 Global change: anthropogenic impacts (6)

EASC3405 Environmental remote sensing (6)
EASC3419 Earth System Science Field Studies (6)
ENVS3007 Natural hazards and mitigation (6)
ENVS3010 Sustainable energy and environment (6)

ENVS3019 Urban ecology (6)
ENVS3020 Global change ecology (6)

ENVS3022 Environmental science field course (6)

ENVS3028 Coastal Sustainability (6)

May take either ENVS1301 or BIOL2306 to fulfill this 12 credits requirement, but not both.

May take either ENVS1301 or BIOL2306 to fulfill this 12 credits requirement, but not both.

ENVS3042 Pollution (6)

ENVS3202 Plant physiology and climate change (6)

ENVS3313 Environmental oceanography (6)

ENVS3401 Understanding tropical ecosystems in a changing world (6)
ENVS3402 Qualitative data, social science methods and decision-making in environmental science (6)

BIOL4302 Environmental impact assessment (6) ENVS4110 Environmental remediation (6)

#### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

ENVS3999 Directed studies in environmental science (6)

ENVS4966 Environmental science internship (6) ENVS4999 Environmental science project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis

#### Remarks:

Offered to students 2019

admitted to Year 1 in

#### **Objectives:**

The Major in Environmental Science aims to provide students with a strong scientific and technological background for understanding and addressing the environmental issues faced by humankind. This includes a flexible teaching and learning programme so that students can explore environmental issues from a range of aspects. Core courses in the curriculum emphasize fundamental knowledge in life and environment, physical and sustainable environment, pollution, monitoring and management. Throughout the curriculum, students are encouraged to undertake their own independent study from primary and secondary sources to incorporate critical thinking, field and laboratory work, documentary and archive scholarship, as integrated elements of relevant courses. By completing the curriculum, students are expected to have enhanced their knowledge in environmental science and have improved their problem-solving ability, communication and social skills. Students will be prepared to work in industries and government agencies, where they will help manage wisely the resources for which they are responsible.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe different components of the environmental systems and key issues in environmental science (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 2: observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
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- PLO 4: gain an advanced level of skills in scientific inquiry and effective communication of global environmental problems, issues of resource management, policies and management methods and appreciation of the related ethical issues (by means of field/ laboratory/ team-based learning, research projects, presentation opportunities and capstone experiences in the curriculum)

#### Impermissible Combinations:

Minor in Environmental Science

#### Required courses (96 credits)

#### 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (24 credits)** 

CHEM1042 General chemistry I (6)

ENVS1401 Introduction to environmental science (6)
ENVS2001 Methods in environmental science (6)
ENVS2002 Environmental data analysis (6)

**Disciplinary Electives (12 credits)** 

At least 12 credits selected from the following courses (Level 1 & 2):

EASC1020 Introduction to climate science (6)

EASC1401 Blue Planet (6)

ENVS1301 Environmental life science (6)

BIOL2102 Biostatistics (6)

BIOL2306 Ecology and evolution (6)

CHEM2241 Analytical chemistry I (6)

# 2. Advanced level courses (42 credits) Disciplinary Core Courses (6 credits)

ENVS3004 Environment, society and economics (6)

#### **Disciplinary Electives (36 credits)**

At least 36 credits selected from the following courses:

BIOL3109 Environmental microbiology (6)
BIOL3110 Environmental toxicology (6)
BIOL3216 Food waste management (6)
BIOL3217 Food, environment and health (6)
BIOL3303 Conservation biology (6)
CHEM3141 Environmental chemistry (6)

CHEM3241 Analytical chemistry II: chemical instrumentation (6) EASC3020 Global change: anthropogenic impacts (6)

EASC3405 Environmental remote sensing (6)
EASC3419 Earth System Science Field Studies (6)
ENVS3007 Natural hazards and mitigation (6)
ENVS3010 Sustainable energy and environment (6)

ENVS3019 Urban ecology (6)
ENVS3020 Global change ecology (6)

ENVS3022 Environmental science field course (6)

ENVS3028 Coastal Sustainability (6)

May take either ENVS1301 or BIOL2306 to fulfill this 12 credits requirement, but not both.

May take either ENVS1301 or BIOL2306 to fulfill this 12 credits requirement, but not both.

ENVS3042 Pollution (6)

ENVS3202 Plant physiology and climate change (6)

ENVS3313 Environmental oceanography (6)

ENVS3401 Understanding tropical ecosystems in a changing world (6)
ENVS3402 Qualitative data, social science methods and decision-making in environmental science (6)

BIOL4302 Environmental impact assessment (6) ENVS4110 Environmental remediation (6)

#### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

ENVS3999 Directed studies in environmental science (6)

ENVS4966 Environmental science internship (6) ENVS4999 Environmental science project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

#### Remarks:

Offered to students 2018

admitted to Year 1 in

#### **Objectives:**

The Major in Environmental Science aims to provide students with a strong scientific and technological background for understanding and addressing the environmental issues faced by humankind. This includes a flexible teaching and learning programme so that students can explore environmental issues from a range of aspects. Core courses in the curriculum emphasize fundamental knowledge in life and environment, physical and sustainable environment, pollution, monitoring and management. Throughout the curriculum, students are encouraged to undertake their own independent study from primary and secondary sources to incorporate critical thinking, field and laboratory work, documentary and archive scholarship, as integrated elements of relevant courses. By completing the curriculum, students are expected to have enhanced their knowledge in environmental science and have improved their problem-solving ability, communication and social skills. Students will be prepared to work in industries and government agencies, where they will help manage wisely the resources for which they are responsible.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe different components of the environmental systems and key issues in environmental science (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 2: observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 3: appropriately use and critically analyze a range of forms and sources of environmental data, and assess environmental problems (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 4: gain an advanced level of skills in scientific inquiry and effective communication of global environmental problems, issues of resource management, policies and management methods and appreciation of the related ethical issues (by means of field/ laboratory/ team-based learning, research projects, presentation opportunities and capstone experiences in the curriculum)

#### Impermissible Combinations:

Minor in Environmental Science

#### Required courses (96 credits)

#### 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (24 credits)** 

CHEM1042 General chemistry I (6)

ENVS1401 Introduction to environmental science (6)
ENVS2001 Methods in environmental science (6)
ENVS2002 Environmental data analysis (6)

**Disciplinary Electives (12 credits)** 

At least 12 credits selected from the following courses (Level 1 & 2):

EASC1020 Introduction to climate science (6)

EASC1401 Blue Planet (6)

ENVS1301 Environmental life science (6)

BIOL2102 Biostatistics (6)

BIOL2306 Ecology and evolution (6)

CHEM2241 Analytical chemistry I (6)

# 2. Advanced level courses (42 credits) Disciplinary Core Courses (6 credits)

ENVS3004 Environment, society and economics (6)

#### **Disciplinary Electives (36 credits)**

At least 36 credits selected from the following courses:

BIOL3109 Environmental microbiology (6)
BIOL3110 Environmental toxicology (6)
BIOL3216 Food waste management (6)
BIOL3217 Food, environment and health (6)
BIOL3303 Conservation biology (6)
CHEM3141 Environmental chemistry (6)

CHEM3241 Analytical chemistry II: chemical instrumentation (6) EASC3020 Global change: anthropogenic impacts (6)

EASC3405 Environmental remote sensing (6)
EASC3419 Earth System Science Field Studies (6)
ENVS3007 Natural hazards and mitigation (6)
ENVS3010 Sustainable energy and environment (6)

ENVS3019 Urban ecology (6)
ENVS3020 Global change ecology (6)

ENVS3022 Environmental science field course (6)

ENVS3028 Coastal Sustainability (6)

May take either ENVS1301 or BIOL2306 to fulfill this 12 credits requirement, but not both.

May take either ENVS1301 or BIOL2306 to fulfill this 12 credits requirement, but not both.

ENVS3042 Pollution (6)

ENVS3202 Plant physiology and climate change (6)

ENVS3313 Environmental oceanography (6)

ENVS3401 Understanding tropical ecosystems in a changing world (6)
ENVS3402 Qualitative data, social science methods and decision-making in environmental science (6)

BIOL4302 Environmental impact assessment (6) ENVS4110 Environmental remediation (6)

#### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

ENVS3999 Directed studies in environmental science (6)

ENVS4966 Environmental science internship (6) ENVS4999 Environmental science project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

#### Remarks

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

The Major in Environmental Science aims to provide students with a strong scientific and technological background for understanding and addressing the environmental issues faced by humankind. This includes a flexible teaching and learning programme so that students can explore environmental issues from a range of aspects. Core courses in the curriculum emphasize fundamental knowledge in life and environment, physical and sustainable environment, pollution, monitoring and management. Throughout the curriculum, students are encouraged to undertake their own independent study from primary and secondary sources to incorporate critical thinking, field and laboratory work, documentary and archive scholarship, as integrated elements of relevant courses. By completing the curriculum, students are expected to have enhanced their knowledge in environmental science and have improved their problem-solving ability, communication and social skills. Students will be prepared to work in industries and government agencies, where they will help manage wisely the resources for which they are responsible.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe different components of the environmental systems and key issues in environmental science (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 2: observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 3: appropriately use and critically analyze a range of forms and sources of environmental data, and assess environmental problems (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 4: gain an advanced level of skills in scientific inquiry and effective communication of global environmental problems, issues of resource management, policies and management methods and appreciation of the related ethical issues (by means of field/ laboratory/ team-based learning, research projects, presentation opportunities and capstone experiences in the curriculum)

#### Impermissible Combinations:

Minor in Environmental Science

#### Required courses (96 credits)

1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (18 credits)** 

ENVS1401 Introduction to environmental science (6)
ENVS2001 Methods in environmental science (6)
ENVS2002 Environmental data analysis (6)

**Disciplinary Electives (18 credits)** 

At least 18 credits selected from the following courses (Level 1 & 2):

CHEM1042 General chemistry I (6)

EASC1020 Introduction to climate science (6)

EASC1401 Blue Planet (6)

ENVS1301 Environmental life science (6) STAT1601 Elementary statistical methods (6)

STAT1603 Introductory statistics (6)

BIOL2102 Biostatistics (6)

BIOL2306 Ecology and evolution (6) CHEM2041 Principles of chemistry (6) CHEM2241 Analytical chemistry I (6)

CHEM2442 Fundamentals of organic chemistry (6)

2. Advanced level courses (42 credits)

Disciplinary Core Courses (6 credits)

ENVS3004 Environment, society and economics (6)

**Disciplinary Electives (36 credits)** 

At least 36 credits selected from the following courses:

BIOL3109 Environmental microbiology (6)
BIOL3110 Environmental toxicology (6)
BIOL3216 Food waste management (6)
BIOL3217 Food, environment and health (6)
BIOL3303 Conservation biology (6)
CHEM3141 Environmental chemistry (6)

CHEM3241 Analytical chemistry II: chemical instrumentation (6)

CHEM3242 Food and water analysis (6)

EASC3020 Global change: anthropogenic impacts (6)
EASC3405 Environmental remote sensing (6)
EASC3419 Earth System Science Field Studies (6)
ENVS3007 Natural hazards and mitigation (6)

May take either STAT1601 or STAT1603 to fulfill this 18 credits requirement, but not both. May take either STAT1601 or STAT1603 to fulfill this 18 credits requirement, but not both.

ENVS3010	Sustainable energy and environment (6)	
ENVS3019	Urban ecology (6)	
ENVS3020	Global change ecology (6)	
ENVS3022	Environmental science field course (6)	
ENVS3028	Coastal Sustainability (6)	
ENVS3042	Pollution (6)	
ENVS3202	Plant physiology and climate change (6)	
ENVS3313	Environmental oceanography (6)	
ENVS3401	Understanding tropical ecosystems in a changing world (6)	
ENVS3402	Qualitative data, social science methods and decision-making	
	in environmental science (6)	
MATH3408	Computational methods and differential equations with	
	applications (6)	
STAT3611	Computer-aided data analysis (6)	
BIOL4302	Environmental impact assessment (6)	
ENVS4110	Environmental remediation (6)	
3. Capstone requirement (6 credits)		
At least 6 credits sel	ected from the following courses:	
ENVS3999	Directed studies in environmental science (6)	
ENVS4966	Environmental science internship (6)	
ENVS4999	Environmental science project (12)	

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details

#### Remarks:

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

The Major in Environmental Science aims to provide students with a strong scientific and technological background for understanding and addressing the environmental issues faced by humankind. This includes a flexible teaching and learning programme so that students can explore environmental issues from a range of aspects. Core courses in the curriculum emphasize fundamental knowledge in life and environment, physical and sustainable environment, pollution, monitoring and management. Throughout the curriculum, students are encouraged to undertake their own independent study from primary and secondary sources to incorporate critical thinking, field and laboratory work, documentary and archive scholarship, as integrated elements of relevant courses. By completing the curriculum, students are expected to have enhanced their knowledge in environmental science and have improved their problem-solving ability, communication and social skills. Students will be prepared to work in industries and government agencies, where they will help manage wisely the resources for which they are responsible.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe different components of the environmental systems and key issues in environmental science (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 2: observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 3: appropriately use and critically analyze a range of forms and sources of environmental data, and assess environmental problems (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 4: gain an advanced level of skills in scientific inquiry and effective communication of global environmental problems, issues of resource management, policies and management methods and appreciation of the related ethical issues (by means of field/ laboratory/ team-based learning, research projects, presentation opportunities and capstone experiences in the curriculum)

#### Impermissible Combinations:

Minor in Environmental Science

#### Required courses (96 credits)

#### 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (18 credits)** 

ENVS1401 Introduction to environmental science (6)
ENVS2001 Methods in environmental science (6)
ENVS2002 Environmental data analysis (6)

**Disciplinary Electives (18 credits)** 

At least 18 credits selected from the following courses (Level 1 & 2):

CHEM1042 General chemistry I (6)

EASC1020 Introduction to climate science (6)

EASC1401 Blue Planet (6)

ENVS1301 Environmental life science (6) STAT1601 Elementary statistical methods (6)

STAT1603 Introductory statistics (6)

BIOL2102 Biostatistics (6)

BIOL2306 Ecology and evolution (6) CHEM2041 Principles of chemistry (6) CHEM2241 Analytical chemistry I (6)

CHEM2442 Fundamentals of organic chemistry (6)

2. Advanced level courses (42 credits)

**Disciplinary Core Courses (6 credits)** 

ENVS3004 Environment, society and economics (6)

**Disciplinary Electives (36 credits)** 

At least 36 credits selected from the following courses:

BIOL3109 Environmental microbiology (6)
BIOL3110 Environmental toxicology (6)
BIOL3216 Food waste management (6)
BIOL3217 Food, environment and health (6)
BIOL3303 Conservation biology (6)
CHEM3141 Environmental chemistry (6)

CHEM3241 Analytical chemistry II: chemical instrumentation (6)

CHEM3242 Food and water analysis (6)

EASC3020 Global change: anthropogenic impacts (6)
EASC3405 Environmental remote sensing (6)
EASC3419 Earth System Science Field Studies (6)
ENVS3007 Natural hazards and mitigation (6)

May take either STAT1601 or STAT1603 to fulfill this 18 credits requirement, but not both. May take either STAT1601 or STAT1603 to fulfill this 18 credits requirement, but not both.

ENVS3010	Sustainable energy and environment (6)	
ENVS3019	Urban ecology (6)	
ENVS3020	Global change ecology (6)	
ENVS3022	Environmental science field course (6)	
ENVS3028	Coastal Sustainability (6)	
ENVS3042	Pollution (6)	
ENVS3202	Plant physiology and climate change (6)	
ENVS3313	Environmental oceanography (6)	
ENVS3401	Understanding tropical ecosystems in a changing world (6)	
ENVS3402	Qualitative data, social science methods and decision-making in environmental science (6)	
MATH3408	Computational methods and differential equations with applications (6)	
STAT3611	Computer-aided data analysis (6)	
BIOL4302	Environmental impact assessment (6)	
ENVS4110	Environmental remediation (6)	
3. Capstone requirement (6 credits)		
At least 6 credits selected from the following courses:		
ENVS3999	Directed studies in environmental science (6)	
ENVS4966	Environmental science internship (6)	
ENVS4999	Environmental science project (12)	

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details

#### Remarks:

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

The Major in Environmental Science aims to provide students with a strong scientific and technological background for understanding and addressing the environmental issues faced by humankind. This includes a flexible teaching and learning programme so that students can explore environmental issues from a range of aspects. Core courses in the curriculum emphasize fundamental knowledge in life and environment, physical and sustainable environment, pollution, monitoring and management. Throughout the curriculum, students are encouraged to undertake their own independent study from primary and secondary sources to incorporate critical thinking, field and laboratory work, documentary and archive scholarship, as integrated elements of relevant courses. By completing the curriculum, students are expected to have enhanced their knowledge in environmental science and have improved their problem-solving ability, communication and social skills. Students will be prepared to work in industries and government agencies, where they will help manage wisely the resources for which they are responsible.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe different components of the environmental systems and key issues in environmental science (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 2: observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 3: appropriately use and critically analyze a range of forms and sources of environmental data, and assess environmental problems (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 4: gain an advanced level of skills in scientific inquiry and effective communication of global environmental problems, issues of resource management, policies and management methods and appreciation of the related ethical issues (by means of field/ laboratory/ team-based learning, research projects, presentation opportunities and capstone experiences in the curriculum)

#### Impermissible Combinations:

Minor in Environmental Science

#### Required courses (96 credits)

1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (18 credits)** 

ENVS1401 Introduction to environmental science (6)
ENVS2001 Methods in environmental science (6)
ENVS2002 Environmental data analysis (6)

**Disciplinary Electives (18 credits)** 

At least 18 credits selected from the following courses (Level 1 & 2):

CHEM1042 General chemistry I (6)

EASC1020 Introduction to climate science (6)

EASC1401 Blue Planet (6)

ENVS1301 Environmental life science (6) STAT1601 Elementary statistical methods (6)

STAT1603 Introductory statistics (6)

BIOL2102 Biostatistics (6)

BIOL2306 Ecology and evolution (6) CHEM2041 Principles of chemistry (6) CHEM2241 Analytical chemistry I (6)

CHEM2442 Fundamentals of organic chemistry (6)

2. Advanced level courses (42 credits)

**Disciplinary Core Courses (6 credits)** 

ENVS3004 Environment, society and economics (6)

**Disciplinary Electives (36 credits)** 

At least 36 credits selected from the following courses:

BIOL3109 Environmental microbiology (6)
BIOL3110 Environmental toxicology (6)
BIOL3217 Food, environment and health (6)
BIOL3303 Conservation biology (6)
CHEM3141 Environmental chemistry (6)

CHEM3241 Analytical chemistry II: chemical instrumentation (6)

CHEM3242 Food and water analysis (6)

EASC3020 Global change: anthropogenic impacts (6)
EASC3405 Environmental remote sensing (6)
EASC3419 Earth System Science Field Studies (6)
ENVS3007 Natural hazards and mitigation (6)
ENVS3010 Sustainable energy and environment (6)

May take either STAT1601 or STAT1603 to fulfill this 18 credits requirement, but not both. May take either STAT1601 or STAT1603 to fulfill this 18 credits requirement, but not both.

ENVS3019	Urban ecology (6)	
ENVS3020	Global change ecology (6)	
ENVS3028	Coastal Sustainability (6)	
ENVS3022	Environmental science field course (6)	
ENVS3042	Pollution (6)	
ENVS3202	Plant physiology and climate change (6)	
ENVS3313	Environmental oceanography (6)	
ENVS3401	Understanding tropical ecosystems in a changing world (6)	
ENVS3402	Qualitative data, social science methods and decision-making in environmental science (6)	
MATH3408	Computational methods and differential equations with applications (6)	
STAT3611	Computer-aided data analysis (6)	
BIOL4302	Environmental impact assessment (6)	
ENVS4110	Environmental remediation (6)	
3. Capstone requirement (6 credits)		
At least 6 credits selected from the following courses:		
ENVS3999	Directed studies in environmental science (6)	
ENVS4966	Environmental science internship (6)	
ENVS4999	Environmental science project (12)	

#### Notes

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

#### Remarks:

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

The Major in Environmental Science aims to provide students with a strong scientific and technological background for understanding and addressing the environmental issues faced by humankind. This includes a flexible teaching and learning programme so that students can explore environmental issues from a range of aspects. Core courses in the curriculum emphasize fundamental knowledge in life and environment, physical and sustainable environment, pollution, monitoring and management. Throughout the curriculum, students are encouraged to undertake their own independent study from primary and secondary sources to incorporate critical thinking, field and laboratory work, documentary and archive scholarship, as integrated elements of relevant courses. By completing the curriculum, students are expected to have enhanced their knowledge in environmental science and have improved their problem-solving ability, communication and social skills. Students will be prepared to work in industries and government agencies, where they will help manage wisely the resources for which they are responsible.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe different components of the environmental systems and key issues in environmental science (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 2: observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 3: appropriately use and critically analyze a range of forms and sources of environmental data, and assess environmental problems (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- gain an advanced level of skills in scientific inquiry and effective communication of global environmental problems, issues of resource management, policies and management methods and appreciation of the related ethical issues (by means of field/ laboratory/ team-based learning, research projects, presentation opportunities and capstone experiences in the curriculum)

#### Impermissible Combinations:

Minor in Environmental Science

#### Required courses (96 credits)

1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (18 credits)** 

ENVS1401 Introduction to environmental science (6) Methods in environmental science (6) ENVS2001 ENVS2002 Environmental data analysis (6)

**Disciplinary Electives (18 credits)** 

At least 18 credits selected from the following courses (Level 1 & 2):

General chemistry I (6) CHEM1042

Introduction to climate science (6) FASC1020

EASC1401 Blue Planet (6)

ENVS1301 Environmental life science (6) Elementary statistical methods (6) STAT1601

STAT1603 Introductory statistics (6)

Biostatistics (6) BIOL2102

Ecology and evolution (6) BIOL2306 CHEM2041 Principles of chemistry (6) CHEM2241 Analytical chemistry I (6)

CHEM2442 Fundamentals of organic chemistry (6)

2. Advanced level courses (42 credits)

**Disciplinary Core Courses (6 credits)** 

Environment, society and economics (6) FNVS3004

**Disciplinary Electives (36 credits)** 

At least 36 credits selected from the following courses:

BIOL3110 Environmental toxicology (6) Conservation biology (6) **BIOL3303** CHEM3141 Environmental chemistry (6)

Analytical chemistry II: chemical instrumentation (6) CHEM3241

CHEM3242 Food and water analysis (6)

EASC3020 Global change: anthropogenic impacts (6) EASC3405 Environmental remote sensing (6) **ENVS3006** Environmental radiation (6) Natural hazards and mitigation (6) ENVS3007 ENVS3010 Sustainable energy and environment (6)

ENVS3019 Urban ecology (6)

Global change ecology (6) ENVS3020

May take either STAT1601 or STAT1603 to fulfill this 18 credits requirement, but not both. May take either STAT1601 or STAT1603 to fulfill this 18 credits requirement, but not both. ENVS3042 Pollution (6)

ENVS3313 Environmental oceanography (6)

MATH3408 Computational methods and differential equations with

applications (6)

STAT3611 Computer-aided data analysis (6)
BIOL4302 Environmental impact assessment (6)
ENVS4110 Environmental remediation (6)

#### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

ENVS3999 Directed studies in environmental science (6)
ENVS4955 Environmental science in practice (6)
ENVS4966 Environmental science internship (6)
ENVS4999 Environmental science project (12)

#### **Notes**

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

#### Remarks:

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

The Major in Environmental Science aims to provide students with a strong scientific and technological background for understanding and addressing the environmental issues faced by humankind. This includes a flexible teaching and learning programme so that students can explore environmental issues from a range of aspects. Core courses in the curriculum emphasize fundamental knowledge in life and environment, physical and sustainable environment, pollution, monitoring and management. Throughout the curriculum, students are encouraged to undertake their own independent study from primary and secondary sources to incorporate critical thinking, field and laboratory work, documentary and archive scholarship, as integrated elements of relevant courses. By completing the curriculum, students are expected to have enhanced their knowledge in environmental science and have improved their problem-solving ability, communication and social skills. Students will be prepared to work in industries and government agencies, where they will help manage wisely the resources for which they are responsible.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe different components of the environmental systems and key issues in environmental science (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 2: observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 3: appropriately use and critically analyze a range of forms and sources of environmental data, and assess environmental problems (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 4: gain an advanced level of skills in scientific inquiry and effective communication of global environmental problems, issues of resource management, policies and management methods and appreciation of the related ethical issues (by means of field/ laboratory/ team-based learning, research projects, presentation opportunities and capstone experiences in the curriculum)

#### Impermissible Combinations:

Minor in Environmental Science

#### Required courses (96 credits)

1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (18 credits)** 

ENVS1401 Introduction to environmental science (6)
ENVS2001 Methods in environmental science (6)
ENVS2002 Environmental data analysis (6)

**Disciplinary Electives (18 credits)** 

At least 18 credits selected from the following courses (Level 1 & 2):

CHEM1042 General chemistry I (6)

EASC1020 Introduction to climate science (6)

EASC1401 Blue Planet (6)

ENVS1301 Environmental life science (6) STAT1601 Elementary statistical methods (6)

STAT1603 Introductory statistics (6)

BIOL2102 Biostatistics (6)

BIOL2306 Ecology and evolution (6) CHEM2041 Principles of chemistry (6) CHEM2241 Analytical chemistry I (6)

CHEM2442 Fundamentals of organic chemistry (6)

2. Advanced level courses (42 credits)

Disciplinary Core Courses (6 credits)

ENVS3004 Environment, society and economics (6)

**Disciplinary Electives (36 credits)** 

At least 36 credits selected from the following courses:

BIOL3110 Environmental toxicology (6)
BIOL3303 Conservation biology (6)
CHEM3141 Environmental chemistry (6)

CHEM3241 Analytical chemistry II: chemical instrumentation (6)

CHEM3242 Food and water analysis (6)

EASC3020 Global change: anthropogenic impacts (6)
EASC3405 Environmental remote sensing (6)
ENVS3006 Environmental radiation (6)
ENVS3007 Natural hazards and mitigation (6)
ENVS3010 Sustainable energy and environment (6)

ENVS3019 Urban ecology (6) ENVS3020 Global change ecology (6) May take either STAT1601 or STAT1603 to fulfill this 18 credits requirement, but not both. May take either STAT1601 or STAT1603 to fulfill this 18 credits requirement, but not both.

ENVS3042 Pollution (6)

ENVS3313 Environmental oceanography (6)

MATH3408 Computational methods and differential equations with

applications (6)

STAT3611 Computer-aided data analysis (6)
BIOL4302 Environmental impact assessment (6)
ENVS4110 Environmental remediation (6)

#### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

ENVS3999 Directed studies in environmental science (6)
ENVS4955 Environmental science in practice (6)
ENVS4966 Environmental science internship (6)
ENVS4999 Environmental science project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

#### Remarks:

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

The Major in Environmental Science aims to provide students with a strong scientific and technological background for understanding and addressing the environmental issues faced by humankind. This includes a flexible teaching and learning programme so that students can explore environmental issues from a range of aspects. Core courses in the curriculum emphasize fundamental knowledge in life and environment, physical and sustainable environment, pollution, monitoring and management. Throughout the curriculum, students are encouraged to undertake their own independent study from primary and secondary sources to incorporate critical thinking, field and laboratory work, documentary and archive scholarship, as integrated elements of relevant courses. By completing the curriculum, students are expected to have enhanced their knowledge in environmental science and have improved their problem-solving ability, communication and social skills. Students will be prepared to work in industries and government agencies, where they will help manage wisely the resources for which they are responsible.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe different components of the environmental systems and key issues in environmental science (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 2: observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 3: appropriately use and critically analyze a range of forms and sources of environmental data, and assess environmental problems (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 4: gain an advanced level of skills in scientific inquiry and effective communication of global environmental problems, issues of resource management, policies and management methods and appreciation of the related ethical issues (by means of field/ laboratory/ team-based learning, research projects, presentation opportunities and capstone experiences in the curriculum)

#### Impermissible Combinations:

Minor in Environmental Science

#### Required courses (96 credits)

1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (12 credits)** 

ENVS1401 Introduction to environmental science (6) STAT1601 Elementary statistical methods (6)

STAT1603 Introductory statistics (6)

May take either STAT1601 or STAT1603 to fulfill this 12 credits requirement, but not both. May take either STAT1601 or STAT1603 to fulfill this 12 credits requirement, but not both.

#### Disciplinary Electives (24 credits)

At least 12 credits selected from the following courses (Level 1) in List A:

List A

CHEM1042 General chemistry I (6)
EASC1020 Introduction to climate science (6)

EASC1401 Blue Planet (6)

ENVS1301 Environmental life science (6)

At least 12 credits selected from the following courses (Level 2) in List B:

List B

BIOL2102 Biostatistics (6)

BIOL2306 Ecology and evolution (6) CHEM2041 Principles of chemistry (6) CHEM2241 Analytical chemistry I (6)

CHEM2442 Fundamentals of organic chemistry (6)

EASC2404 Introduction to atmosphere and hydrosphere (6)

ENVS2001 Methods in environmental science (6) ENVS2002 Environmental data analysis (6)

2. Advanced level courses (42 credits)

Disciplinary Core Courses (6 credits)

ENVS3004 Environment, society and economics (6)

**Disciplinary Electives (36 credits)** 

At least 36 credits selected from the following courses:

BIOL3110 Environmental toxicology (6)
BIOL3303 Conservation biology (6)
CHEM3141 Environmental chemistry (6)

CHEM3241 Analytical chemistry II: chemical instrumentation (6)

CHEM3242 Food and water analysis (6)

EASC3020 Global change: anthropogenic impacts (6)
EASC3405 Environmental remote sensing (6)
ENVS3006 Environmental radiation (6)

ENVS3007 Natural hazards and mitigation (6) ENVS3010 Sustainable energy and environment (6)

ENVS3019 Urban ecology (6)

ENVS3020 Global change ecology (6)

ENVS3042 Pollution (6)

ENVS3313 Environmental oceanography (6)

MATH3408 Computational methods and differential equations with

applications (6)

STAT3611 Computer-aided data analysis (6)
BIOL4302 Environmental impact assessment (6)
ENVS4110 Environmental remediation (6)

# 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

ENVS3999 Directed studies in environmental science (6)
ENVS4955 Environmental science in practice (6)
ENVS4966 Environmental science internship (6)
ENVS4999 Environmental science project (12)

## Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

#### Remarks:

Major Title Major in Food & Nutritional Science 2021

Offered to students

admitted to Year 1 in

## **Objectives:**

The Major in Food and Nutritional Science aims to offer an exciting, dynamic, and challenging environment to prepare the students for career opportunities in food and nutritional science. The goals of the programme are to provide the students with: (a) critical knowledge and understanding of the theoretical and practical aspects of food science and technology, and nutrition and their relationship to human health; (b) critical knowledge and understanding on the relationship between food and a wide range of social, legal, technological and environmental factors; (c) a curriculum meeting the requirements for higher degree in MPhil and PhD and or the taught Master of Science degrees in the field of Food industry: Management and Marketing, Food Safety and Toxicology and the postgraduate diploma related to health sciences. The curriculum is designed for students to select studies in Nutrition and Public Health in preparation for postgraduate diploma in dietetics or human nutrition. Study in Food Security is an innovative programme that entails scientific and social approach in food, nutrition and environment, allowing students to relate global challenges in industry, society and government levels.

The mission is to provide a progressive and effective programme that integrates theoretical and experiential learning to better prepare students for the challenges of the workplace. Throughout the curriculum, there is consistent emphasis on experiential learning through laboratory studies, internship training, research-based learning, debate and presentations, which are designed to enhance students' critical thinking, communication and collaboration, tackling of ill-defined problems, development of individual learning objectives and self-evaluation of performance. Internship experiences can be gained in medical and health sectors, schools, industries, government and community setting. Students graduated from this programme are prepared for diverse careers in the food industry, government or private-sector food and nutrition agencies, and scientific research laboratories, health-care and fitness facilities, hospitals, nutrition edition and communication enterprises.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand the science underpinning food and nutrition as applied to diet and health, and to food production (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: analyze controversial food related issues such as GM foods, nutritional labeling and food sustainability (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: understand ethical perspectives and practice in all areas of food product development, food safety and public health nutrition, and appreciate and identify the need for ethical standards and professional codes of conduct (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: apply and disseminate scientific knowledge obtained from food, nutrition and related biosciences for the understanding of the influences in nutrition, health and disease of a community using a range of formats and approaches (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: apply independent thinking and the principles of scientific enquiry to conduct a small research project to test a foodand/or nutrition-related hypothesis (by means of coursework, tutorial classes, laboratory-based and project-based learning in the curriculum)
- PLO 6: demonstrate communication and teamwork skills necessary to working in a multi-disciplinary environment (by means of coursework and group-project learning in the curriculum)

## Impermissible Combinations:

Minor in Food & Nutritional Science

## Required courses (96 credits)

## 1. Introductory level courses (60 credits)

## Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

# **Disciplinary Core Courses (36 credits)**

From molecules to cells (6) BIOL1110 BIOL1201 Introduction to food and nutrition (6) Principles of food chemistry (6) **BIOI 2101** 

BIOL2102 Biostatistics (6)

**BIOL2103** Biological sciences laboratory course (6)

Principles of biochemistry (6) **BIOL2220** 

BIOC2600 Basic biochemistry (6) Take either BIOI 2220 or BIOC2600 to fulfill this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL2220 or BIOC2600 to fulfill this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive

## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

General chemistry I (6) CHEM1042

CHEM2442 Fundamentals of organic chemistry (6) Sustainable development (6) GFOG2013 Global development (6) GEOG2030 Health and medical geography (6) GEOG2152 Healthy food, place, and sustainability (6) GFOG2154

2. Advanced level courses (30 credits)

BIOL3202 Nutritional biochemistry (6) Food microbiology (6) BIOL3203 **Disciplinary Electives (18 credits)** At least 12 credits of advanced level BIOL3XXX and/or BIOL4XXX course from the list below: Nutrition and the life cycle (6) **BIOI 3204** Human physiology (6) BIOL3205 BIOL3207 Principles of toxicology (6) Food and nutrient analysis (6) BIOL3209 BIOL3211 Nutrigenomics (6) BIOL3216 Food waste management (6) Food, environment and health (6) BIOL3217 BIOL3218 Food hygiene and quality control (6) Diet and disease (6) BIOL3606 **BIOL3608** Food commodities (6) Public health nutrition (6) BIOL4201 Nutrition and sports performance (6) BIOL4202 BIOL4205 Food technology (6) Functional foods (6) BIOL4209 BIOL4411 Plant and food biotechnology (6) BIOC3606 Molecular medicine (6) Sample survey methods (6) STAT3617 GEOG3202 GIS in environmental studies (6) POLI3121 Environmental policy (6) BBMS4004 Public health genetics (6) 3. Capstone requirement (6 credits) At least 6 credits selected from the following courses: Directed studies in food & nutritional science (6) BIOL3992 **BIOI 4922** Food product development and evaluation (6) BIOL4962 Food & nutritional science internship (6)

## Notes:

BIOL4992

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 and SCNC1112. Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Those who want to specialize in the Nutrition and Public Health Studies should pass the following course: Introduction level courses - 2 Disciplinary Core Courses: Science Foundation: SCNC1111 and SCNC1112; 6 Disciplinary Core Courses: BIOL1110, BIOL2101; BIOL2102, BIOL2103, BIOL2220 or BIOC2600; 2 Disciplinary Electives: CHEM1042 and CHEM2442. Advanced level courses - 2 Disciplinary Core Courses: BIOL3202 and BIOL3203; any 3 Disciplinary Electives with at least 2 must be at BIOL3XXX and/or BIOL4XXX in the list: BIOL3204, BIOL3205, BIOL3207, BIOL3209, BIOL3211, BIOL3217, BIOL3606, BIOL4201, BIOL4202, BIOL4209, BIOC3606, STAT3617, and BBMS4004 Capstone requirement: any 1 Capstone Course: BIOL3992, BIOL4922, BIOL4962, and BIOL4992.

Food & nutritional science project (12)

5. Those who want to specialize in the Food Security Studies should pass the following course:
Introduction level courses - 2 Disciplinary Core Courses: Science Foundation: SCNC1111 and SCNC1112; 6 Disciplinary Core Courses:
BIOL1110, BIOL2101, BIOL2101, BIOL2102, BIOL2103, BIOL2220 or BIOC2600; 2 Disciplinary Electives: GEOG2013, GEOG2030, GEOG2152 and GEOG2154

Advanced level courses - 2 Disciplinary Core Courses: BIOL3202 and BIOL3203; any 3 Disciplinary Electives with at least 2 must be at BIOL3XXX and/or BIOL4XXX in the list: BIOL3207, BIOL3216, BIOL3217, BIOL3218, BIOL3608, BIOL3608, BIOL4201, BIOL4205, BIOL4209, BIOL4411, GEOG3202, POLI3121; STAT3617, and BBMS4004

Capstone requirement: any 1 Capstone Course: BIOL3992, BIOL4922, BIOL4962, and BIOL4992.

- 6. Students who may wish to pursue postgraduate study in dietetics are strongly advised to consult their academic and course selection advisor. Students are recommended to take BIOL1110, BIOL2103, CHEM1042 and CHEM2442 in Year 1/2 of the study. Students should also take BIOL3204, BIOL3503 and one Level 3/4 courses related to molecular biology.
- 7. Specialisation recognition will be allowed for 2014-2018 student intake. Students who already took any two of these CHEM1041, CHEM1042, CHEM1043, CHEM2441, CHEM2442 can be counted as two disciplinary electives for specialization in Nutrition and Public Health.
- 8. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis
- 9. Candidates who have been admitted to Year 1 in 2021-22 (and thereafter) and have achieved any one of the following qualifications are

exempted from taking SCNC1112. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.

- Level 4 or above in Biology, Chemistry, and Physics in the Hong Kong Diploma of Secondary Education (HKDSE)
   Level 5 or above in Biology, Chemistry, and Physics Higher Level in International Baccalaureate (IB)
   Grade B or above in Biology, Chemistry, and Physics in General Certificate of Education Advanced Level (GCEAL)
- Biology, Chemistry, and Physics qualification in Gao Kao will be considered on a case-by-case basis

## Remarks:

Major Title Major in Food & Nutritional Science

Offered to students 2020

admitted to Year 1 in

#### **Objectives:**

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By the end of this programme, students should be able to:

- PLO 1: understand the science underpinning food and nutrition as applied to diet and health, and to food production (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
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## Impermissible Combinations:

Minor in Food & Nutritional Science

## Required courses (96 credits)

## 1. Introductory level courses (60 credits)

## Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

# **Disciplinary Core Courses (36 credits)**

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BIOL2102 Biostatistics (6)

**BIOL2103** Biological sciences laboratory course (6)

Principles of biochemistry (6) **BIOL2220** 

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CHEM2442 Fundamentals of organic chemistry (6) Sustainable development (6) GFOG2013 Global development (6) GEOG2030 Health and medical geography (6) GEOG2152 Healthy food, place, and sustainability (6)

2. Advanced level courses (30 credits) **Disciplinary Core Courses (12 credits)** 

GFOG2154

BIOL3202 Nutritional biochemistry (6) BIOL3203 Food microbiology (6)

#### **Disciplinary Electives (18 credits)**

At least 12 credits of advanced level BIOL3XXX and/or BIOL4XXX course from the list below:

BIOL3204 Nutrition and the life cycle (6)
BIOL3205 Human physiology (6)
BIOL3207 Principles of toxicology (6)
BIOL3209 Food and nutrient analysis (6)
BIOL3211 Nutrigenomics (6)

BIOL3216 Food waste management (6)
BIOL3217 Food, environment and health (6)
BIOL3218 Food hygiene and quality control (6)

BIOL3606 Diet and disease (6)
BIOL3608 Food commodities (6)
BIOL4201 Public health nutrition (6)

BIOL4202 Nutrition and sports performance (6)

BIOL4205 Food technology (6) BIOL4209 Functional foods (6)

BIOL4411 Plant and food biotechnology (6)
BIOC3606 Molecular medicine (6)
STAT3617 Sample survey methods (6)
GEOG3202 GIS in environmental studies (6)
POLI3121 Environmental policy (6)
BBMS4004 Public health genetics (6)

## 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

BIOL3992 Directed studies in food & nutritional science (6)
BIOL4922 Food product development and evaluation (6)
BIOL4962 Food & nutritional science internship (6)
BIOL4992 Food & nutritional science project (12)

#### Notes:

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- Capstone requirement: any 1 Capstone Course: BIOL3992, BIOL4922, BIOL4962, and BIOL4992.
- 5. Those who want to specialize in the Food Security Studies should pass the following course: Introduction level courses 2 Disciplinary Core Courses: Science Foundation: SCNC1111 and SCNC1112; 6 Disciplinary Core Courses: BIOL1110, BIOL1201, BIOL2101; BIOL2102, BIOL2103, BIOL2220 or BIOC2600; 2 Disciplinary Electives: GEOG2013, GEOG2030 and GEOG2152 and GEOG2154.

Advanced level courses - 2 Disciplinary Core Courses: BIOL3202 and BIOL3203; any 3 Disciplinary Electives with at least 2 must be at BIOL3XXX and/or BIOL4XXX in the list: BIOL3207, BIOL3216, BIOL3217, BIOL3218, BIOL3606, BIOL3608, BIOL4201, BIOL4205, BIOL4209, BIOL4411, GEOG3202, POLI3121; STAT3617, and BBMS4004.

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- Mathematics qualification in Gao Kao will be considered on a case-by-case basis

## Remarks:

Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled.

Students must take and pass all required courses in the selected primary science major in order to satisfy the degree graduation requirements.

Major Title Major in Food & Nutritional Science 2019

Offered to students

admitted to Year 1 in

## **Objectives:**

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- PLO 2: analyze controversial food related issues such as GM foods, nutritional labeling and food sustainability (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: understand ethical perspectives and practice in all areas of food product development, food safety and public health nutrition, and appreciate and identify the need for ethical standards and professional codes of conduct (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
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## Impermissible Combinations:

Minor in Food & Nutritional Science

## Required courses (96 credits)

## 1. Introductory level courses (60 credits)

## Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

# **Disciplinary Core Courses (36 credits)**

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**BIOL2103** Biological sciences laboratory course (6)

Principles of biochemistry (6) **BIOL2220** 

**BIOC2600** Basic biochemistry (6) Take either BIOL2220 or BIOC2600 to fulfill this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

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## **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

General chemistry I (6) CHEM1042

CHEM2442 Fundamentals of organic chemistry (6) Sustainable development (6) GFOG2013 Global development (6) GEOG2030 Health and medical geography (6) GEOG2152 Healthy food, place, and sustainability (6)

2. Advanced level courses (30 credits) **Disciplinary Core Courses (12 credits)** 

GFOG2154

BIOL3202 Nutritional biochemistry (6) BIOL3203 Food microbiology (6)

#### **Disciplinary Electives (18 credits)**

At least 12 credits of advanced level BIOL3XXX and/or BIOL4XXX course from the list below:

BIOL3204 Nutrition and the life cycle (6)
BIOL3205 Human physiology (6)
BIOL3207 Principles of toxicology (6)
BIOL3209 Food and nutrient analysis (6)
BIOL3211 Nutrigenomics (6)

BIOL3216 Food waste management (6)
BIOL3217 Food, environment and health (6)
BIOL3218 Food hygiene and quality control (6)

BIOL3606 Diet and disease (6)
BIOL3608 Food commodities (6)
BIOL4201 Public health nutrition (6)

BIOL4202 Nutrition and sports performance (6)

BIOL4205 Food technology (6) BIOL4209 Functional foods (6)

BIOL4411 Plant and food biotechnology (6)
BIOC3606 Molecular medicine (6)
STAT3617 Sample survey methods (6)
GEOG3202 GIS in environmental studies (6)
POLI3121 Environmental policy (6)
BBMS4004 Public health genetics (6)

## 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

BIOL3992 Directed studies in food & nutritional science (6)
BIOL4922 Food product development and evaluation (6)
BIOL4962 Food & nutritional science internship (6)
BIOL4992 Food & nutritional science project (12)

#### Notes:

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- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details
- 5. Those who want to specialize in the Nutrition and Public Health Studies should pass the following course:

Introduction level courses - 2 Disciplinary Core Courses: Science Foundation: SCNC1111 and SCNC1112; 6 Disciplinary Core Courses: BIOL1110, BIOL2101, BIOL2101; BIOL2102, BIOL2103, BIOL2220 or BIOC2600; 2 Disciplinary Electives: CHEM1042 and CHEM2442. Advanced level courses - 2 Disciplinary Core Courses: BIOL3202 and BIOL3203; any 3 Disciplinary Electives with at least 2 must be at BIOL3XXX and/or BIOL4XXX in the list: BIOL3204, BIOL3205, BIOL3207, BIOL3209, BIOL3211, BIOL3217, BIOL3606, BIOL4201, BIOL4202,

BIOL4209, BIOC3606, STAT3617, and BBMS4004. Capstone requirement: any 1 Capstone Course: BIOL3992, BIOL4922, BIOL4962, and BIOL4992.

6. Those who want to specialize in the Food Security Studies should pass the following course:

Introduction level courses - 2 Disciplinary Core Courses: Science Foundation: SCNC1111 and SCNC1112; 6 Disciplinary Core Courses: BIOL1110, BIOL1201, BIOL2101; BIOL2102, BIOL2103, BIOL2220 or BIOC2600; 2 Disciplinary Electives: GEOG2013, GEOG2030, GEOG2152 and GEOG2154.

Advanced level courses - 2 Disciplinary Core Courses: BIOL3202 and BIOL3203; any 3 Disciplinary Electives with at least 2 must be at BIOL3XXX and/or BIOL4XXX in the list: BIOL3207, BIOL3216, BIOL3217, BIOL3218, BIOL3606, BIOL3608, BIOL4201, BIOL4205, BIOL4209, BIOL4411, GEOG3202, POLI3121; STAT3617, and BBMS4004.

Capstone requirement: any 1 Capstone Course: BIOL3992, BIOL4922, BIOL4962, and BIOL4992.

- 7. Students who may wish to pursue postgraduate study in dietetics are strongly advised to consult their academic and course selection advisor. Students are recommended to take BIOL1110, BIOL2103, CHEM1042 and CHEM2442 in Year 1/2 of the study. Students should also take BIOL3204, BIOL3503 and one Level 3/4 courses related to molecular biology.
- 8. Specialisation recognition will be allowed for 2014-2018 student intake. Students who already took any two of these CHEM1041, CHEM1042, CHEM1043, CHEM2441, CHEM2442 can be counted as two disciplinary electives for specialization in Nutrition and Public Health.

## Remarks

Major Title Major in Food & Nutritional Science

Offered to students 2018

admitted to Year 1 in

## **Objectives:**

The Major in Food and Nutritional Science aims to offer an exciting, dynamic, and challenging environment to prepare the students for career opportunities in food and nutritional science. The goals of the programme are to provide the students with: (a) critical knowledge and understanding of the theoretical and practical aspects of food science and technology, and nutrition and their relationship to human health; (b) critical knowledge and understanding on the relationship between food and a wide range of social, legal, technological and environmental factors; (c) a curriculum meeting the requirements for higher degree in MPhil and PhD and or the taught Master of Science degrees in the field of Food industry: Management and Marketing, Food Safety and Toxicology and the postgraduate diploma in dietetics.

The mission is to provide a progressive and effective programme that integrates theoretical and experiential learning to better prepare students for the challenges of the workplace. Throughout the curriculum, there is consistent emphasis on experiential learning through laboratory studies, internship training, research-based learning, debate and presentations, which are designed to enhance students' critical thinking, communication and collaboration, tackling of ill-defined problems, development of individual learning objectives and self-evaluation of performance. Internship experiences can be gained in medical centers, schools, industries, government and community setting. Students graduated from this programme are prepared for diverse careers in the food industry, government or private-sector food and nutrition agencies, and scientific research laboratories, health-care and fitness facilities, hospitals, nutrition edition and communication enterprises.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand the science underpinning food and nutrition as applied to diet and health, and to commercial food production (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: analyze controversial food related issues such as GM foods, nutritional labeling and food security (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: understand ethical perspectives and practice in all areas of food product development, food safety and public health nutrition, and appreciate and identify the need for ethical standards and professional codes of conduct (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: apply and disseminate scientific knowledge obtained from food, nutrition and related biosciences for the understanding of the influences of nutrition in health and disease, using a range of formats and approaches (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: apply independent thinking and the principles of scientific enquiry to conduct a small research project to test a food-and/or nutrition-related hypothesis (by means of coursework, tutorial classes, laboratory-based and project-based learning in the curriculum)
- PLO 6: demonstrate communication and teamwork skills necessary to working in a multi-disciplinary environment (by means of coursework and group-project learning in the curriculum)

# Impermissible Combinations:

Minor in Food & Nutritional Science

# Required courses (96 credits)

# 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

BIOL1110 From molecules to cells (6)
BIOL1201 Introduction to food and nutrition (6)
BIOL2101 Principles of food chemistry (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

BIOC2600 Basic biochemistry (6)

Take either BIOL2220 or BIOC2600 to fulfill this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL2220 or BIOC2600 to fulfill this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive

# 2. Advanced level courses (42 credits)

**Disciplinary Core Courses (18 credits)** 

BIOL3202 Nutritional biochemistry (6)
BIOL3203 Food microbiology (6)
BIOL3209 Food and nutrient analysis (6)

Disciplinary Electives (24 credits)

At least 24 credits selected from the following courses: BIOL3204 Nutrition and the life cycle (6)

BIOL3204 Nutrition and the life cycles BIOL3205 Human physiology (6)
BIOL3206 Clinical nutrition (6)

Take either BIOL3206 or BIOL3606 to fulfill this 24 credits requirement, but not both. BIOL3206 and BIOL3606 are mutually exclusive.

Principles of toxicology (6)

	BIOL3207		[previous title: Food and nutritional toxicology (6) ]
	BIOL3211	Nutrigenomics (6)	(6)]
	BIOL3211	Principles of dietary assessment (6)	
	BIOL3216	Food waste management (6)	
	BIOL3217	Food, environment and health (6)	
	BIOL3217	Food hygiene and quality control (6)	
	BIOL3606	. , , ,	Take either BIOL3206 or BIOL3606 to fulfill
	BIOL3000	Diet and disease (6)	this 24 credits requirement, but not both.
			BIOL3206 and BIOL3606 are mutually
			exclusive.
	BIOL3608	Food commodities (6)	Take either BIOL3608 or BIOL4208 to fulfill
		•	this 24 credits requirement, but not both.
			BIOL3608 and BIOL4208 are mutually
			exclusive.
	BIOL4201	Public health nutrition (6)	
	BIOL4202	Nutrition and sports performance (6)	
	BIOL4205	Food technology (6)	[previous title: Food processing and
	DIOI 4000	Most dain, and main salamass (C)	engineering (6) ] Take either BIOL3608 or BIOL4208 to fulfill
	BIOL4208	Meat, dairy and grain sciences (6)	this 24 credits requirement, but not both.
			BIOL3608 and BIOL4208 are mutually
			exclusive.
	BIOL4209	Functional foods (6)	
	BIOL4411	Plant and food biotechnology (6)	
3.	Capstone requirem	ent (6 credits)	
	•	lected from the following courses:	
	BIOL3992	Directed studies in food & nutritional science (6)	
	BIOL4913	Advanced practicum on food and nutrient analysis (6)	
	BIOL4922	Food product development and evaluation (6)	
	BIOL4962	Food & nutritional science internship (6)	
	BIOL4992	Food & nutritional science project (12)	

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 and SCNC1112. Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 5. Students who wish to specialize in a certain area may choose to emphasize selection of courses from the following lists:
- (a) Food Science and Technology: BIOL3608; BIOL3207; BIOL3209; BIOL3216; BIOL3218; BIOL4205; BIOL4208; BIOL4209; BIOL4411; BIOL4913; BIOL4922.
- (b) Nutrition and Health Science: BIOL3204; BIOL3205; BIOL3206; BIOL3207; BIOL3211; BIOL3215; BIOL3217; BIOL3218; BIOL3606; BIOL4201; BIOL4202.
- 6. Students who may wish to pursue postgraduate study in dietetics are strongly advised to consult their academic and course selection advisors regarding additional courses in Physiology and Biochemistry.

## Remarks

Major Title Major in Food & Nutritional Science

Offered to students 2017

admitted to Year 1 in

## **Objectives:**

The Major in Food and Nutritional Science aims to offer an exciting, dynamic, and challenging environment to prepare the students for career opportunities in food and nutritional science. The goals of the programme are to provide the students with: (a) critical knowledge and understanding of the theoretical and practical aspects of food science and technology, and nutrition and their relationship to human health; (b) critical knowledge and understanding on the relationship between food and a wide range of social, legal, technological and environmental factors; (c) a curriculum meeting the requirements for higher degree in MPhil and PhD and or the taught Master of Science degrees in the field of Food industry: Management and Marketing, Food Safety and Toxicology and the postgraduate diploma in dietetics.

The mission is to provide a progressive and effective programme that integrates theoretical and experiential learning to better prepare students for the challenges of the workplace. Throughout the curriculum, there is consistent emphasis on experiential learning through laboratory studies, internship training, research-based learning, debate and presentations, which are designed to enhance students' critical thinking, communication and collaboration, tackling of ill-defined problems, development of individual learning objectives and self-evaluation of performance. Internship experiences can be gained in medical centers, schools, industries, government and community setting. Students graduated from this programme are prepared for diverse careers in the food industry, government or private-sector food and nutrition agencies, and scientific research laboratories, health-care and fitness facilities, hospitals, nutrition edition and communication enterprises.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand the science underpinning food and nutrition as applied to diet and health, and to commercial food production (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: analyze controversial food related issues such as GM foods, nutritional labeling and food security (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: understand ethical perspectives and practice in all areas of food product development, food safety and public health nutrition, and appreciate and identify the need for ethical standards and professional codes of conduct (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: apply and disseminate scientific knowledge obtained from food, nutrition and related biosciences for the understanding of the influences of nutrition in health and disease, using a range of formats and approaches (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: apply independent thinking and the principles of scientific enquiry to conduct a small research project to test a food-and/or nutrition-related hypothesis (by means of coursework, tutorial classes, laboratory-based and project-based learning in the curriculum)
- PLO 6: demonstrate communication and teamwork skills necessary to working in a multi-disciplinary environment (by means of coursework and group-project learning in the curriculum)

# Impermissible Combinations:

Minor in Food & Nutritional Science

# Required courses (96 credits)

# 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

# **Disciplinary Core Courses (36 credits)**

BIOL1110 From molecules to cells (6)
BIOL1201 Introduction to food and nutrition (6)
BIOL2101 Principles of food chemistry (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

BIOC2600 Basic biochemistry (6)

Take either BIOL2220 or BIOC2600 to fulfill this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL2220 or BIOC2600 to fulfill this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive

# 2. Advanced level courses (42 credits)

**Disciplinary Core Courses (18 credits)** 

BIOL3202 Nutritional biochemistry (6)
BIOL3203 Food microbiology (6)
BIOL3209 Food and nutrient analysis (6)

Disciplinary Electives (24 credits)

At least 24 credits selected from the following courses:
BIOL3204 Nutrition and the life cycle (6)

BIOL3205 Human physiology (6) BIOL3206 Clinical nutrition (6)

Take either BIOL3206 or BIOL3606 to fulfill this 24 credits requirement, but not both. BIOL3206 and BIOL3606 are mutually exclusive.

Principles of toxicology (6)

	BIOL3207		[previous title: Food and nutritional toxicology (6) ]	
	BIOL3211	Nutrigenomics (6)	(🜖 ]	
П	BIOL3215	Principles of dietary assessment (6)		
П	BIOL3216	Food waste management (6)		
П	BIOL3217	Food, environment and health (6)		
П	BIOL3218	Food hygiene and quality control (6)		
	BIOL3606	Diet and disease (6)	Take either BIOL3206 or BIOL3606 to fulfill this 24 credits requirement, but not both. BIOL3206 and BIOL3606 are mutually exclusive.	
	BIOL3608	Food commodities (6)	Take either BIOL3608 or BIOL4208 to fulfill this 24 credits requirement, but not both. BIOL3608 and BIOL4208 are mutually exclusive.	
П	BIOL4201	Public health nutrition (6)	exclusive.	
П	BIOL4202	Nutrition and sports performance (6)		
П	BIOL4205	Food technology (6)	[previous title: Food processing and	
П	B.02.1200		engineering (6) ]	
	BIOL4208	Meat, dairy and grain sciences (6)	Take either BIOL3608 or BIOL4208 to fulfill this 24 credits requirement, but not both. BIOL3608 and BIOL4208 are mutually exclusive.	
П	BIOL4209	Functional foods (6)		
П	BIOL4411	Plant and food biotechnology (6)		
	3. Capstone requi	rement (6 credits)		
П	At least 6 credits selected from the following courses:			
	BIOL3992	Directed studies in food & nutritional science (6)		
	BIOL4913	Advanced practicum on food and nutrient analysis (6)		
	BIOL4922	Food product development and evaluation (6)		
	BIOL4962	Food & nutritional science internship (6)		
	BIOL4992	Food & nutritional science project (12)		
П				

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 and SCNC1112. Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 5. Students who wish to specialize in a certain area may choose to emphasize selection of courses from the following lists:
- (a) Food Science and Technology: BIOL3608; BIOL3207; BIOL3209; BIOL3216; BIOL3218; BIOL4205; BIOL4208; BIOL4209; BIOL4411; BIOL4913; BIOL4922.
- (b) Nutrition and Health Science: BIOL3204; BIOL3205; BIOL3206; BIOL3207; BIOL3211; BIOL3215; BIOL3217; BIOL3218; BIOL3606; BIOL4201; BIOL4202.
- 6. Students who may wish to pursue postgraduate study in dietetics are strongly advised to consult their academic and course selection advisors regarding additional courses in Physiology and Biochemistry.

## Remarks

Major Title Major in Food & Nutritional Science

Offered to students 2016

admitted to Year 1 in

## Objectives:

The Major in Food and Nutritional Science aims to offer an exciting, dynamic, and challenging environment to prepare the students for career opportunities in food and nutritional science. The goals of the programme are to provide the students with: (a) critical knowledge and understanding of the theoretical and practical aspects of food science and technology, and nutrition and their relationship to human health; (b) critical knowledge and understanding on the relationship between food and a wide range of social, legal, technological and environmental factors; (c) a curriculum meeting the requirements for higher degree in MPhil and PhD and or the taught Master of Science degrees in the field of Food industry: Management and Marketing, Food Safety and Toxicology and the postgraduate diploma in dietetics.

The mission is to provide a progressive and effective programme that integrates theoretical and experiential learning to better prepare students for the challenges of the workplace. Throughout the curriculum, there is consistent emphasis on experiential learning through laboratory studies, internship training, research-based learning, debate and presentations, which are designed to enhance students' critical thinking, communication and collaboration, tackling of ill-defined problems, development of individual learning objectives and self-evaluation of performance. Internship experiences can be gained in medical centers, schools, industries, government and community setting. Students graduated from this programme are prepared for diverse careers in the food industry, government or private-sector food and nutrition agencies, and scientific research laboratories, health-care and fitness facilities, hospitals, nutrition edition and communication enterprises.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand the science underpinning food and nutrition as applied to diet and health, and to commercial food production (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: analyze controversial food related issues such as GM foods, nutritional labeling and food security (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: understand ethical perspectives and practice in all areas of food product development, food safety and public health nutrition, and appreciate and identify the need for ethical standards and professional codes of conduct (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: apply and disseminate scientific knowledge obtained from food, nutrition and related biosciences for the understanding of the influences of nutrition in health and disease, using a range of formats and approaches (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: apply independent thinking and the principles of scientific enquiry to conduct a small research project to test a food-and/or nutrition-related hypothesis (by means of coursework, tutorial classes, laboratory-based and project-based learning in the curriculum)
- PLO 6: demonstrate communication and teamwork skills necessary to working in a multi-disciplinary environment (by means of coursework and group-project learning in the curriculum)

# Impermissible Combinations:

Minor in Food & Nutritional Science

# Required courses (96 credits)

# 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

BIOL1110 From molecules to cells (6)
BIOL1201 Introduction to food and nutrition (6)
BIOL1309 Evolutionary diversity (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

BIOC2600 Basic biochemistry (6)

Take either BIOL2220 or BIOC2600 to fufill this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually

exclusive.

Take either BIOL2220 or BIOC2600 to fufill this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

2. Advanced level courses (42 credits)

Disciplinary Core Courses (18 credits)

BIOL3201 Food chemistry (6)
BIOL3202 Nutritional biochemistry (6)
BIOL3203 Food microbiology (6)

Disciplinary Electives (24 credits)

At least 24 credits selected from the following courses: BIOL3204 Nutrition and the life cycle (6)

BIOL3205 Human physiology (6) BIOL3206 Clinical nutrition (6)

Take either BIOL3206 or BIOL3606 to fulfill this 24 credits requirement, but not both. BIOL3206 and BIOL3606 are mutually exclusive.

Principles of toxicology (6)

BIOL3207		[previous title: Food and nutritional toxicology
BIOL3208	Food safety and quality management (6)	(6) ] Take either BIOL3208 or BIOL3218 to fufill this 24 credits requirement, but not both. BIOL3208 and BIOL3218 are mutually exclusive.
BIOL3209	Food and nutrient analysis (6)	
BIOL3210	Grain production and utilization (6)	Take either BIOL3210 or BIOL4208 to fufill this 24 credits requirement, but not both. BIOL3210 and BIOL4208 are mutually exclusive.
BIOL3211	Nutrigenomics (6)	
BIOL3215	Principles of dietary assessment (6)	
BIOL3216	Food waste management (6)	
BIOL3217	Food, environment and health (6)	
BIOL3218	Food hygiene and quality control (6)	Take either BIOL3208 or BIOL3218 to fufill this 24 credits requirement, but not both. BIOL3208 and BIOL3218 are mutually exclusive.
BIOL3606	Diet and disease (6)	Take either BIOL3206 or BIOL3606 to fulfill this 24 credits requirement, but not both. BIOL3206 and BIOL3606 are mutually exclusive.
BIOL3608	Food commodities (6)	Take either BIOL3608 or BIOL4208 to fulfill this 24 credits requirement, but not both. BIOL3608 and BIOL4208 are mutually exclusive.
BIOL4201	Public health nutrition (6)	oxoladivo.
BIOL4202	Nutrition and sports performance (6)	
BIOL4204	Diet, brain function and behavior (6)	
BIOL4205	Food technology (6)	[previous title: Food processing and
BIOL4207	Meat and dairy sciences (6)	engineering (6) ] Take either BIOL4207 or BIOL4208 to fufill this 24 credits requirement, but not both.
		BIOL4207 and BIOL4208 are mutually exclusive.
BIOL4208	Meat, dairy and grain sciences (6)	Take either BIOL3210 or BIOL4208; BIOL4207 or BIOL4208; BIOL3608 or BIOL4208 to fufill this 24 credits requirement, but not both. BIOL3210 and BIOL4208; BIOL4207 and BIOL4208; BIOL3608 and BIOL4208 are mutually exclusive.
BIOL4209	Functional foods (6)	,
BIOL4411	Plant and food biotechnology (6)	
3. Capstone require	ement (6 credits)	
At least 6 credits s	selected from the following courses:	
BIOL3992	Directed studies in food & nutritional science (6)	
BIOL4912	Sensory evaluation of food (6)	
BIOL4913	Advanced practicum on food and nutrient analysis (6)	
BIOL4922	Food product development and evaluation (6)	
BIOL4962	Food & nutritional science internship (6)	
BIOL4992	Food & nutritional science project (12)	

## Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 and SCNC1112. Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
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- 5. Students who wish to specialize in a certain area may choose to emphasize selection of courses from the following lists:
- (a) Food Science and Technology: BIOL3608; BIOL3207; BIOL3208 or BIOL3218; BIOL3209; BIOL3210 or BIOL4208; BIOL3216; BIOL4205; BIOL4207 or BIOL4208; BIOL4209; BIOL4411; BIOL4913; BIOL4922.
- (b) Nutrition and Health Science: BIOL3204; BIOL3205; BIOL3206; BIOL3207; BIOL3208 or BIOL3218; BIOL3211; BIOL3215; BIOL3217; BIOL3606; BIOL4201; BIOL4202.
- 6. Students who may wish to pursue postgraduate study in dietetics are strongly advised to consult their academic and course selection advisors regarding additional courses in Physiology and Biochemistry.

Major Title Major in Food & Nutritional Science

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

The Major in Food and Nutritional Science aims to offer an exciting, dynamic, and challenging environment to prepare the students for career opportunities in food and nutritional science. The goals of the programme are to provide the students with: (a) critical knowledge and understanding of the theoretical and practical aspects of food science and technology, and nutrition and their relationship to human health; (b) critical knowledge and understanding on the relationship between food and a wide range of social, legal, technological and environmental factors; (c) a curriculum meeting the requirements for higher degree in MPhil and PhD and or the taught Master of Science degrees in the field of Food industry: Management and Marketing, Food Safety and Toxicology and the postgraduate diploma in dietetics.

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## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand the science underpinning food and nutrition as applied to diet and health, and to commercial food production (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: analyze controversial food related issues such as GM foods, nutritional labeling and food security (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: understand ethical perspectives and practice in all areas of food product development, food safety and public health nutrition, and appreciate and identify the need for ethical standards and professional codes of conduct (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: apply and disseminate scientific knowledge obtained from food, nutrition and related biosciences for the understanding of the influences of nutrition in health and disease, using a range of formats and approaches (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: apply independent thinking and the principles of scientific enquiry to conduct a small research project to test a food-and/or nutrition-related hypothesis (by means of coursework, tutorial classes, laboratory-based and project-based learning in the curriculum)
- PLO 6: demonstrate communication and teamwork skills necessary to working in a multi-disciplinary environment (by means of coursework and group-project learning in the curriculum)

# Impermissible Combinations:

Minor in Food & Nutritional Science

# Required courses (96 credits)

# 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

BIOL1110 From molecules to cells (6)
BIOL1201 Introduction to food and nutrition (6)
BIOL1309 Evolutionary diversity (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

BIOC2600 Basic biochemistry (6)

Take either BIOL2220 or BIOC2600 to fulfill this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL2220 or BIOC2600 to fulfill this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive

Take either BIOL3206 or BIOL3606 to fulfill

# 2. Advanced level courses (42 credits)

Disciplinary Core Courses (18 credits)

BIOL3201 Food chemistry (6)
BIOL3202 Nutritional biochemistry (6)
BIOL3203 Food microbiology (6)

Disciplinary Electives (24 credits)

At least 24 credits selected from the following courses: BIOL3204 Nutrition and the life cycle (6)

BIOL3205 Human physiology (6) BIOL3206 Clinical nutrition (6)

this 24 credits requirement, but not both. BIOL3206 and BIOL3606 are mutually exclusive.

Principles of toxicology (6)

BIOL3207		[previous title: Food and nutritional toxicology		
BIOL3208	Food safety and quality management (6)	(6) ] Take either BIOL3208 or BIOL3218 to fulfill		
DIOLOZOO	1 ood salety and quality management (o)	this 24 credits requirement, but not both.		
		BIOL3208 and BIOL3218 are mutually		
BIOL3209	Food and nutrient analysis (6)	exclusive.		
BIOL3210	Grain production and utilization (6)	Take either BIOL3210 or BIOL4208 to fulfill		
B1020210	(· ·	this 24 credits requirement, but not both.		
		BIOL3210 and BIOL4208 are mutually		
BIOL3211	Nutrigenomics (6)	exclusive.		
BIOL3217	Principles of dietary assessment (6)			
BIOL3216	Food waste management (6)			
BIOL3217	Food, environment and health (6)			
BIOL3218	Food hygiene and quality control (6)	Take either BIOL3208 or BIOL3218 to fulfill		
		this 24 credits requirement, but not both. BIOL3208 and BIOL3218 are mutually		
		exclusive.		
BIOL3606	Diet and disease (6)	Take either BIOL3206 or BIOL3606 to fulfill		
		this 24 credits requirement, but not both.		
		BIOL3206 and BIOL3606 are mutually exclusive.		
BIOL3608	Food commodities (6)	Take either BIOL3608 or BIOL4208 to fulfill		
	( )	this 24 credits requirement, but not both.		
		BIOL3608 and BIOL4208 are mutually exclusive.		
BIOL4201	Public health nutrition (6)	exclusive.		
BIOL4201	Nutrition and sports performance (6)			
BIOL4204	Diet, brain function and behavior (6)			
BIOL4205	Food technology (6)	[previous title: Food processing and		
DIOI 4007	Most and dainy esigness (6)	engineering (6) ] Take either BIOL4207 or BIOL4208 to fulfill		
BIOL4207	Meat and dairy sciences (6)	this 24 credits requirement, but not both.		
		BIOL4207 and BIOL4208 are mutually		
		exclusive.		
BIOL4208	Meat, dairy and grain sciences (6)	Take either BIOL3210 or BIOL4208; BIOL4207 or BIOL4208; BIOL3608 or		
		BIOL4208 to fufill this 24 credits requirement,		
		but not both. BIOL3210 and BIOL4208;		
		BIOL4207 and BIOL4208; BIOL3608 and BIOL4208 are mutually exclusive.		
BIOL4209	Functional foods (6)	DIOL4200 are mulually exclusive.		
BIOL4210	Food product development (6)			
BIOL4411	Plant and food biotechnology (6)			
	3. Capstone requirement (6 credits)			
	selected from the following courses:			
BIOL3992	Directed studies in food & nutritional science (6)			
BIOL4912 BIOL4913	Sensory evaluation of food (6)  Advanced practicum on food and nutrient analysis (6)			
BIOL4913	Food product development and evaluation (6)			
BIOL4962	Food & nutritional science internship (6)			
BIOL4992	Food & nutritional science project (12)			

## Notes:

- 1. BIOL4210 and BIOL4922 are mutually exclusive.
- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 and SCNC1112. Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details
- 6. Students who wish to specialize in a certain area may choose to emphasize selection of courses from the following lists:
- (a) Food Science and Technology: BIOL3608; BIOL3207; BIOL3208 or BIOL3218; BIOL3209; BIOL3210 or BIOL4208; BIOL3216; BIOL4205; BIOL4207 or BIOL4208; BIOL4209; BIOL4210 or BIOL4922; BIOL4411; BIOL4913.
- (b) Nutrition and Health Science: BIOL3204; BIOL3205; BIOL3206; BIOL3207; BIOL3208 or BIOL3218; BIOL3211; BIOL3215; BIOL3217; BIOL3606; BIOL4201; BIOL4202.

7. Students who may wish to pursue postgraduate study in dietetics are strongly advised to consult their academic and course selection advisors regarding additional courses in Physiology and Biochemistry.

#### Remarks

Major Title Major in Food & Nutritional Science 2014

Offered to students

admitted to Year 1 in

## **Objectives:**

The Major in Food and Nutritional Science aims to offer an exciting, dynamic, and challenging environment to prepare the students for career opportunities in food and nutritional science. The goals of the programme are to provide the students with: (a) critical knowledge and understanding of the theoretical and practical aspects of food science and technology, and nutrition and their relationship to human health; (b) critical knowledge and understanding on the relationship between food and a wide range of social, legal, technological and environmental factors; (c) a curriculum meeting the requirements for higher degree in MPhil and PhD and or the taught Master of Science degrees in the field of Food industry: Management and Marketing, Food Safety and Toxicology and the postgraduate diploma in dietetics.

The mission is to provide a progressive and effective programme that integrates theoretical and experiential learning to better prepare students for the challenges of the workplace. Throughout the curriculum, there is consistent emphasis on experiential learning through laboratory studies, internship training, research-based learning, debate and presentations, which are designed to enhance students' critical thinking, communication and collaboration, tackling of ill-defined problems, development of individual learning objectives and self-evaluation of performance. Internship experiences can be gained in medical centers, schools, industries, government and community setting. Students graduated from this programme are prepared for diverse careers in the food industry, government or private-sector food and nutrition agencies, and scientific research laboratories, health-care and fitness facilities, hospitals, nutrition edition and communication enterprises.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand the science underpinning food and nutrition as applied to diet and health, and to commercial food production (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: analyze controversial food related issues such as GM foods, nutritional labeling and food security (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: understand ethical perspectives and practice in all areas of food product development, food safety and public health nutrition, and appreciate and identify the need for ethical standards and professional codes of conduct (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: apply and disseminate scientific knowledge obtained from food, nutrition and related biosciences for the understanding of the influences of nutrition in health and disease, using a range of formats and approaches (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: apply independent thinking and the principles of scientific enquiry to conduct a small research project to test a foodand/or nutrition-related hypothesis (by means of coursework, tutorial classes, laboratory-based and project-based learning in the curriculum)
- PLO 6: demonstrate communication and teamwork skills necessary to working in a multi-disciplinary environment (by means of coursework and group-project learning in the curriculum)

# Impermissible Combinations:

Minor in Food & Nutritional Science

# Required courses (96 credits)

# 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

Scientific method and reasoning (6) SCNC1111 SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

From molecules to cells (6) BIOL1110 Introduction to food and nutrition (6) BIOL1201 BIOL1309 Evolutionary diversity (6)

Biostatistics (6) BIOL2102

BIOL2103 Biological sciences laboratory course (6)

Principles of biochemistry (6) **BIOL2220** 

BIOC2600 Basic biochemistry (6) Take either BIOL2220 or BIOC2600 to fufill this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL2220 or BIOC2600 to fufill this 36 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive

# 2. Advanced level courses (42 credits)

**Disciplinary Core Courses (18 credits)** 

BIOL3201 Food chemistry (6) Nutritional biochemistry (6) BIOL3202 Food microbiology (6) BIOL3203

**Disciplinary Electives (24 credits)** 

At least 24 credits selected from the following courses: Nutrition and the life cycle (6) **BIOI 3204** 

Human physiology (6) BIOL3205 Clinical nutrition (6) BIOL3206

Principles of toxicology (6)

Take either BIOL3206 or BIOL3606 to fulfill this 24 credits requirement, but not both. BIOL3206 and BIOL3606 are mutually exclusive.

BIOL3207		[previous title: Food and nutritional toxicology
BIOL3208	Food safety and quality management (6)	(6) ] Take either BIOL3208 or BIOL3218 to fulfill this 24 credits requirement, but not both. BIOL3208 and BIOL3218 are mutually exclusvie.
BIOL3209	Food and nutrient analysis (6)	
BIOL3210	Grain production and utilization (6)	Take either BIOL3210 or BIOL4208 to fulfill this 24 credits requirement, but not both. BIOL3210 and BIOL4208 are mutually exclusive.
BIOL3211	Nutrigenomics (6)	
BIOL3215	Principles of dietary assessment (6)	
BIOL3216	Food waste management (6)	
BIOL3217	Food, environment and health (6)	
BIOL3218	Food hygiene and quality control (6)	Take either BIOL3208 or BIOL3218 to fulfill this 24 credits requirement, but not both. BIOL3208 and BIOL3218 are mutually exclusive.
BIOL3606	Diet and disease (6)	Take either BIOL3206 or BIOL3606 to fulfill
2.023000	( )	this 24 credits requirement, but not both. BIOL3206 and BIOL3606 are mutually exclusive.
BIOL3608	Food commodities (6)	Take either BIOL3608 or BIOL4208 to fulfill this 24 credits requirement, but not both. BIOL3608 and BIOL4208 are mutually exclusive.
BIOL4201	Public health nutrition (6)	exclusive.
BIOL4201	Nutrition and sports performance (6)	
BIOL4202 BIOL4204	Diet, brain function and behavior (6)	
	Food technology (6)	[previous title: Food processing and
BIOL4205	1 ood technology (o)	engineering (6) ]
BIOL4207	Meat and dairy sciences (6)	BIOL4207 or BIOL4208 to fulfill this 24 credits requirement, but not both. BIOL4207
DIOI 4200	Most dairy and grain sciences (6)	and BIOL4208 are mutually exclusive.
BIOL4208	Meat, dairy and grain sciences (6)	Take either BIOL3210 or BIOL4208; BIOL4207 or BIOL4208; BIOL3608 or BIOL4208 to fufill this 24 credits requirement, but not both. BIOL3210 and BIOL4208; BIOL4207 and BIOL4208; BIOL3608 and BIOL4208 are mutually exclusive.
BIOL4209	Functional foods (6)	DIOL-200 are mutually exclusive.
BIOL4210	Food product development (6)	
BIOL4210	Plant and food biotechnology (6)	
3. Capstone requir	<del></del> , ,	
	selected from the following courses:	
BIOL3992	Directed studies in food & nutritional science (6)	
BIOL4912	Sensory evaluation of food (6)	
BIOL4913	Advanced practicum on food and nutrient analysis (6)	
BIOL4922	Food product development and evaluation (6)	
BIOL4962	Food & nutritional science internship (6)	
BIOL4992	Food & nutritional science project (12)	

# Notes:

- 1. BIOL4210 and BIOL4922 are mutually exclusive.
- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 and SCNC1112. Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 6. Students who wish to specialize in a certain area may choose to emphasize selection of courses from the following lists:
- (a) Food Science and Technology: BIOL3608; BIOL3207; BIOL3208 or BIOL3218; BIOL3209; BIOL3210 or BIOL4208; BIOL3216; BIOL4205; BIOL4207 or BIOL4208; BIOL4209; BIOL4210 or BIOL4922; BIOL4411; BIOL4913.
- (b) Nutrition and Health Science: BIOL3204; BIOL3205; BIOL3206; BIOL3207; BIOL3208 or BIOL3218; BIOL3211; BIOL3215; BIOL3217; BIOL3206; BIOL4201; BIOL4202.
- 7. Students who may wish to pursue postgraduate study in dietetics are strongly advised to consult their academic and course selection

advisors regarding additional courses in Physiology and Biochemistry.

Major Title Major in Food & Nutritional Science

Offered to students 2013

admitted to Year 1 in

## **Objectives:**

The Major in Food and Nutritional Science aims to offer an exciting, dynamic, and challenging environment to prepare the students for career opportunities in food and nutritional science. The goals of the programme are to provide the students with: (a) critical knowledge and understanding of the theoretical and practical aspects of food science and technology, and nutrition and their relationship to human health; (b) critical knowledge and understanding on the relationship between food and a wide range of social, legal, technological and environmental factors; (c) a curriculum meeting the requirements for higher degree in MPhil and PhD and or the taught Master of Science degrees in the field of Food industry: Management and Marketing, Food Safety and Toxicology and the postgraduate diploma in dietetics.

The mission is to provide a progressive and effective programme that integrates theoretical and experiential learning to better prepare students for the challenges of the workplace. Throughout the curriculum, there is consistent emphasis on experiential learning through laboratory studies, internship training, research-based learning, debate and presentations, which are designed to enhance students' critical thinking, communication and collaboration, tackling of ill-defined problems, development of individual learning objectives and self-evaluation of performance. Internship experiences can be gained in medical centers, schools, industries, government and community setting. Students graduated from this programme are prepared for diverse careers in the food industry, government or private-sector food and nutrition agencies, and scientific research laboratories, health-care and fitness facilities, hospitals, nutrition edition and communication enterprises.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand the science underpinning food and nutrition as applied to diet and health, and to commercial food production (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: analyze controversial food related issues such as GM foods, nutritional labeling and food security (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: understand ethical perspectives and practice in all areas of food product development, food safety and public health nutrition, and appreciate and identify the need for ethical standards and professional codes of conduct (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: apply and disseminate scientific knowledge obtained from food, nutrition and related biosciences for the understanding of the influences of nutrition in health and disease, using a range of formats and approaches (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
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- PLO 6: demonstrate communication and teamwork skills necessary to working in a multi-disciplinary environment (by means of coursework and group-project learning in the curriculum)

# Impermissible Combinations:

Minor in Food & Nutritional Science

# Required courses (96 credits)

# 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

BIOL1110 From molecules to cells (6)
BIOL1201 Introduction to food and nutrition (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

BIOC2600 Basic biochemistry (6)

Disciplinary Electives (6 credits)

BIOL1309 Evolutionary diversity (6)
BIOL2306 Ecology and evolution (6)

2. Advanced level courses (42 credits)
Disciplinary Core Courses (18 credits)

BIOL3201 Food chemistry (6)
BIOL3202 Nutritional biochemistry (6)
BIOL3203 Food microbiology (6)

**Disciplinary Electives (24 credits)** 

At least 24 credits selected from the following courses:
BIOL3204 Nutrition and the life cycle (6)
BIOL3205 Human physiology (6)

Clinical nutrition (6)

Take either BIOL2220 or BIOC2600 to fufill this 30 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL2220 or BIOC2600 to fufill this 30 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL1309 or BIOL2306 to fulfill this 6 credits requirement, but not both. Take either BIOL1309 or BIOL2306 to fulfill this 6 credits requirement, but not both.

BIOL3206		Take either BIOL3206 or BIOL3606 to fulfill this 24 credits requirement, but not both. BIOL3206 and BIOL3606 are mutually exclusive.
BIOL3207	Principles of toxicology (6)	[previous title: Food and nutritional toxicology (6)]
BIOL3208	Food safety and quality management (6)	Take either BIOL3208 or BIOL3218 to fulfill this 24 credits requirement, but not both. BIOL3208 and BIOL3218 are mutually exclusive.
BIOL3209 BIOL3210	Food and nutrient analysis (6) Grain production and utilization (6)	Take either BIOL3210 or BIOL4208 to fulfill this 24 credits requirement, but not both. BIOL3210 and BIOL4208 are mutually exclusive.
BIOL3211 BIOL3215 BIOL3216	Nutrigenomics (6) Principles of dietary assessment (6) Food waste management (6)	5,666,76
BIOL3217 BIOL3218	Food, environment and health (6) Food hygiene and quality control (6)	Take either BIOL3208 or BIOL3218 to fulfill this 24 credits requirement, but not both. BIOL3208 and BIOL3218 are mutually exclusive.
BIOL3606	Diet and disease (6)	Take either BIOL3206 or BIOL3606 to fulfill this 24 credits requirement, but not both. BIOL3206 and BIOL3606 are mutually exclusive.
BIOL3608	Food commodities (6)	Take either BIOL3608 or BIOL4208 to fulfill this 24 credits requirement, but not both. BIOL3608 and BIOL4208 are mutually exclusive.
BIOL4201 BIOL4202 BIOL4204	Public health nutrition (6) Nutrition and sports performance (6) Diet, brain function and behavior (6)	
BIOL4205	Food technology (6)	[previous title: Food processing and engineering (6) ]
BIOL4207	Meat and dairy sciences (6)	Take either BIOL4207 or BIOL4208 to fulfill this 24 credits requirement, but not both. BIOL4207 and BIOL4208 are mutually exclusive.
BIOL4208	Meat, dairy and grain sciences (6)	Take either BIOL3210 or BIOL4208; BIOL4207 or BIOL4208; BIOL3608 or BIOL4208 to fufill this 24 credits requirement, but not both. BIOL3210 and BIOL4208; BIOL4207 and BIOL4208; BIOL3608 and BIOL4208 are mutually exclusive.
BIOL4209	Functional foods (6)	,
BIOL4210 BIOL4411	Food product development (6) Plant and food biotechnology (6)	
3. Capstone requirer	ment (6 credits)	
At least 6 credits se	elected from the following courses: Directed studies in food & nutritional science (6)	
BIOL3992 BIOL4912	Sensory evaluation of food (6)	
BIOL4913	Advanced practicum on food and nutrient analysis (6)	
BIOL4922	Food product development and evaluation (6)	
BIOL4962 BIOL4992	Food & nutritional science internship (6) Food & nutritional science project (12)	

# Notes:

- 1. BIOL4210 and BIOL4922 are mutually exclusive.
- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 and SCNC1112. Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
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- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 6. Students who wish to specialize in a certain area may choose to emphasize selection of courses from the following lists:
- (a) Food Science and Technology: BIOL3608; BIOL3207; BIOL3208 or BIOL3218; BIOL3209; BIOL3210 or BIOL4208; BIOL3216; BIOL4205;

- BIOL4207 or BIOL4208; BIOL4209; BIOL4210 or BIOL4922; BIOL4411; BIOL4913.
  (b) Nutrition and Health Science: BIOL3204; BIOL3205; BIOL3206; BIOL3207; BIOL3208 or BIOL3218; BIOL3211; BIOL3215; BIOL3217; BIOL3606; BIOL4201; BIOL4202.
- 7. Students who may wish to pursue postgraduate study in dietetics are strongly advised to consult their academic and course selection advisors regarding additional courses in Physiology and Biochemistry.

Major Title Major in Food & Nutritional Science

Offered to students 2012

admitted to Year 1 in

## **Objectives:**

The Major in Food and Nutritional Science aims to offer an exciting, dynamic, and challenging environment to prepare the students for career opportunities in food and nutritional science. The goals of the programme are to provide the students with: (a) critical knowledge and understanding of the theoretical and practical aspects of food science and technology, and nutrition and their relationship to human health; (b) critical knowledge and understanding on the relationship between food and a wide range of social, legal, technological and environmental factors; (c) a curriculum meeting the requirements for higher degree in MPhil and PhD and or the taught Master of Science degrees in the field of Food industry: Management and Marketing, Food Safety and Toxicology and the postgraduate diploma in dietetics.

The mission is to provide a progressive and effective programme that integrates theoretical and experiential learning to better prepare students for the challenges of the workplace. Throughout the curriculum, there is consistent emphasis on experiential learning through laboratory studies, internship training, research-based learning, debate and presentations, which are designed to enhance students' critical thinking, communication and collaboration, tackling of ill-defined problems, development of individual learning objectives and self-evaluation of performance. Internship experiences can be gained in medical centers, schools, industries, government and community setting. Students graduated from this programme are prepared for diverse careers in the food industry, government or private-sector food and nutrition agencies, and scientific research laboratories, health-care and fitness facilities, hospitals, nutrition edition and communication enterprises.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand the science underpinning food and nutrition as applied to diet and health, and to commercial food production (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: analyze controversial food related issues such as GM foods, nutritional labeling and food security (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
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- PLO 4: apply and disseminate scientific knowledge obtained from food, nutrition and related biosciences for the understanding of the influences of nutrition in health and disease, using a range of formats and approaches (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 5: apply independent thinking and the principles of scientific enquiry to conduct a small research project to test a food-and/or nutrition-related hypothesis (by means of coursework, tutorial classes, laboratory-based and project-based learning in the curriculum)
- PLO 6: demonstrate communication and teamwork skills necessary to working in a multi-disciplinary environment (by means of coursework and group-project learning in the curriculum)

# Impermissible Combinations:

Minor in Food & Nutritional Science

1. Introductory	level course	s (48 credits)
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Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

BIOL1110 From molecules to cells (6)
BIOL1201 Introduction to food and nutrition (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

BIOL2306 Ecology and evolution (6)
BIOC2600 Basic biochemistry (6)

Take either BIOL2220 or BIOC2600 to fulfill this 36 credits, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL2220 or BIOC2600 to fulfill this 36 credits, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

## 2. Advanced level courses (42 credits)

**Disciplinary Core Courses (18 credits)** 

BIOL3201 Food chemistry (6)
BIOL3202 Nutritional biochemistry (6)
BIOL3203 Food microbiology (6)

Disciplinary Electives (24 credits)

At least 24 credits selected from the following courses:
BIOL3204 Nutrition and the life cycle (6)
BIOL3205 Human physiology (6)

BIOL3205 Human physiology (6 BIOL3206 Clinical nutrition (6)

BIOL3207 Principles of toxicology (6)

Food safety and quality management (6)

Take either BIOL3206 or BIOL3606 to fulfill this 24 credits requirement, but not both. BIOL3206 and BIOL3606 are mutually exclusive.

[previous title: Food and nutritional toxicology

(6)]

BIOL3208		Take either BIOL3208 or BIOL3218 to fulfill
		this 24 credits requirement, but not both.
		BIOL3208 and BIOL3218 are mutually exclusive.
BIOL3209	Food and nutrient analysis (6)	CAGINGIVE.
BIOL3210	Grain production and utilization (6)	Take either BIOL3210 or BIOL4208 to fulfill
2.0202.0	- 1 (-7)	this 24 credits requirement, but not both.
		BIOL3210 and BIOL4208 are mutually
		exclusive.
BIOL3211	Nutrigenomics (6)	
BIOL3215	Principles of dietary assessment (6)	
BIOL3216	Food waste management (6)	
BIOL3217	Food, environment and health (6)	Taka aith an BIOL 2200 an BIOL 2040 to fulfill
BIOL3218	Food hygiene and quality control (6)	Take either BIOL3208 or BIOL3218 to fulfill this 24 credits requirement, but not both.
		BIOL3208 and BIOL3218 are mutually
		exclusive.
BIOL3606	Diet and disease (6)	Take either BIOL3206 or BIOL3606 to fulfill
		this 24 credits requirement, but not both.
		BIOL3206 and BIOL3606 are mutually
DIOL 2000	Food commodition (6)	exclusive. Take either BIOL3608 or BIOL4208 to fulfill
BIOL3608	Food commodities (6)	this 24 credits requirement, but not both.
		BIOL3608 and BIOL4208 are mutually
		exclusive.
BIOL4201	Public health nutrition (6)	
BIOL4202	Nutrition and sports performance (6)	
BIOL4204	Diet, brain function and behavior (6)	
BIOL4205	Food technology (6)	[previous title: Food processing and
DIOI 4007	Most and dainy asigness (6)	engineering (6) ] Take either BIOL4207 or BIOL4208 to fulfill
BIOL4207	Meat and dairy sciences (6)	this 24 credits requirement, but not both.
		BIOL4207 and BIOL4208 are mutually
		exclusive.
BIOL4208	Meat, dairy and grain sciences (6)	Take either BIOL3210 or BIOL4208;
		BIOL4207 or BIOL4208; BIOL3608 or
		BIOL4208 to fufill this 24 credits requirement,
		but not both. BIOL3210 and BIOL4208; BIOL4207 and BIOL4208: BIOL3608 and
		BIOL4207 and BIOL4206, BIOL3006 and BIOL4208 are mutually exclusive.
BIOL4209	Functional foods (6)	z=====================================
BIOL4210	Food product development (6)	
BIOL4411	Plant and food biotechnology (6)	
3. Capstone requi		
	s selected from the following courses:	
BIOL3992	Directed studies in food & nutritional science (6)	
BIOL4912	Sensory evaluation of food (6)	
BIOL4913	Advanced practicum on food and nutrient analysis (6)	
BIOL4922	Food product development and evaluation (6)	
BIOL4962	Food & nutritional science internship (6)	
BIOL4992	Food & nutritional science project (12)	

## Notes:

- 1. BIOL4210 and BIOL4922 are mutually exclusive.
- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 and SCNC1112. Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details
- 6. Students who wish to specialize in a certain area may choose to emphasize selection of courses from the following lists:
- (a) Food Science and Technology: BIOL3608; BIOL3207; BIOL3208 or BIOL3218; BIOL3209; BIOL3210 or BIOL4208; BIOL3216; BIOL4205; BIOL4207 or BIOL4208; BIOL4209; BIOL4210 or BIOL4922; BIOL4411; BIOL4913.
- (b) Nutrition and Health Science: BIOL3204; BIOL3205; BIOL3206; BIOL3207; BIOL3208 or BIOL3218; BIOL3211; BIOL3215; BIOL3217; BIOL3606; BIOL4201; BIOL4202.
- 7. Students who may wish to pursue postgraduate study in dietetics are strongly advised to consult their academic and course selection advisors regarding additional courses in Physiology and Biochemistry.

Major Title Major in Geology

Offered to students 2021

admitted to Year 1 in

#### **Objectives:**

Geology concerns with the scientific study of the Earth's structure, processes, material and history. Geologists apply knowledge of chemistry, biology, physics and mathematics to solve Earth problems. The Geology Major aims to give students a sound foundation of the geological sciences and enable them to pursue postgraduate studies or careers in the geosciences. The curriculum emphasizes the development of knowledge and skills, and practical experience in the field. The core courses are designed to give students a well-rounded understanding of the geological disciplines including petrology, paleontology, geophysics, geochemistry, geochronology and the applications of geological knowledge to resource development, natural hazard management, and geotechnical and environmental engineering. Students who wish to become a professional geologist may take additional designated courses designed to meet the pathway for accreditation as a chartered geologist.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and apply key concepts in the conventional areas of the geosciences, covering the areas of physical geology, historical geology, mineralogy, petrology, geochemistry, geophysics, structural geology, tectonics and petrogenesis, and earth resources (by means of coursework, laboratory-based, tutorial classes and project-based learning in the curriculum)
- PLO 2: have acquired the ability to make observation, description, measurement and analysis of common geological features in the field, conduct geological mapping as well as undertake independent geological study, and appraise the related ethical issues (by means of both local and overseas residential field learning experience)
- PLO 3: communicate scientific concepts and critically discuss aspects of contemporary issues pertaining to earth sciences, environments and resources (by means of capstone, project-based learning and presentation opportunities in the curriculum)
- PLO 4: have gained some insight to the real-life industrial environment and developed connections within the geosciences profession (by means of internship opportunities in the curriculum)
- PLO 5: work with others in an effective manner and have learned to accept and appreciate different cultures (by means of group project learning, field learning experience in the curriculum)

#### Impermissible Combinations:

Major in Geology (Intensive)

Minor in Earth Sciences

## Required courses (96 credits)

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

Disciplinary Core Courses (30 credits)

EASC1402 Principles of geology (6)

EASC2401 Fluid/solid interactions in earth processes (6)

EASC2402 Field and laboratory methods (6)

EASC2406 Geochemistry (6) EASC2407 Mineralogy (6)

# 2. Advanced level courses (48 credits)

# **Disciplinary Core Courses (36 credits)**

EASC3402 Petrology (6)

EASC3403 Sedimentary environments (6) EASC3404 Structural geology (6)

EASC3408 Geophysics (6)

EASC3409 Igneous and metamorphic petrogenesis (6)
EASC4406 Earth dynamics & global tectonics (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses: EASC3406 Reconstruction of past climate (6)

EASC3410 Hydrogeology (6)
EASC3412 Earth resources (6)

EASC3413 Engineering geology (6)
EASC3414 Soil and rock mechanics (6)

EASC3416 Advanced geochemistry and geochronology (6)

EASC3417 Earth through time (6)

EASC3999 Directed studies in earth sciences (6)
ENVS3007 Natural hazards and mitigation (6)
EASC4403 Biogeochemical cycles (6)
EASC4407 Regional geology (6)

EASC4408 Special topics in earth sciences (6) EASC4999 Earth sciences project (12)

3. Capstone requirement (6 credits)

EASC4955 Integrated field studies (6)

## Notes:

1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second

major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc svllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis
- 5. Candidates who have been admitted to Year 1 in 2021-22 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1112. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Biology, Chemistry, and Physics in the Hong Kong Diploma of Secondary Education (HKDSE)
   Level 5 or above in Biology, Chemistry, and Physics Higher Level in International Baccalaureate (IB)
- Grade B or above in Biology, Chemistry, and Physics in General Certificate of Education Advanced Level (GCEAL)
   Biology, Chemistry, and Physics qualification in Gao Kao will be considered on a case-by-case basis

#### Remarks:

Major Title Major in Geology

Offered to students 2020

admitted to Year 1 in

#### **Objectives:**

Geology concerns with the scientific study of the Earth's structure, processes, material and history. Geologists apply knowledge of chemistry, biology, physics and mathematics to solve Earth problems. The Geology Major aims to give students a sound foundation of the geological sciences and enable them to pursue postgraduate studies or careers in the geosciences. The curriculum emphasizes the development of knowledge and skills, and practical experience in the field. The core courses are designed to give students a well-rounded understanding of the geological disciplines including petrology, paleontology, geophysics, geochemistry, geochronology and the applications of geological knowledge to resource development, natural hazard management, and geotechnical and environmental engineering. Students who wish to become a professional geologist may take additional designated courses designed to meet the pathway for accreditation as a chartered geologist.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and apply key concepts in the conventional areas of the geosciences, covering the areas of physical geology, historical geology, mineralogy, petrology, geochemistry, geophysics, structural geology, tectonics and petrogenesis, and earth resources (by means of coursework, laboratory-based, tutorial classes and project-based learning in the curriculum)
- PLO 2: have acquired the ability to make observation, description, measurement and analysis of common geological features in the field, conduct geological mapping as well as undertake independent geological study, and appraise the related ethical issues (by means of both local and overseas residential field learning experience)
- PLO 3: communicate scientific concepts and critically discuss aspects of contemporary issues pertaining to earth sciences, environments and resources (by means of capstone, project-based learning and presentation opportunities in the curriculum)
- PLO 4: have gained some insight to the real-life industrial environment and developed connections within the geosciences profession (by means of internship opportunities in the curriculum)
- PLO 5: work with others in an effective manner and have learned to accept and appreciate different cultures (by means of group project learning, field learning experience in the curriculum)

#### Impermissible Combinations:

Major in Geology (Intensive)

Minor in Earth Sciences

# Required courses (96 credits)

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

Disciplinary Core Courses (30 credits)

EASC1402 Principles of geology (6)

EASC2401 Fluid/solid interactions in earth processes (6)

EASC2402 Field and laboratory methods (6)

EASC2406 Geochemistry (6) EASC2407 Mineralogy (6)

# 2. Advanced level courses (48 credits)

# **Disciplinary Core Courses (36 credits)**

EASC3402 Petrology (6)

EASC3403 Sedimentary environments (6) EASC3404 Structural geology (6)

EASC3408 Geophysics (6)

EASC3409 Igneous and metamorphic petrogenesis (6)
EASC4406 Earth dynamics & global tectonics (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

EASC3406 Reconstruction of past climate (6)
EASC3410 Hydrogeology (6)

EASC3412 Earth resources (6)
EASC3413 Engineering geology (6)
EASC3414 Soil and rock mechanics (6)

EASC3416 Advanced geochemistry and geochronology (6)

EASC3417 Earth through time (6)

EASC3999 Directed studies in earth sciences (6)
ENVS3007 Natural hazards and mitigation (6)
EASC4403 Biogeochemical cycles (6)
EASC4407 Regional geology (6)

EASC4408 Special topics in earth sciences (6) EASC4999 Earth sciences project (12)

3. Capstone requirement (6 credits)

EASC4955 Integrated field studies (6)

## Notes:

1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second

major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis

#### Remarks:

Major Title Major in Geology

Offered to students 2019

admitted to Year 1 in

#### **Objectives:**

Geology concerns with the scientific study of the Earth's structure, processes, material and history. Geologists apply knowledge of chemistry, biology, physics and mathematics to solve Earth problems. The Geology Major aims to give students a sound foundation of the geological sciences and enable them to pursue postgraduate studies or careers in the geosciences. The curriculum emphasizes the development of knowledge and skills, and practical experience in the field. The core courses are designed to give students a well-rounded understanding of the geological disciplines including petrology, paleontology, geophysics, geochemistry, geochronology and the applications of geological knowledge to resource development, natural hazard management, and geotechnical and environmental engineering. Students who wish to become a professional geologist may take additional designated courses designed to meet the pathway for accreditation as a chartered geologist.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and apply key concepts in the conventional areas of the geosciences, covering the areas of physical geology, historical geology, mineralogy, petrology, geochemistry, geophysics, structural geology, tectonics and petrogenesis, and earth resources (by means of coursework, laboratory-based, tutorial classes and project-based learning in the curriculum)
- PLO 2: have acquired the ability to make observation, description, measurement and analysis of common geological features in the field, conduct geological mapping as well as undertake independent geological study, and appraise the related ethical issues (by means of both local and overseas residential field learning experience)
- PLO 3: communicate scientific concepts and critically discuss aspects of contemporary issues pertaining to earth sciences, environments and resources (by means of capstone, project-based learning and presentation opportunities in the curriculum)
- PLO 4: have gained some insight to the real-life industrial environment and developed connections within the geosciences profession (by means of internship opportunities in the curriculum)
- PLO 5: work with others in an effective manner and have learned to accept and appreciate different cultures (by means of group project learning, field learning experience in the curriculum)

#### Impermissible Combinations:

Major in Geology (Intensive)

Minor in Earth Sciences

# Required courses (96 credits)

# 1. Introductory level courses (42 credits)

# Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

# Disciplinary Core Courses (30 credits)

EASC1402 Principles of geology (6)

EASC2401 Fluid/solid interactions in earth processes (6)

EASC2402 Field and laboratory methods (6)

EASC2406 Geochemistry (6) EASC2407 Mineralogy (6)

# 2. Advanced level courses (48 credits)

# **Disciplinary Core Courses (36 credits)**

EASC3402 Petrology (6)

EASC3403 Sedimentary environments (6) EASC3404 Structural geology (6) EASC3408 Geophysics (6)

EASC3409 Igneous and metamorphic petrogenesis (6)
EASC4406 Earth dynamics & global tectonics (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses: EASC3406 Reconstruction of past climate (6)

EASC3410 Hydrogeology (6)
EASC3412 Earth resources (6)
EASC3413 Engineering geology (6)
EASC3414 Soil and rock mechanics (6)

EASC3416 Advanced geochemistry and geochronology (6)

EASC3417 Earth through time (6)

EASC3999 Directed studies in earth sciences (6)
ENVS3007 Natural hazards and mitigation (6)
EASC4403 Biogeochemical cycles (6)
EASC4407 Regional geology (6)

EASC4408 Special topics in earth sciences (6) EASC4999 Earth sciences project (12)

## 3. Capstone requirement (6 credits)

EASC4955 Integrated field studies (6)

## Notes:

1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second

major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

# Remarks:

Major Title Major in Geology

Offered to students 2018

admitted to Year 1 in

#### **Objectives:**

Geology concerns with the scientific study of the Earth's structure, processes, material and history. Geologists apply knowledge of chemistry, biology, physics and mathematics to solve Earth problems. The Geology Major aims to give students a sound foundation of the geological sciences and enable them to pursue postgraduate studies or careers in the geosciences. The curriculum emphasizes the development of knowledge and skills, and practical experience in the field. The core courses are designed to give students a well-rounded understanding of the geological disciplines including petrology, paleontology, geophysics, geochemistry, geochronology and the applications of geological knowledge to resource development, natural hazard management, and geotechnical and environmental engineering. Students who wish to become a professional geologist may take additional designated courses designed to meet the pathway for accreditation as a chartered geologist.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and apply key concepts in the conventional areas of the geosciences, covering the areas of physical geology, historical geology, mineralogy, petrology, geochemistry, geophysics, structural geology, tectonics and petrogenesis, and earth resources (by means of coursework, laboratory-based, tutorial classes and project-based learning in the curriculum)
- PLO 2: have acquired the ability to make observation, description, measurement and analysis of common geological features in the field, conduct geological mapping as well as undertake independent geological study, and appraise the related ethical issues (by means of both local and overseas residential field learning experience)
- PLO 3: communicate scientific concepts and critically discuss aspects of contemporary issues pertaining to earth sciences, environments and resources (by means of capstone, project-based learning and presentation opportunities in the curriculum)
- PLO 4: have gained some insight to the real-life industrial environment and developed connections within the geosciences profession (by means of internship opportunities in the curriculum)
- PLO 5: work with others in an effective manner and have learned to accept and appreciate different cultures (by means of group project learning, field learning experience in the curriculum)

#### Impermissible Combinations:

Major in Geology (Intensive)

Minor in Earth Sciences

# Required courses (96 credits)

# 1. Introductory level courses (42 credits)

# Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

## **Disciplinary Core Courses (30 credits)**

EASC1402 Principles of geology (6)

EASC2401 Fluid/solid interactions in earth processes (6)

EASC2402 Field and laboratory methods (6)

EASC2406 Geochemistry (6) EASC2407 Mineralogy (6)

# 2. Advanced level courses (48 credits)

# **Disciplinary Core Courses (36 credits)**

EASC3402 Petrology (6)

EASC3403 Sedimentary environments (6) EASC3404 Structural geology (6) EASC3408 Geophysics (6)

EASC3409 Igneous and metamorphic petrogenesis (6)
EASC4406 Earth dynamics & global tectonics (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses: EASC3406 Reconstruction of past climate (6)

EASC3410 Hydrogeology (6)
EASC3412 Earth resources (6)
EASC3413 Engineering geology (6)

EASC3414 Soil and rock mechanics (6)
EASC3416 Advanced geochemistry and geochronology (6)

EASC3417 Earth through time (6)

EASC3999 Directed studies in earth sciences (6)
ENVS3007 Natural hazards and mitigation (6)
EASC4403 Biogeochemical cycles (6)
EASC4407 Regional geology (6)

EASC4408 Special topics in earth sciences (6) EASC4999 Earth sciences project (12)

3. Capstone requirement (6 credits)

EASC4955 Integrated field studies (6)

## Notes:

1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second

major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

# Remarks:

Major Title Major in Geology

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

Geology concerns with the scientific study of the Earth's structure, processes, material and history. Geologists apply knowledge of chemistry, biology, physics and mathematics to solve Earth problems. The Geology Major aims to give students a sound foundation of the geological sciences and enable them to pursue postgraduate studies or careers in the geosciences. The curriculum emphasizes the development of knowledge and skills, and practical experience in the field. The core courses are designed to give students a well-rounded understanding of the geological disciplines including petrology, paleontology, geophysics, geochemistry, geochronology and the applications of geological knowledge to resource development, natural hazard management, and geotechnical and environmental engineering. Students who wish to become a professional geologist may take additional designated courses designed to meet the pathway for accreditation as a chartered geologist.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and apply key concepts in the conventional areas of the geosciences, covering the areas of physical geology, historical geology, mineralogy, petrology, geochemistry, geophysics, structural geology, tectonics and petrogenesis, and earth resources (by means of coursework, laboratory-based, tutorial classes and project-based learning in the curriculum)
- PLO 2: have acquired the ability to make observation, description, measurement and analysis of common geological features in the field, conduct geological mapping as well as undertake independent geological study, and appraise the related ethical issues (by means of both local and overseas residential field learning experience)
- PLO 3: communicate scientific concepts and critically discuss aspects of contemporary issues pertaining to earth sciences, environments and resources (by means of capstone, project-based learning and presentation opportunities in the curriculum)
- PLO 4: have gained some insight to the real-life industrial environment and developed connections within the geosciences profession (by means of internship opportunities in the curriculum)
- PLO 5: work with others in an effective manner and have learned to accept and appreciate different cultures (by means of group project learning, field learning experience in the curriculum)

#### Impermissible Combinations:

Major in Geology (Intensive)

Minor in Earth Sciences

#### Required courses (96 credits)

# 1. Introductory level courses (42 credits)

# Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

### **Disciplinary Core Courses (30 credits)**

EASC1402 Principles of geology (6)

EASC2401 Fluid/solid interactions in earth processes (6)

EASC2402 Field and laboratory methods (6)

EASC2406 Geochemistry (6) EASC2407 Mineralogy (6)

# 2. Advanced level courses (48 credits)

# **Disciplinary Core Courses (36 credits)**

EASC3402 Petrology (6)

EASC3403 Sedimentary environments (6) EASC3404 Structural geology (6)

EASC3408 Geophysics (6)

EASC3409 Igneous and metamorphic petrogenesis (6)
EASC4406 Earth dynamics & global tectonics (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses: EASC3406 Reconstruction of past climate (6)

EASC3410 Hydrogeology (6)
EASC3412 Earth resources (6)

EASC3413 Engineering geology (6)
EASC3414 Soil and rock mechanics (6)

EASC3416 Advanced geochemistry and geochronology (6)

EASC3417 Earth through time (6)

EASC3999 Directed studies in earth sciences (6)
ENVS3007 Natural hazards and mitigation (6)
EASC4403 Biogeochemical cycles (6)
EASC4407 Regional geology (6)

EASC4408 Special topics in earth sciences (6) EASC4999 Earth sciences project (12)

3. Capstone requirement (6 credits)

EASC4955 Integrated field studies (6)

#### Notes:

1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second

major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

# Remarks:

Major Title Major in Geology

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

Geology concerns with the scientific study of the Earth's structure, processes, material and history. Geologists apply knowledge of chemistry, biology, physics and mathematics to solve Earth problems. The Geology Major aims to give students a sound foundation of the geological sciences and enable them to pursue postgraduate studies or careers in the geosciences. The curriculum emphasizes the development of knowledge and skills, and practical experience in the field. The core courses are designed to give students a well-rounded understanding of the geological disciplines including petrology, paleontology, geophysics, geochemistry, geochronology and the applications of geological knowledge to resource development, natural hazard management, and geotechnical and environmental engineering. Students who wish to become a professional geologist may take additional designated courses designed to meet the pathway for accreditation as a chartered geologist.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and apply key concepts in the conventional areas of the geosciences, covering the areas of physical geology, historical geology, mineralogy, petrology, geochemistry, geophysics, structural geology, tectonics and petrogenesis, and earth resources (by means of coursework, laboratory-based, tutorial classes and project-based learning in the curriculum)
- PLO 2: have acquired the ability to make observation, description, measurement and analysis of common geological features in the field, conduct geological mapping as well as undertake independent geological study, and appraise the related ethical issues (by means of both local and overseas residential field learning experience)
- PLO 3: communicate scientific concepts and critically discuss aspects of contemporary issues pertaining to earth sciences, environments and resources (by means of capstone, project-based learning and presentation opportunities in the curriculum)
- PLO 4: have gained some insight to the real-life industrial environment and developed connections within the geosciences profession (by means of internship opportunities in the curriculum)
- PLO 5: work with others in an effective manner and have learned to accept and appreciate different cultures (by means of group project learning, field learning experience in the curriculum)

#### Impermissible Combinations:

Major in Geology (Intensive)

Minor in Earth Sciences

### Required courses (96 credits)

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

Scientific method and reasoning (6) SCNC1111 Fundamentals of modern science (6) SCNC1112

**Disciplinary Core Courses (30 credits)** 

Principles of geology (6) EASC1402

Fluid/solid interactions in earth processes (6) EASC2401

EASC2402 Field and laboratory methods (6)

Geochemistry (6) FASC2406 Mineralogy (6) EASC2407

# 2. Advanced level courses (48 credits)

# **Disciplinary Core Courses (36 credits)**

EASC3402 Petrology (6)

Sedimentary environments (6) EASC3403 EASC3404 Structural geology (6) Geophysics (6) FASC3408

Igneous and metamorphic petrogenesis (6) EASC3409 Earth dynamics & global tectonics (6) EASC4406

# **Disciplinary Electives (12 credits)**

EASC3414

At least 12 credits selected from the following courses: Reconstruction of past climate (6) EASC3406

Hydrogeology (6) EASC3410 Earth resources (6) EASC3412 Engineering geology (6) EASC3413

Soil and rock mechanics (6) EASC3416 Advanced geochemistry and geochronology (6)

Earth through time (6) EASC3417

EASC3999 Directed studies in earth sciences (6) Natural hazards and mitigation (6) ENVS3007 **EASC4403** Biogeochemical cycles (6) Regional geology (6) EASC4407

Special topics in earth sciences (6) EASC4408 Earth sciences project (12) **EASC4999** 

3. Capstone requirement (6 credits)

EASC4955 Integrated field studies (6)

#### Notes:

1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second

major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

# Remarks:

Major Title Major in Geology

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

Geology concerns with the scientific study of the Earth's structure, processes, material and history. Geologists apply knowledge of chemistry, biology, physics and mathematics to solve Earth problems. The Geology Major aims to give students a sound foundation of the geological sciences and enable them to pursue postgraduate studies or careers in the geosciences. The curriculum emphasizes the development of knowledge and skills, and practical experience in the field. The core courses are designed to give students a well-rounded understanding of the geological disciplines including petrology, paleontology, geophysics, geochemistry, geochronology and the applications of geological knowledge to resource development, natural hazard management, and geotechnical and environmental engineering. Students who wish to become a professional geologist may take additional designated courses designed to meet the pathway for accreditation as a chartered geologist.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and apply key concepts in the conventional areas of the geosciences, covering the areas of physical geology, historical geology, mineralogy, petrology, geochemistry, geophysics, structural geology, tectonics and petrogenesis, and earth resources (by means of coursework, laboratory-based, tutorial classes and project-based learning in the curriculum)
- PLO 2: have acquired the ability to make observation, description, measurement and analysis of common geological features in the field, conduct geological mapping as well as undertake independent geological study, and appraise the related ethical issues (by means of both local and overseas residential field learning experience)
- PLO 3: communicate scientific concepts and critically discuss aspects of contemporary issues pertaining to earth sciences, environments and resources (by means of capstone, project-based learning and presentation opportunities in the curriculum)
- PLO 4: have gained some insight to the real-life industrial environment and developed connections within the geosciences profession (by means of internship opportunities in the curriculum)
- PLO 5: work with others in an effective manner and have learned to accept and appreciate different cultures (by means of group project learning, field learning experience in the curriculum)

#### Impermissible Combinations:

Major in Geology (Intensive)

Minor in Earth Sciences

### Required courses (96 credits)

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

Disciplinary Core Courses (30 credits)

EASC1402 Principles of geology (6)

EASC2401 Fluid/solid interactions in earth processes (6)

EASC2402 Field and laboratory methods (6)

EASC2406 Geochemistry (6) EASC2407 Mineralogy (6)

# 2. Advanced level courses (48 credits)

# Disciplinary Core Courses (36 credits)

EASC3402 Petrology (6)

EASC3403 Sedimentary environments (6)
EASC3404 Structural geology (6)
EASC3408 Geophysics (6)

EASC3409 Igneous and metamorphic petrogenesis (6)
EASC4406 Earth dynamics & global tectonics (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses: EASC3406 Reconstruction of past climate (6)

EASC3410 Hydrogeology (6)
EASC3412 Earth resources (6)
EASC3413 Engineering geology (6)
EASC3414 Soil and rock mechanics (6)

EASC3414 Soil and rock mechanics (6)
EASC3416 Advanced geochemistry and geochronology (6)

EASC3417 Earth through time (6)

EASC3999 Directed studies in earth sciences (6)
ENVS3007 Natural hazards and mitigation (6)
EASC4403 Biogeochemical cycles (6)
EASC4407 Regional geology (6)

EASC4408 Special topics in earth sciences (6) EASC4999 Earth sciences project (12)

3. Capstone requirement (6 credits)

EASC4955 Integrated field studies (6)

#### Notes:

1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second

major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

# Remarks:

Major Title Major in Geology

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

Geology concerns with the scientific study of the Earth's structure, processes, material and history. Geologists apply knowledge of chemistry, biology, physics and mathematics to solve Earth problems. The Geology Major aims to give students a sound foundation of the geological sciences and enable them to pursue postgraduate studies or careers in the geosciences. The curriculum emphasizes the development of knowledge and skills, and practical experience in the field. The core courses are designed to give students a well-rounded understanding of the geological disciplines including petrology, paleontology, geophysics, geochemistry, geochronology and the applications of geological knowledge to resource development, natural hazard management, and geotechnical and environmental engineering. Students who wish to become a professional geologist may take additional designated courses designed to meet the pathway for accreditation as a chartered geologist.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and apply key concepts in the conventional areas of the geosciences, covering the areas of physical geology, historical geology, mineralogy, petrology, geochemistry, geophysics, structural geology, tectonics and petrogenesis, and earth resources (by means of coursework, laboratory-based, tutorial classes and project-based learning in the curriculum)
- PLO 2: have acquired the ability to make observation, description, measurement and analysis of common geological features in the field, conduct geological mapping as well as undertake independent geological study, and appraise the related ethical issues (by means of both local and overseas residential field learning experience)
- PLO 3: communicate scientific concepts and critically discuss aspects of contemporary issues pertaining to earth sciences, environments and resources (by means of capstone, project-based learning and presentation opportunities in the curriculum)
- PLO 4: have gained some insight to the real-life industrial environment and developed connections within the geosciences profession (by means of internship opportunities in the curriculum)
- PLO 5: work with others in an effective manner and have learned to accept and appreciate different cultures (by means of group project learning, field learning experience in the curriculum)

#### Impermissible Combinations:

Minor in Earth Sciences

# Required courses (96 credits) 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

Principles of geology (6) EASC1402

Fluid/solid interactions in earth processes (6) EASC2401

Field and laboratory methods (6) EASC2402

EASC2406 Geochemistry (6) Mineralogy (6) EASC2407 2. Advanced level courses (48 credits)

**Disciplinary Core Courses (36 credits)** 

EASC3402 Petrology (6)

Sedimentary environments (6) EASC3403 Structural geology (6) EASC3404 EASC3408 Geophysics (6)

Igneous and metamorphic petrogenesis (6) EASC3409 EASC4406 Earth dynamics & global tectonics (6)

**Disciplinary Electives (12 credits)** 

At least 12 credits selected from the following courses:

EASC3406 Reconstruction of past climate (6) EASC3410 Hydrogeology (6) Earth resources (6) EASC3412 Engineering geology (6) **EASC3413** Soil and rock mechanics (6) EASC3414

EASC3416 Advanced geochemistry and geochronology (6)

Earth through time (6) FASC3417

Directed studies in earth sciences (6) EASC3999 Natural hazards and mitigation (6) ENVS3007 Biogeochemical cycles (6) FASC4403 EASC4407 Regional geology (6)

Special topics in earth sciences (6) EASC4408 Earth sciences project (12) EASC4999

3. Capstone requirement (6 credits)

EASC4955 Integrated field studies (6)

1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112

Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

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- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

### Remarks:

Major Title Major in Geology

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

Geology concerns with the scientific study of the Earth's structure, processes, material and history. Geologists apply knowledge of chemistry, biology, physics and mathematics to solve Earth problems. The Geology Major aims to give students a sound foundation of the geological sciences and enable them to pursue postgraduate studies or careers in the geosciences. The curriculum emphasizes the development of knowledge and skills, and practical experience in the field. The core courses are designed to give students a well-rounded understanding of the geological disciplines including petrology, paleontology, geophysics, geochemistry, geochronology and the applications of geological knowledge to resource development, natural hazard management, and geotechnical and environmental engineering. Students who wish to become a professional geologist may take additional designated courses designed to meet the pathway for accreditation as a chartered geologist.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and apply key concepts in the conventional areas of the geosciences, covering the areas of physical geology, historical geology, mineralogy, petrology, geochemistry, geophysics, structural geology, tectonics and petrogenesis, and earth resources (by means of coursework, laboratory-based, tutorial classes and project-based learning in the curriculum)
- PLO 2: have acquired the ability to make observation, description, measurement and analysis of common geological features in the field, conduct geological mapping as well as undertake independent geological study, and appraise the related ethical issues (by means of both local and overseas residential field learning experience)
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- PLO 4: have gained some insight to the real-life industrial environment and developed connections within the geosciences profession (by means of internship opportunities in the curriculum)
- PLO 5: work with others in an effective manner and have learned to accept and appreciate different cultures (by means of group project learning, field learning experience in the curriculum)

#### Impermissible Combinations:

Minor in Earth Sciences

# Required courses (96 credits) 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

EASC1402 Principles of geology (6)

EASC2401 Fluid/solid interactions in earth processes (6)

EASC2402 Field and laboratory methods (6)

EASC2406 Geochemistry (6) EASC2407 Mineralogy (6)

# 2. Advanced level courses (48 credits) Disciplinary Core Courses (36 credits)

#### EASC3402 Petrology (6)

EASC3403 Sedimentary environments (6) EASC3404 Structural geology (6)

EASC3408 Geophysics (6)

EASC3409 Igneous and metamorphic petrogenesis (6)
EASC4406 Earth dynamics & global tectonics (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

EASC3406 Reconstruction of past climate (6)
EASC3410 Hydrogeology (6)
EASC3412 Earth resources (6)
EASC3413 Engineering geology (6)
EASC3414 Soil and rock mechanics (6)

EASC3416 Advanced geochemistry and geochronology (6)

EASC3417 Earth through time (6)

EASC3999 Directed studies in earth sciences (6)
ENVS3007 Natural hazards and mitigation (6)
EASC4403 Biogeochemical cycles (6)
EASC4407 Regional geology (6)

EASC4408 Special topics in earth sciences (6)
EASC4999 Earth sciences project (12)

#### 3. Capstone requirement (6 credits)

EASC4955 Integrated field studies (6)

#### Notes:

1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112

Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

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- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

### Remarks:

Major Title Major in Geology

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

Geology concerns with the scientific study of the Earth's structure, processes, material and history. Geologists apply knowledge of chemistry, biology, physics and mathematics to solve Earth problems. The Geology Major aims to give students a sound foundation of the geological sciences and enable them to pursue postgraduate studies or careers in the geosciences. The curriculum emphasizes the development of knowledge and skills, and practical experience in the field. The core courses are designed to give students a well-rounded understanding of the geological disciplines including petrology, paleontology, geophysics, geochemistry, geochronology and the applications of geological knowledge to resource development, natural hazard management, and geotechnical and environmental engineering. Students who wish to become a professional geologist may take additional designated courses designed to meet the pathway for accreditation as a chartered geologist.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and apply key concepts in the conventional areas of the geosciences, covering the areas of physical geology, historical geology, mineralogy, petrology, geochemistry, geophysics, structural geology, tectonics and petrogenesis, and earth resources (by means of coursework, laboratory-based, tutorial classes and project-based learning in the curriculum)
- PLO 2: have acquired the ability to make observation, description, measurement and analysis of common geological features in the field, conduct geological mapping as well as undertake independent geological study, and appraise the related ethical issues (by means of both local and overseas residential field learning experience)
- PLO 3: communicate scientific concepts and critically discuss aspects of contemporary issues pertaining to earth sciences, environments and resources (by means of capstone, project-based learning and presentation opportunities in the curriculum)
- PLO 4: have gained some insight to the real-life industrial environment and developed connections within the geosciences profession (by means of internship opportunities in the curriculum)
- PLO 5: work with others in an effective manner and have learned to accept and appreciate different cultures (by means of group project learning, field learning experience in the curriculum)

#### Impermissible Combinations:

Minor in Earth Sciences

#### Required courses (96 credits)

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

# **Disciplinary Core Courses (30 credits)**

Principles of geology (6) EASC1402

Fluid/solid interactions in earth processes (6) EASC2401

Field and laboratory methods (6) EASC2402

EASC2406 Geochemistry (6) Mineralogy (6) FASC2407

### 2. Advanced level courses (48 credits) Disciplinary Core Courses (36 credits)

EASC3402 Petrology (6)

Sedimentary environments (6) EASC3403 Structural geology (6) EASC3404 EASC3408 Geophysics (6)

Igneous and metamorphic petrogenesis (6) EASC3409 EASC4406 Earth dynamics & global tectonics (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

EASC3406 Reconstruction of past climate (6) EASC3410 Hydrogeology (6) Earth resources (6) EASC3412 Engineering geology (6) **EASC3413** Soil and rock mechanics (6) EASC3414

EASC3416 Advanced geochemistry and geochronology (6)

EASC3417 Earth through time (6)

Directed studies in earth sciences (6) EASC3999 Natural hazards and mitigation (6) ENVS3007 Biogeochemical cycles (6) FASC4403 EASC4407 Regional geology (6)

Special topics in earth sciences (6) EASC4408 Earth sciences project (12) EASC4999

#### 3. Capstone requirement (6 credits)

EASC4955 Integrated field studies (6)

1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112

Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

### Remarks:

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Maior Title	Maior in Geology (Intensive)	١
IVIAIOI TILI <del>U</del>	Maior in Geology (Intensive	,

Offered to students 2021

admitted to Year 1 in

#### **Objectives:**

To provide an education in Geology which meets the current minimum requirements of the Geological Society of London for accreditation.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and apply key concepts in the conventional areas of the geosciences, covering the areas of physical geology, historical geology, mineralogy, petrology, geochemistry, geophysics, structural geology, tectonics and petrogenesis, and earth resources (by means of coursework, laboratory-based, tutorial classes and project-based learning in the curriculum)
- PLO 2: have acquired the ability to make observation, description, measurement and analysis of common geological features in the field, conduct geological mapping as well as undertake independent geological study, and appraise the related ethical issues (by means of both local and overseas residential field learning experience)
- PLO 3: communicate scientific concepts and critically discuss aspects of contemporary issues pertaining to earth sciences, environments and resources (by means of capstone, project-based learning and presentation opportunities in the curriculum)
- PLO 4: have gained some insight to the real-life industrial environment and developed connections within the geosciences profession (by means of internship opportunities in the curriculum)
- PLO 5: work with others in an effective manner and have learned to accept and appreciate different cultures (by means of group project learning, field learning experience in the curriculum)

### Impermissible Combinations:

Major in Geology

Poguirod courses (4E0	aradita\	
Required courses (150	·	
	urses (54 to 66 credits) (Note 1)	
	es: Science Foundation Courses (12 credits)	(1)
SCNC1111	Scientific method and reasoning (6)	(Note 1)
SCNC1112	Fundamentals of modern science (6)	(Note 1)
Disciplinary Core Cours		
EASC1401	Blue Planet (6)	41.4.4
EASC1402	Principles of geology (6)	(Note 1)
EASC2401	Fluid/solid interactions in earth processes (6)	(Note 1)
EASC2402	Field and laboratory methods (6)	(Note 1)
EASC2406	Geochemistry (6)	(Note 1)
EASC2407	Mineralogy (6)	(Note 1)
EASC2409	Regional field studies (6)	
	es (78 to 90 credits) (Note 1)	
Disciplinary Core Cours		
EASC3402	Petrology (6)	(Note 1)
EASC3403	Sedimentary environments (6)	(Note 1)
EASC3404	Structural geology (6)	(Note 1)
EASC3408	Geophysics (6)	(Note 1)
EASC3409	Igneous and metamorphic petrogenesis (6)	(Note 1)
EASC3417	Earth through time (6)	
EASC4406	Earth dynamics & global tectonics (6)	(Note 1)
EASC4407	Regional geology (6)	
EASC4999	Earth sciences project (12)	(Note 2)
Disciplinary Electives (3		
	cted from the following introductory and advanced level courses in I	List A and List B, among whic
at least 6 credits from I	List A:	
List A		
EASC3405	Environmental remote sensing (6)	
EASC3413	Engineering geology (6)	
List B		
EASC2404	Introduction to atmosphere and hydrosphere (6)	
EASC2408	Planetary geology (6)	
EASC3020	Global change: anthropogenic impacts (6)	
EASC3406	Reconstruction of past climate (6)	
EASC3410	Hydrogeology (6)	
EASC3412	Earth resources (6)	
EASC3414	Soil and rock mechanics (6)	
EASC3416	Advanced geochemistry and geochronology (6)	
EASC3999	Directed studies in earth sciences (6)	
ENVS3007	Natural hazards and mitigation (6)	
ENVS3313	Environmental oceanography (6)	
EASC4403	Biogeochemical cycles (6)	
EASC4408	Special topics in earth sciences (6)	
EASC4911	Earth system: contemporary issues (6)	

**EASC4966** Earth sciences internship (6) 3. Capstone requirement (6 credits) integrated field studies (6) **EASC4955** 

(Note 1)

#### Notes:

- 1. These are core courses in the regular Geology Major (96 credits) curriculum.
- 2. Requires approval to qualify for accredited pathway. EASC4999 Earth sciences project must have a significant 3D geological evolutionary component to meet Accredited Pathway requirements, as specified during our 2016 re-accreditation. Therefore, each EASC4999 project intended to qualify for the Accredited Pathway must be approved by the Geology major coordinator as satisfying this requirement. This policy is effective for all projects starting in 2017 and after.
- 3. In the list of disciplinary elective courses, two of them are introductory level courses while the others are advanced level courses. If students take all advanced level courses in the list, the total number of introductory level courses is 54 credits while that of advanced level courses is 90 credits. If students take 2 introductory level courses in the list and 3 advanced level courses, the total number of introductory level courses is 66 credits and that of advanced level courses is 78 credits.
- 4. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis
- 5. Candidates who have been admitted to Year 1 in 2021-22 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1112. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Biology, Chemistry, and Physics in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Biology, Chemistry, and Physics Higher Level in International Baccalaureate (IB)
   Grade B or above in Biology, Chemistry, and Physics in General Certificate of Education Advanced Level (GCEAL)
- Biology, Chemistry, and Physics qualification in Gao Kao will be considered on a case-by-case basis

#### Remarks:

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Maior Title	Maior in Geology (Intensive)	١
IVIAIOI TILI <del>U</del>	Maior in Geology (Intensive	,

Offered to students 2020

admitted to Year 1 in

#### **Objectives:**

To provide an education in Geology which meets the current minimum requirements of the Geological Society of London for accreditation.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and apply key concepts in the conventional areas of the geosciences, covering the areas of physical geology, historical geology, mineralogy, petrology, geochemistry, geophysics, structural geology, tectonics and petrogenesis, and earth resources (by means of coursework, laboratory-based, tutorial classes and project-based learning in the curriculum)
- PLO 2: have acquired the ability to make observation, description, measurement and analysis of common geological features in the field, conduct geological mapping as well as undertake independent geological study, and appraise the related ethical issues (by means of both local and overseas residential field learning experience)
- PLO 3: communicate scientific concepts and critically discuss aspects of contemporary issues pertaining to earth sciences, environments and resources (by means of capstone, project-based learning and presentation opportunities in the curriculum)
- PLO 4: have gained some insight to the real-life industrial environment and developed connections within the geosciences profession (by means of internship opportunities in the curriculum)
- PLO 5: work with others in an effective manner and have learned to accept and appreciate different cultures (by means of group project learning, field learning experience in the curriculum)

#### Impermissible Combinations:

Major in Geology

nor in Earth Sciences		
Required courses (150	-	
	urses (54 to 66 credits) (Note 1)	
	es: Science Foundation Courses (12 credits)	
SCNC1111	Scientific method and reasoning (6)	(Note 1)
SCNC1112	Fundamentals of modern science (6)	(Note 1)
Disciplinary Core Cours		
EASC1401	Blue Planet (6)	
EASC1402	Principles of geology (6)	(Note 1)
EASC2401	Fluid/solid interactions in earth processes (6)	(Note 1)
EASC2402	Field and laboratory methods (6)	(Note 1)
EASC2406	Geochemistry (6)	(Note 1)
EASC2407	Mineralogy (6)	(Note 1)
EASC2409	Regional field studies (6)	
2. Advanced level cours	es (78 to 90 credits) (Note 1)	
Disciplinary Core Cours	es (60 credits)	
EASC3402	Petrology (6)	(Note 1)
EASC3403	Sedimentary environments (6)	(Note 1)
EASC3404	Structural geology (6)	(Note 1)
EASC3408	Geophysics (6)	(Note 1)
EASC3409	Igneous and metamorphic petrogenesis (6)	(Note 1)
EASC3417	Earth through time (6)	
EASC4406	Earth dynamics & global tectonics (6)	(Note 1)
EASC4407	Regional geology (6)	
EASC4999	Earth sciences project (12)	(Note 2)
Disciplinary Electives (3	0 credits)	
At least 30 credits sele	cted from the following introductory and advanced level courses in Li	ist A and List B, among whic
at least 6 credits from I	List A:	
List A		
EASC3405	Environmental remote sensing (6)	
EASC3413	Engineering geology (6)	
List B		
EASC2404	Introduction to atmosphere and hydrosphere (6)	
EASC2408	Planetary geology (6)	
EASC3020	Global change: anthropogenic impacts (6)	
EASC3406	Reconstruction of past climate (6)	
EASC3410	Hydrogeology (6)	
EASC3412	Earth resources (6)	
EASC3414	Soil and rock mechanics (6)	
EASC3416	Advanced geochemistry and geochronology (6)	
EASC3999	Directed studies in earth sciences (6)	
ENVS3007	Natural hazards and mitigation (6)	
ENVS3313	Environmental oceanography (6)	
EASC4403	Biogeochemical cycles (6)	
	• • • •	
EASC4408	Special topics in earth sciences (6)	

EASC4966 Earth sciences internship (6)

3. Capstone requirement (6 credits)

EASC4955 Integrated field studies (6)

(Note 1)

#### Notes:

- 1. These are core courses in the regular Geology Major (96 credits) curriculum.
- 2. Requires approval to qualify for accredited pathway. EASC4999 Earth sciences project must have a significant 3D geological evolutionary component to meet Accredited Pathway requirements, as specified during our 2016 re-accreditation. Therefore, each EASC4999 project intended to qualify for the Accredited Pathway must be approved by the Geology major coordinator as satisfying this requirement. This policy is effective for all projects starting in 2017 and after.
- 3. In the list of disciplinary elective courses, two of them are introductory level courses while the others are advanced level courses. If students take all advanced level courses in the list, the total number of introductory level courses is 54 credits while that of advanced level courses is 90 credits. If students take 2 introductory level courses in the list and 3 advanced level courses, the total number of introductory level courses is 66 credits and that of advanced level courses is 78 credits.
- 4. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis

#### Remarks

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Maior Title	Maior in Geology (Intensive)	١
IVIAIOI TILI <del>U</del>	Maior in Geology (Intensive	,

Offered to students 2019

admitted to Year 1 in

#### **Objectives:**

To provide an education in Geology which meets the current minimum requirements of the Geological Society of London for accreditation.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and apply key concepts in the conventional areas of the geosciences, covering the areas of physical geology, historical geology, mineralogy, petrology, geochemistry, geophysics, structural geology, tectonics and petrogenesis, and earth resources (by means of coursework, laboratory-based, tutorial classes and project-based learning in the curriculum)
- PLO 2: have acquired the ability to make observation, description, measurement and analysis of common geological features in the field, conduct geological mapping as well as undertake independent geological study, and appraise the related ethical issues (by means of both local and overseas residential field learning experience)
- PLO 3: communicate scientific concepts and critically discuss aspects of contemporary issues pertaining to earth sciences, environments and resources (by means of capstone, project-based learning and presentation opportunities in the curriculum)
- PLO 4: have gained some insight to the real-life industrial environment and developed connections within the geosciences profession (by means of internship opportunities in the curriculum)
- PLO 5: work with others in an effective manner and have learned to accept and appreciate different cultures (by means of group project learning, field learning experience in the curriculum)

#### Impermissible Combinations:

Major in Geology

Required courses (150	O credits)	
•	urses (54 to 66 credits) (Note 1)	
	ses: Science Foundation Courses (12 credits)	
SCNC1111	Scientific method and reasoning (6)	(Note 1)
SCNC1111	Fundamentals of modern science (6)	(Note 1)
Disciplinary Core Cours	` ,	(14010-1)
EASC1401	Blue Planet (6)	
EASC1401	Principles of geology (6)	(Note 1)
EASC2401	Fluid/solid interactions in earth processes (6)	(Note 1)
EASC2402	Field and laboratory methods (6)	(Note 1)
EASC2406	Geochemistry (6)	(Note 1)
EASC2407	Mineralogy (6)	(Note 1)
EASC2409	Regional field studies (6)	(14010-1)
	ses (78 to 90 credits) (Note 1)	
Disciplinary Core Cours		
EASC3402	Petrology (6)	(Note 1)
EASC3403	Sedimentary environments (6)	(Note 1)
EASC3404	Structural geology (6)	(Note 1)
EASC3408	Geophysics (6)	(Note 1)
EASC3409	Igneous and metamorphic petrogenesis (6)	(Note 1)
EASC3417	Earth through time (6)	()
EASC4406	Earth dynamics & global tectonics (6)	(Note 1)
EASC4407	Regional geology (6)	()
EASC4999	Earth sciences project (12)	(Note 2)
Disciplinary Electives (	. , , ,	,
	ected from the following introductory and advanced level courses in L	ist A and List B. among whi
at least 6 credits from		3
List A		
EASC3405	Environmental remote sensing (6)	
EASC3413	Engineering geology (6)	
List B		
EASC2404	Introduction to atmosphere and hydrosphere (6)	
EASC2408	Planetary geology (6)	
EASC3020	Global change: anthropogenic impacts (6)	
EASC3406	Reconstruction of past climate (6)	
EASC3410	Hydrogeology (6)	
EASC3412	Earth resources (6)	
EASC3414	Soil and rock mechanics (6)	
EASC3416	Advanced geochemistry and geochronology (6)	
EACC2000	Directed studies in earth sciences (6)	
EASC3999	Natural hazards and mitigation (6)	
EASC3999 ENVS3007		
	Environmental oceanography (6)	
ENVS3007	÷ , ,	
ENVS3007 ENVS3313	Environmental oceanography (6)	

EASC4966 Earth sciences internship (6)

3. Capstone requirement (6 credits)

EASC4955 Integrated field studies (6) (Note 1)

#### Notes:

- 1. These are core courses in the regular Geology Major (96 credits) curriculum.
- 2. Requires approval to qualify for accredited pathway. EASC4999 Earth sciences project must have a significant 3D geological evolutionary component to meet Accredited Pathway requirements, as specified during our 2016 re-accreditation. Therefore, each EASC4999 project intended to qualify for the Accredited Pathway must be approved by the Geology major coordinator as satisfying this requirement. This policy is effective for all projects starting in 2017 and after.
- 3. In the list of disciplinary elective courses, two of them are introductory level courses while the others are advanced level courses. If students take all advanced level courses in the list, the total number of introductory level courses is 54 credits while that of advanced level courses is 90 credits. If students take 2 introductory level courses in the list and 3 advanced level courses, the total number of introductory level courses is 66 credits and that of advanced level courses is 78 credits.

### Remarks:

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Maior Title	Maior in Geology (Intensive)	١
IVIAIOI TILI <del>U</del>	Maior in Geology (Intensive	,

Offered to students 2018

admitted to Year 1 in

#### **Objectives:**

To provide an education in Geology which meets the current minimum requirements of the Geological Society of London for accreditation.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and apply key concepts in the conventional areas of the geosciences, covering the areas of physical geology, historical geology, mineralogy, petrology, geochemistry, geophysics, structural geology, tectonics and petrogenesis, and earth resources (by means of coursework, laboratory-based, tutorial classes and project-based learning in the curriculum)
- PLO 2: have acquired the ability to make observation, description, measurement and analysis of common geological features in the field, conduct geological mapping as well as undertake independent geological study, and appraise the related ethical issues (by means of both local and overseas residential field learning experience)
- PLO 3: communicate scientific concepts and critically discuss aspects of contemporary issues pertaining to earth sciences, environments and resources (by means of capstone, project-based learning and presentation opportunities in the curriculum)
- PLO 4: have gained some insight to the real-life industrial environment and developed connections within the geosciences profession (by means of internship opportunities in the curriculum)
- PLO 5: work with others in an effective manner and have learned to accept and appreciate different cultures (by means of group project learning, field learning experience in the curriculum)

#### Impermissible Combinations:

Major in Geology

Minor in Earth Sciences

Minor in Earth Sciences		
Required courses (150	Credits)	
1. Introductory level cou	urses (54 to 66 credits) (Note 1)	
	ses: Science Foundation Courses (12 credits)	
SCNC1111	Scientific method and reasoning (6)	(Note 1)
SCNC1112	Fundamentals of modern science (6)	(Note 1)
Disciplinary Core Cours	ses (42 credits)	
EASC1401	Blue Planet (6)	
EASC1402	Principles of geology (6)	(Note 1)
EASC2401	Fluid/solid interactions in earth processes (6)	(Note 1)
EASC2402	Field and laboratory methods (6)	(Note 1)
EASC2406	Geochemistry (6)	(Note 1)
EASC2407	Mineralogy (6)	(Note 1)
EASC2409	Regional field studies (6)	, ,
2. Advanced level cours	ses (78 to 90 credits) (Note 1)	
Disciplinary Core Cours		
EASC3402	Petrology (6)	(Note 1)
EASC3403	Sedimentary environments (6)	(Note 1)
EASC3404	Structural geology (6)	(Note 1)
EASC3408	Geophysics (6)	(Note 1)
EASC3409	Igneous and metamorphic petrogenesis (6)	(Note 1)
EASC3417	Earth through time (6)	,
EASC4406	Earth dynamics & global tectonics (6)	(Note 1)
EASC4407	Regional geology (6)	,
EASC4999	Earth sciences project (12)	(Note 2)
Disciplinary Electives (3	, ,	, ,
	ected from the following introductory and advanced level courses in Li	ist A and List B. among which
at least 6 credits from		,
List A		
EASC3405	Environmental remote sensing (6)	
EASC3413	Engineering geology (6)	
List B	0 00 0, ( )	
EASC2404	Introduction to atmosphere and hydrosphere (6)	
EASC2408	Planetary geology (6)	
EASC3020	Global change: anthropogenic impacts (6)	
EASC3406	Reconstruction of past climate (6)	
EASC3410	Hydrogeology (6)	
EASC3412	Earth resources (6)	
EASC3414	Soil and rock mechanics (6)	
EASC3416	Advanced geochemistry and geochronology (6)	
EASC3999	Directed studies in earth sciences (6)	
ENVS3007	Natural hazards and mitigation (6)	
ENVS3313	Environmental oceanography (6)	
EASC4403	Biogeochemical cycles (6)	
EASC4408	Special topics in earth sciences (6)	
EASC4911	Earth system: contemporary issues (6)	
	· · · · · · · · · · · · · · · · · · ·	

EASC4966	Earth sciences internship (6)	
3. Capstone requirement	nt (6 credits)	
EASC4955	Integrated field studies (6)	(Note 1)

#### Notes:

- 1. These are core courses in the regular Geology Major (96 credits) curriculum.
- 2. Requires approval to qualify for accredited pathway. EASC4999 Earth sciences project must have a significant 3D geological evolutionary component to meet Accredited Pathway requirements, as specified during our 2016 re-accreditation. Therefore, each EASC4999 project intended to qualify for the Accredited Pathway must be approved by the Geology major coordinator as satisfying this requirement. This policy is effective for all projects starting in 2017 and after.
- 3. In the list of disciplinary elective courses, two of them are introductory level courses while the others are advanced level courses. If students take all advanced level courses in the list, the total number of introductory level courses is 54 credits while that of advanced level courses is 90 credits. If students take 2 introductory level courses in the list and 3 advanced level courses, the total number of introductory level courses is 66 credits and that of advanced level courses is 78 credits.

#### Remarks:

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Maior Title	Maior in Geology (Intensive)	١
IVIAIOI TILI <del>U</del>	Maior in Geology (Intensive	,

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

To provide an education in Geology which meets the current minimum requirements of the Geological Society of London for accreditation.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and apply key concepts in the conventional areas of the geosciences, covering the areas of physical geology, historical geology, mineralogy, petrology, geochemistry, geophysics, structural geology, tectonics and petrogenesis, and earth resources (by means of coursework, laboratory-based, tutorial classes and project-based learning in the curriculum)
- PLO 2: have acquired the ability to make observation, description, measurement and analysis of common geological features in the field, conduct geological mapping as well as undertake independent geological study, and appraise the related ethical issues (by means of both local and overseas residential field learning experience)
- PLO 3: communicate scientific concepts and critically discuss aspects of contemporary issues pertaining to earth sciences, environments and resources (by means of capstone, project-based learning and presentation opportunities in the curriculum)
- PLO 4: have gained some insight to the real-life industrial environment and developed connections within the geosciences profession (by means of internship opportunities in the curriculum)
- PLO 5: work with others in an effective manner and have learned to accept and appreciate different cultures (by means of group project learning, field learning experience in the curriculum)

#### Impermissible Combinations:

Major in Geology

nor in Earth Sciences		
Required courses (150	-	
	urses (54 to 66 credits) (Note 1)	
	es: Science Foundation Courses (12 credits)	
SCNC1111	Scientific method and reasoning (6)	(Note 1)
SCNC1112	Fundamentals of modern science (6)	(Note 1)
Disciplinary Core Cours		
EASC1401	Blue Planet (6)	
EASC1402	Principles of geology (6)	(Note 1)
EASC2401	Fluid/solid interactions in earth processes (6)	(Note 1)
EASC2402	Field and laboratory methods (6)	(Note 1)
EASC2406	Geochemistry (6)	(Note 1)
EASC2407	Mineralogy (6)	(Note 1)
EASC2409	Regional field studies (6)	
2. Advanced level cours	es (78 to 90 credits) (Note 1)	
Disciplinary Core Cours	es (60 credits)	
EASC3402	Petrology (6)	(Note 1)
EASC3403	Sedimentary environments (6)	(Note 1)
EASC3404	Structural geology (6)	(Note 1)
EASC3408	Geophysics (6)	(Note 1)
EASC3409	Igneous and metamorphic petrogenesis (6)	(Note 1)
EASC3417	Earth through time (6)	
EASC4406	Earth dynamics & global tectonics (6)	(Note 1)
EASC4407	Regional geology (6)	
EASC4999	Earth sciences project (12)	(Note 2)
Disciplinary Electives (3	0 credits)	
At least 30 credits sele	cted from the following introductory and advanced level courses in Li	ist A and List B, among whic
at least 6 credits from I	List A:	
List A		
EASC3405	Environmental remote sensing (6)	
EASC3413	Engineering geology (6)	
List B		
EASC2404	Introduction to atmosphere and hydrosphere (6)	
EASC2408	Planetary geology (6)	
EASC3020	Global change: anthropogenic impacts (6)	
EASC3406	Reconstruction of past climate (6)	
EASC3410	Hydrogeology (6)	
EASC3412	Earth resources (6)	
EASC3414	Soil and rock mechanics (6)	
EASC3416	Advanced geochemistry and geochronology (6)	
EASC3999	Directed studies in earth sciences (6)	
ENVS3007	Natural hazards and mitigation (6)	
ENVS3313	Environmental oceanography (6)	
EASC4403	Biogeochemical cycles (6)	
	• • • •	
EASC4408	Special topics in earth sciences (6)	

EASC4966 Earth sciences internship (6)

3. Capstone requirement (6 credits)

EASC4955 Integrated field studies (6) (Note 1)

#### Notes:

- 1. These are core courses in the regular Geology Major (96 credits) curriculum.
- 2. Requires approval to qualify for accredited pathway. EASC4999 Earth sciences project must have a significant 3D geological evolutionary component to meet Accredited Pathway requirements, as specified during our 2016 re-accreditation. Therefore, each EASC4999 project intended to qualify for the Accredited Pathway must be approved by the Geology major coordinator as satisfying this requirement. This policy is effective for all projects starting in 2017 and after.
- 3. In the list of disciplinary elective courses, two of them are introductory level courses while the others are advanced level courses. If students take all advanced level courses in the list, the total number of introductory level courses is 54 credits while that of advanced level courses is 90 credits. If students take 2 introductory level courses in the list and 3 advanced level courses, the total number of introductory level courses is 66 credits and that of advanced level courses is 78 credits.

### Remarks:

Major Title	Major in Geology (Intensive)	
Maior Tille	Major III Geology (IIIIelisive)	

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

To provide an education in Geology which meets the current minimum requirements of the Geological Society of London for accreditation.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and apply key concepts in the conventional areas of the geosciences, covering the areas of physical geology, historical geology, mineralogy, petrology, geochemistry, geophysics, structural geology, tectonics and petrogenesis, and earth resources (by means of coursework, laboratory-based, tutorial classes and project-based learning in the curriculum)
- PLO 2: have acquired the ability to make observation, description, measurement and analysis of common geological features in the field, conduct geological mapping as well as undertake independent geological study, and appraise the related ethical issues (by means of both local and overseas residential field learning experience)
- PLO 3: communicate scientific concepts and critically discuss aspects of contemporary issues pertaining to earth sciences, environments and resources (by means of capstone, project-based learning and presentation opportunities in the curriculum)
- PLO 4: have gained some insight to the real-life industrial environment and developed connections within the geosciences profession (by means of internship opportunities in the curriculum)
- PLO 5: work with others in an effective manner and have learned to accept and appreciate different cultures (by means of group project learning, field learning experience in the curriculum)

#### Impermissible Combinations:

Major in Geology

Required courses (150	crodite)	
-	-	
	rrses (54 to 66 credits) (Note 1)	
	es: Science Foundation Courses (12 credits)	(Nata 4)
SCNC1111	Scientific method and reasoning (6)	(Note 1)
SCNC1112	Fundamentals of modern science (6)	(Note 1)
Disciplinary Core Cours		
EASC1401	Blue Planet (6)	(Nata 4)
EASC1402	Principles of geology (6)	(Note 1)
EASC2401	Fluid/solid interactions in earth processes (6)	(Note 1)
EASC2402	Field and laboratory methods (6)	(Note 1)
EASC2406	Geochemistry (6)	(Note 1)
EASC2407	Mineralogy (6)	(Note 1)
EASC2409	Regional field studies (6)	
	es (78 to 90 credits) (Note 1)	
Disciplinary Core Cours		44
EASC3402	Petrology (6)	(Note 1)
EASC3403	Sedimentary environments (6)	(Note 1)
EASC3404	Structural geology (6)	(Note 1)
EASC3408	Geophysics (6)	(Note 1)
EASC3409	Igneous and metamorphic petrogenesis (6)	(Note 1)
EASC3417	Earth through time (6)	
EASC4406	Earth dynamics & global tectonics (6)	(Note 1)
EASC4407	Regional geology (6)	
EASC4999	Earth sciences project (12)	(Note 2)
Disciplinary Electives (3		
At least 30 credits sele	cted from the following introductory and advanced level courses in L	ist A and List B, among whic
at least 6 credits from I	List A:	
List A		
EASC3405	Environmental remote sensing (6)	
EASC3413	Engineering geology (6)	
List B		
EASC2404	Introduction to atmosphere and hydrosphere (6)	
EASC2408	Planetary geology (6)	
EASC3020	Global change: anthropogenic impacts (6)	
EASC3406	Reconstruction of past climate (6)	
EASC3410	Hydrogeology (6)	
EASC3412	Earth resources (6)	
EASC3414	Soil and rock mechanics (6)	
EASC3416	Advanced geochemistry and geochronology (6)	
EASC3999	Directed studies in earth sciences (6)	
ENVS3007	Natural hazards and mitigation (6)	
ENVS3313	Environmental oceanography (6)	
EASC4403	Biogeochemical cycles (6)	
EASC4408	Special topics in earth sciences (6)	
EASC4911	Earth system: contemporary issues (6)	

EASC4966 Earth sciences internship (6)

3. Capstone requirement (6 credits)

EASC4955 Integrated field studies (6) (Note 1)

#### Notes:

- 1. These are core courses in the regular Geology Major (96 credits) curriculum.
- 2. Requires approval to qualify for accredited pathway. EASC4999 Earth sciences project must have a significant 3D geological evolutionary component to meet Accredited Pathway requirements, as specified during our 2016 re-accreditation. Therefore, each EASC4999 project intended to qualify for the Accredited Pathway must be approved by the Geology major coordinator as satisfying this requirement. This policy is effective for all projects starting in 2017 and after.
- 3. In the list of disciplinary elective courses, two of them are introductory level courses while the others are advanced level courses. If students take all advanced level courses in the list, the total number of introductory level courses is 54 credits while that of advanced level courses is 90 credits. If students take 2 introductory level courses in the list and 3 advanced level courses, the total number of introductory level courses is 66 credits and that of advanced level courses is 78 credits.

### Remarks:

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Maior Title	Maior in Geology (Intensive)	١
IVIAIOI TILI <del>U</del>	Maior in Geology (Intensive	,

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

To provide an education in Geology which meets the current minimum requirements of the Geological Society of London for accreditation.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and apply key concepts in the conventional areas of the geosciences, covering the areas of physical geology, historical geology, mineralogy, petrology, geochemistry, geophysics, structural geology, tectonics and petrogenesis, and earth resources (by means of coursework, laboratory-based, tutorial classes and project-based learning in the curriculum)
- PLO 2: have acquired the ability to make observation, description, measurement and analysis of common geological features in the field, conduct geological mapping as well as undertake independent geological study, and appraise the related ethical issues (by means of both local and overseas residential field learning experience)
- PLO 3: communicate scientific concepts and critically discuss aspects of contemporary issues pertaining to earth sciences, environments and resources (by means of capstone, project-based learning and presentation opportunities in the curriculum)
- PLO 4: have gained some insight to the real-life industrial environment and developed connections within the geosciences profession (by means of internship opportunities in the curriculum)
- PLO 5: work with others in an effective manner and have learned to accept and appreciate different cultures (by means of group project learning, field learning experience in the curriculum)

#### Impermissible Combinations:

Major in Geology

loguired courses (450	a andita		
Required courses (150	· · · · · · · · · · · · · · · · · · ·		
	urses (54 to 66 credits) (Note 1)		
	es: Science Foundation Courses (12 credits)	(1)	
SCNC1111	Scientific method and reasoning (6)	(Note 1)	
SCNC1112	Fundamentals of modern science (6)	(Note 1)	
Disciplinary Core Cours			
EASC1401	Blue Planet (6)	(1)	
EASC1402	Principles of geology (6)	(Note 1)	
EASC2401	Fluid/solid interactions in earth processes (6)	(Note 1)	
EASC2402	Field and laboratory methods (6)	(Note 1)	
EASC2406	Geochemistry (6)	(Note 1)	
EASC2407	Mineralogy (6)	(Note 1)	
EASC2409	Regional field studies (6)		
	es (78 to 90 credits) (Note 1)		
Disciplinary Core Cours	,		
EASC3402	Petrology (6)	(Note 1)	
EASC3403	Sedimentary environments (6)	(Note 1)	
EASC3404	Structural geology (6)	(Note 1)	
EASC3408	Geophysics (6)	(Note 1)	
EASC3409	Igneous and metamorphic petrogenesis (6)	(Note 1)	
EASC3417	Earth through time (6)		
EASC4406	Earth dynamics & global tectonics (6)	(Note 1)	
EASC4407	Regional geology (6)		
EASC4999	Earth sciences project (12)	(Note 2)	
Disciplinary Electives (3			
At least 30 credits selected from the following introductory and advanced level courses in List A and List B, among			
at least 6 credits from l	List A:		
List A			
EASC3405	Environmental remote sensing (6)		
EASC3413	Engineering geology (6)		
List B			
EASC2404	Introduction to atmosphere and hydrosphere (6)		
EASC2408	Planetary geology (6)		
EASC3020	Global change: anthropogenic impacts (6)		
EASC3406	Reconstruction of past climate (6)		
EASC3410	Hydrogeology (6)		
EASC3412	Earth resources (6)		
EASC3414	Soil and rock mechanics (6)		
EASC3416	Advanced geochemistry and geochronology (6)		
EASC3999	Directed studies in earth sciences (6)		
ENVS3007	Natural hazards and mitigation (6)		
ENVS3313	Environmental oceanography (6)		
EASC4403	Biogeochemical cycles (6)		
EASC4408	Special topics in earth sciences (6)		
L/100-1-100	1 1 (**/		

EASC4966 Earth sciences internship (6)

3. Capstone requirement (6 credits)

EASC4955 Integrated field studies (6) (Note 1)

#### Notes:

- 1. These are core courses in the regular Geology Major (96 credits) curriculum.
- 2. Requires approval to qualify for accredited pathway. EASC4999 Earth sciences project must have a significant 3D geological evolutionary component to meet Accredited Pathway requirements, as specified during our 2016 re-accreditation. Therefore, each EASC4999 project intended to qualify for the Accredited Pathway must be approved by the Geology major coordinator as satisfying this requirement. This policy is effective for all projects starting in 2017 and after.
- 3. In the list of disciplinary elective courses, two of them are introductory level courses while the others are advanced level courses. If students take all advanced level courses in the list, the total number of introductory level courses is 54 credits while that of advanced level courses is 90 credits. If students take 2 introductory level courses in the list and 3 advanced level courses, the total number of introductory level courses is 66 credits and that of advanced level courses is 78 credits.

### Remarks:

Major Title Major in Mathematics

Offered to students 2021

admitted to Year 1 in

#### **Objectives:**

The Major in Mathematics provides students with a solid and comprehensive undergraduate education in the subject. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving, and capability to tackle novel situations and ill-defined problems. Core courses in the curriculum emphasize fundamental knowledge and concepts in Mathematics and elective courses provide training in both pure and applied aspects of Mathematics. Throughout the curriculum there is also emphasis on experiential learning through guided studies, projects, seminars and summer internships. With the diversity of courses offered in the major, various specializations are available. These will lead to careers in a wide range of sectors including education, economics and finance, analytics and data science, logistics, management, research and further studies.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and present fundamental concepts in mathematics (by means of coursework and learning activities in the major or minor curriculum)
- PLO 2: apply mathematical theory and techniques to different areas of Sciences, and appraise the related ethical issues (by means of coursework and learning activities in the major or minor curriculum)
- PLO 3: communicate in mathematical language and present scientific arguments (by means of coursework, seminars, guided studies and projects)
- PLO 4: collaborate and work with other students in an effective manner (by means of guided studies, projects and seminars)
- PLO 5: appreciate the beauty and power of mathematics (by means of guided studies, projects and seminars)

#### Impermissible Combinations:

Major in Mathematics (Intensive)

Minor in Computational & Financial Mathematics

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

# Required courses (96 credits)

#### 1. Introductory level courses (48 credits)

# Disciplinary Core Courses: Science Foundation Courses (12 credits) SCNC11111 Scientific method and reasoning (6)

SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

MATH1013 University mathematics II (6)

MATH2012 Fundamental concepts of mathematics (6)

MATH2101 Linear algebra I (6)
MATH2102 Linear algebra II (6)
MATH2211 Multivariable calculus (6)

MATH2241 Introduction to mathematical analysis (6)

#### 2. Advanced level courses (42 credits)

# Disciplinary Core Course (6 credits)

MATH3401 Analysis I (6)

# **Disciplinary Electives (36 credits)**

At least 36 credits advanced level Mathematics courses (MATH3XXX or MATH4XXX or MATH7XXX level), of which at least 12 credits are selected from List A and at least 12 credits should be from MATH4XXX or MATH7XXX level, subject to pre-requisite requirements. The current list includes courses in List A, List B and those courses not selected to fulfill the capstone requirements, but excluding MATH4966 Mathematics Internship.

List A

MATH3301 Algebra I (6)

MATH3403 Functions of a complex variable (6) MATH3601 Numerical analysis (6)

MATH3603 Probability theory (6)
MATH3904 Introduction to optimization (6)

List B

MATH3001 Development of mathematical ideas (6)

MATH3002 Mathematics seminar (6)

MATH3303 Matrix theory and its applications (6)
MATH3304 Introduction to number theory (6)
MATH3405 Differential equations (6)

MATH3408 Computational methods and differential equations with

applications (6)

MATH3541 Introduction to topology (6)
MATH3600 Discrete mathematics (6)
MATH3901 Operations research I (6)
MATH3905 Queueing theory and simulation (6)

MATH3905 Queueing theory and simulation (6)
MATH3906 Financial calculus (6)
MATH3911 Game theory and strategy (6)

MATH3943 Network models in operations research (6)

MATH4402 Algebra II (6)
MATH4402 Analysis II (6)
MATH4404 Functional analysis (6)

**MATH4406** Introduction to partial differential equations (6) MATH4501 Geometry (6) Introduction to differentiable manifolds (6) MATH4511 MATH4602 Scientific computing (6) Operations research II (6) MATH4902 Numerical methods for financial calculus (6) MATH4907 Intermediate complex analysis (6) MATH7101 Topics in geometry (6) MATH7201 MATH7202 Complex manifolds (6) MATH7217 Topics in financial mathematics (6) Topics in applied functional analysis (6) MATH7219 MATH7224 Topics in advanced probability theory (6) Topics in algebra (6) MATH7501 MATH7502 Topics in applied discrete mathematics (6) Topics in mathematical programming and optimization (6) MATH7503 Geometric topology (6) MATH7504 Real analysis (6) MATH7505 3. Capstone requirement (6 credits) At least 6 credits selected from the following courses: MATH3999 Directed studies in mathematics (6) Senior mathematics seminar (6) MATH4910 Mathematics capstone project (6) MATH4911 MATH4966 Mathematics internship (6) MATH4999 Mathematics project (12)

#### **Notes**

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 5. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.
- 6. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis
- 7. Candidates who have been admitted to Year 1 in 2021-22 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1112. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Biology, Chemistry, and Physics in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Biology, Chemistry, and Physics Higher Level in International Baccalaureate (IB)
- Grade B or above in Biology, Chemistry, and Physics in General Certificate of Education Advanced Level (GCEAL)
- Biology, Chemistry, and Physics qualification in Gao Kao will be considered on a case-by-case basis

#### Remarks:

Major Title Major in Mathematics

Offered to students 2020

admitted to Year 1 in

#### **Objectives:**

The Major in Mathematics provides students with a solid and comprehensive undergraduate education in the subject. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving, and capability to tackle novel situations and ill-defined problems. Core courses in the curriculum emphasize fundamental knowledge and concepts in Mathematics and elective courses provide training in both pure and applied aspects of Mathematics. Throughout the curriculum there is also emphasis on experiential learning through guided studies, projects, seminars and summer internships. With the diversity of courses offered in the major, various specializations are available. These will lead to careers in a wide range of sectors including education, economics and finance, analytics and data science, logistics, management, research and further studies.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and present fundamental concepts in mathematics (by means of coursework and learning activities in the major or minor curriculum)
- PLO 2: apply mathematical theory and techniques to different areas of Sciences, and appraise the related ethical issues (by means of coursework and learning activities in the major or minor curriculum)
- PLO 3: communicate in mathematical language and present scientific arguments (by means of coursework, seminars, guided studies and projects)
- PLO 4: collaborate and work with other students in an effective manner (by means of guided studies, projects and seminars)
- PLO 5: appreciate the beauty and power of mathematics (by means of guided studies, projects and seminars)

#### Impermissible Combinations:

Major in Mathematics (Intensive)

Minor in Computational & Financial Mathematics

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

# Required courses (96 credits)

#### 1. Introductory level courses (48 credits)

#### Disciplinary Core Courses: Science Foundation Courses (12 credits) Scientific method and reasoning (6) SCNC1111

Fundamentals of modern science (6) **SCNC1112** 

**Disciplinary Core Courses (36 credits)** 

MATH1013 University mathematics II (6)

MATH2012 Fundamental concepts of mathematics (6)

MATH2101 Linear algebra I (6) Linear algebra II (6) MATH2102 Multivariable calculus (6) **MATH2211** 

Introduction to mathematical analysis (6) MATH2241

#### 2. Advanced level courses (42 credits)

# **Disciplinary Core Course (6 credits)**

Analysis I (6) MATH3401

# **Disciplinary Electives (36 credits)**

At least 36 credits advanced level Mathematics courses (MATH3XXX or MATH4XXX or MATH7XXX level), of which at least 12 credits are selected from List A and at least 12 credits should be from MATH4XXX or MATH7XXX level, subject to pre-requisite requirements. The current list includes courses in List A, List B and those courses not selected to fulfill the capstone requirements, but excluding MATH4966 Mathematics Internship.

I ist A

MATH3301 Algebra I (6)

Functions of a complex variable (6) MATH3403 MATH3601 Numerical analysis (6) MATH3603 Probability theory (6)

MATH3904 Introduction to optimization (6)

List B

Development of mathematical ideas (6)

MATH3001 MATH3002 Mathematics seminar (6) MATH3303 Matrix theory and its applications (6) MATH3304 Introduction to number theory (6)

Differential equations (6) MATH3405

Computational methods and differential equations with MATH3408

applications (6)

Introduction to topology (6) MATH3541 Discrete mathematics (6) MATH3600 MATH3901 Operations research I (6) **MATH3905** Queueing theory and simulation (6)

MATH3906 Financial calculus (6) MATH3911 Game theory and strategy (6)

MATH3943 Network models in operations research (6)

MATH4302 Algebra II (6) MATH4402 Analysis II (6) Functional analysis (6) MATH4404

MATH4406	Introduction to partial differential equations (6)	
MATH4501	Geometry (6)	
MATH4511	Introduction to differentiable manifolds (6)	
MATH4602	Scientific computing (6)	
MATH4902	Operations research II (6)	
MATH4907	Numerical methods for financial calculus (6)	
MATH7101	Intermediate complex analysis (6)	
MATH7201	Topics in geometry (6)	
MATH7202	Complex manifolds (6)	
MATH7217	Topics in financial mathematics (6)	
MATH7219	Topics in applied functional analysis (6)	
MATH7224	Topics in advanced probability theory (6)	
MATH7501	Topics in algebra (6)	
MATH7502	Topics in applied discrete mathematics (6)	
MATH7503	Topics in mathematical programming and optimization (6)	
MATH7504	Geometric topology (6)	
MATH7505	Real analysis (6)	
3. Capstone requirement (	6 credits)	
At least 6 credits selected	d from the following courses:	
MATH3999	Directed studies in mathematics (6)	
MATH4910	Senior mathematics seminar (6)	
MATH4911	Mathematics capstone project (6)	
MATH4966	Mathematics internship (6)	
MATH4999	Mathematics project (12)	

#### **Notes**

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 5. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.
- 6. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis

# Remarks:

Major Title Major in Mathematics

Offered to students 2019

admitted to Year 1 in

#### **Objectives:**

The Major in Mathematics provides students with a solid and comprehensive undergraduate education in the subject. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving, and capability to tackle novel situations and ill-defined problems. Core courses in the curriculum emphasize fundamental knowledge and concepts in Mathematics and elective courses provide training in both pure and applied aspects of Mathematics. Throughout the curriculum there is also emphasis on experiential learning through guided studies, projects, seminars and summer internships. With the diversity of courses offered in the major, various specializations are available. These will lead to careers in a wide range of sectors including education, economics and finance, analytics and data science, logistics, management, research and further studies.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and present fundamental concepts in mathematics (by means of coursework and learning activities in the major or minor curriculum)
- PLO 2: apply mathematical theory and techniques to different areas of Sciences, and appraise the related ethical issues (by means of coursework and learning activities in the major or minor curriculum)
- PLO 3: communicate in mathematical language and present scientific arguments (by means of coursework, seminars, guided studies and projects)
- PLO 4: collaborate and work with other students in an effective manner (by means of guided studies, projects and seminars)
- PLO 5: appreciate the beauty and power of mathematics (by means of guided studies, projects and seminars)

#### Impermissible Combinations:

Major in Mathematics (Intensive)

Minor in Computational & Financial Mathematics

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

# Required courses (96 credits)

#### 1. Introductory level courses (48 credits)

#### Disciplinary Core Courses: Science Foundation Courses (12 credits) Scientific method and reasoning (6) SCNC1111

Fundamentals of modern science (6) **SCNC1112** 

**Disciplinary Core Courses (36 credits)** 

MATH1013 University mathematics II (6)

Fundamental concepts of mathematics (6) MATH2012

MATH2101 Linear algebra I (6) Linear algebra II (6) MATH2102 Multivariable calculus (6) **MATH2211** 

Introduction to mathematical analysis (6) MATH2241

# 2. Advanced level courses (42 credits)

# **Disciplinary Core Course (6 credits)**

Analysis I (6) MATH3401

# **Disciplinary Electives (36 credits)**

At least 36 credits advanced level Mathematics courses (MATH3XXX or MATH4XXX or MATH7XXX level), of which at least 12 credits are selected from List A and at least 12 credits should be from MATH4XXX or MATH7XXX level, subject to pre-requisite requirements. The current list includes courses in List A, List B and those courses not selected to fulfill the capstone requirements, but excluding MATH4966 Mathematics Internship.

I ist A

MATH3301 Algebra I (6)

Functions of a complex variable (6) MATH3403

MATH3601 Numerical analysis (6) MATH3603 Probability theory (6)

MATH3904 Introduction to optimization (6)

List B

MATH3001 Development of mathematical ideas (6)

Mathematics seminar (6) MATH3002

MATH3303 Matrix theory and its applications (6) MATH3304 Introduction to number theory (6)

Differential equations (6) MATH3405

Computational methods and differential equations with MATH3408

applications (6)

Introduction to topology (6) MATH3541 Discrete mathematics (6) MATH3600 MATH3901 Operations research I (6)

MATH3905 Queueing theory and simulation (6) MATH3906 Financial calculus (6)

MATH3911 Game theory and strategy (6) MATH3943 Network models in operations research (6)

MATH4302 Algebra II (6) MATH4402 Analysis II (6) Functional analysis (6) MATH4404

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l	MATH4406	Introduction to partial differential equations (6)	
П	MATH4501	Geometry (6)	
П	MATH4511	Introduction to differentiable manifolds (6)	
П	MATH4602	Scientific computing (6)	
П	MATH4902	Operations research II (6)	
П	MATH4907	Numerical methods for financial calculus (6)	
П	MATH7101	Intermediate complex analysis (6)	
П	MATH7201	Topics in geometry (6)	
П	MATH7202	Complex manifolds (6)	
П	MATH7217	Topics in financial mathematics (6)	
П	MATH7219	Topics in applied functional analysis (6)	
П	MATH7224	Topics in advanced probability theory (6)	
П	MATH7501	Topics in algebra (6)	
П	MATH7502	Topics in applied discrete mathematics (6)	
П	MATH7503	Topics in mathematical programming and optimization (6)	
П	MATH7504	Geometric topology (6)	
П	MATH7505	Real analysis (6)	
П	3. Capstone requirement (6 cr	redits)	
П	At least 6 credits selected fro	om the following courses:	
П	MATH3999	Directed studies in mathematics (6)	
П	MATH4910	Senior mathematics seminar (6)	
П	MATH4911	Mathematics capstone project (6)	
Ш	MATH4966	Mathematics internship (6)	
Ш	MATH4999	Mathematics project (12)	
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#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 5. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

#### Remarks:

Major Title Major in Mathematics

Offered to students 2018

admitted to Year 1 in

#### **Objectives:**

The Major in Mathematics provides students with a solid and comprehensive undergraduate education in the subject. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving, and capability to tackle novel situations and ill-defined problems. Core courses in the curriculum emphasize fundamental knowledge and concepts in Mathematics and elective courses provide training in both pure and applied aspects of Mathematics. Throughout the curriculum there is also emphasis on experiential learning through guided studies, projects, seminars and summer internships. With the diversity of courses offered in the major, various specializations are available. These will lead to careers in a wide range of sectors including education, economics and finance, analytics and data science, logistics, management, research and further studies.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and present fundamental concepts in mathematics (by means of coursework and learning activities in the major or minor curriculum)
- PLO 2: apply mathematical theory and techniques to different areas of Sciences, and appraise the related ethical issues (by means of coursework and learning activities in the major or minor curriculum)
- PLO 3: communicate in mathematical language and present scientific arguments (by means of coursework, seminars, guided studies and projects)
- PLO 4: collaborate and work with other students in an effective manner (by means of guided studies, projects and seminars)
- PLO 5: appreciate the beauty and power of mathematics (by means of guided studies, projects and seminars)

#### Impermissible Combinations:

Major in Mathematics (Intensive)

Minor in Computational & Financial Mathematics

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

# Required courses (96 credits)

#### 1. Introductory level courses (48 credits)

# Disciplinary Core Courses: Science Foundation Courses (12 credits) SCNC1111 Scientific method and reasoning (6)

SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

MATH1013 University mathematics II (6)

MATH2012 Fundamental concepts of mathematics (6)
MATH2101 Linear algebra I (6)

MATH2101 Linear algebra I (6)
MATH2102 Linear algebra II (6)
MATH2211 Multivariable calculus (6)

MATH2241 Introduction to mathematical analysis (6)

#### 2. Advanced level courses (42 credits)

# **Disciplinary Core Course (6 credits)**

MATH3401 Analysis I (6)

# Disciplinary Electives (36 credits)

At least 36 credits advanced level Mathematics courses (MATH3XXX or MATH4XXX or MATH7XXX level), of which at least 12 credits are selected from List A and at least 12 credits should be from MATH4XXX or MATH7XXX level, subject to pre-requisite requirements. The current list includes courses in List A, List B and those courses not selected to fulfill the capstone requirements, but excluding MATH4966 Mathematics Internship.

List A

MATH3301 Algebra I (6)

MATH3403 Functions of a complex variable (6)

MATH3601 Numerical analysis (6) MATH3603 Probability theory (6)

MATH3904 Introduction to optimization (6)

List B

MATH3001 Development of mathematical ideas (6)

MATH3001

MATH3002

Mathematics seminar (6)

MATH3303

Matrix theory and its applications (6)

MATH3304

Introduction to number theory (6)

MATH3405 Differential equations (6)

MATH3408 Computational methods and differential equations with

applications (6)

MATH3541 Introduction to topology (6)
MATH3600 Discrete mathematics (6)
MATH3901 Operations research I (6)
MATH3905 Queueing theory and simulation (6)

MATH3905 Queueing theory and simulation (6)
MATH3906 Financial calculus (6)
MATH3911 Game theory and strategy (6)

MATH3943 Network models in operations research (6)

MATH4302 Algebra II (6)
MATH4402 Analysis II (6)
MATH4404 Functional analysis (6)

l	MATH4406	Introduction to partial differential equations (6)	
П	MATH4501	Geometry (6)	
П	MATH4511	Introduction to differentiable manifolds (6)	
П	MATH4602	Scientific computing (6)	
П	MATH4902	Operations research II (6)	
П	MATH4907	Numerical methods for financial calculus (6)	
П	MATH7101	Intermediate complex analysis (6)	
П	MATH7201	Topics in geometry (6)	
П	MATH7202	Complex manifolds (6)	
П	MATH7217	Topics in financial mathematics (6)	
П	MATH7219	Topics in applied functional analysis (6)	
П	MATH7224	Topics in advanced probability theory (6)	
П	MATH7501	Topics in algebra (6)	
П	MATH7502	Topics in applied discrete mathematics (6)	
П	MATH7503	Topics in mathematical programming and optimization (6)	
П	MATH7504	Geometric topology (6)	
П	MATH7505	Real analysis (6)	
П	3. Capstone requirement (6	credits)	
П	At least 6 credits selected f	rom the following courses:	
П	MATH3999	Directed studies in mathematics (6)	
П	MATH4910	Senior mathematics seminar (6)	
Ш	MATH4911	Mathematics capstone project (6)	
П	MATH4966	Mathematics internship (6)	
П	MATH4999	Mathematics project (12)	
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#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 5. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

#### Remarks:

Major Title Major in Mathematics

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

The Major in Mathematics provides students with a solid and comprehensive undergraduate education in the subject. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving, and capability to tackle novel situations and ill-defined problems. Core courses in the curriculum emphasize fundamental knowledge and concepts in Mathematics and elective courses provide training in both pure and applied aspects of Mathematics. Throughout the curriculum there is also emphasis on experiential learning through guided studies, projects, seminars and summer internships. With the diversity of courses offered in the major, various specializations are available. These will lead to careers in a wide range of sectors including education, economics and finance, analytics and data science, logistics, management, research and further studies.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and present fundamental concepts in mathematics (by means of coursework and learning activities in the major or minor curriculum)
- PLO 2: apply mathematical theory and techniques to different areas of Sciences, and appraise the related ethical issues (by means of coursework and learning activities in the major or minor curriculum)
- PLO 3: communicate in mathematical language and present scientific arguments (by means of coursework, seminars, guided studies and projects)
- PLO 4: collaborate and work with other students in an effective manner (by means of guided studies, projects and seminars)
- PLO 5: appreciate the beauty and power of mathematics (by means of guided studies, projects and seminars)

#### Impermissible Combinations:

Major in Mathematics (Intensive)

Major in Mathematics/Physics

Minor in Computational & Financial Mathematics

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

### Required courses (96 credits)

### 1. Introductory level courses (48 credits)

# Disciplinary Core Courses: Science Foundation Courses (12 credits) SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

MATH1013 University mathematics II (6)

MATH2012 Fundamental concepts of mathematics (6)

MATH2101 Linear algebra I (6)
MATH2102 Linear algebra II (6)
MATH2211 Multivariable calculus (6)

MATH2241 Introduction to mathematical analysis (6)

### 2. Advanced level courses (42 credits)

# **Disciplinary Core Course (6 credits)**

MATH3401 Analysis I (6)

# Disciplinary Electives (36 credits)

At least 36 credits advanced level Mathematics courses (MATH3XXX or MATH4XXX or MATH7XXX level), of which at least 12 credits are selected from List A and at least 12 credits should be from MATH4XXX or MATH7XXX level, subject to pre-requisite requirements. The current list includes courses in List A, List B and those courses not selected to fulfill the capstone requirements, but excluding MATH4966 Mathematics Internship.

List A

MATH3301 Algebra I (6)

MATH3403 Functions of a complex variable (6)
MATH3601 Numerical analysis (6)
MATH3603 Probability theory (6)
MATH3904 Introduction to optimization (6)

List B

MATH3001 Development of mathematical ideas (6)

MATH3002 Mathematics seminar (6)

MATH3303 Matrix theory and its applications (6)
MATH3304 Introduction to number theory (6)
MATH3405 Differential equations (6)

MATH3408 Computational methods and differential equations with

applications (6)

MATH3541 Introduction to topology (6)
MATH3600 Discrete mathematics (6)
MATH3901 Operations research I (6)

MATH3905 Outstand simulations and simulations are serious controlled to the controll

MATH3905 Queueing theory and simulation (6) MATH3906 Financial calculus (6)

MATH3911 Game theory and strategy (6)

MATH3913 Representations reserved.

MATH 3943 Network models in operations research (6)

MATH4302 Algebra II (6) MATH4402 Analysis II (6)

l	MATH4404	Functional analysis (6)	
П	MATH4406	Introduction to partial differential equations (6)	
П	MATH4501	Geometry (6)	
П	MATH4511	Introduction to differentiable manifolds (6)	
П	MATH4602	Scientific computing (6)	
П	MATH4902	Operations research II (6)	
П	MATH4907	Numerical methods for financial calculus (6)	
П	MATH7101	Intermediate complex analysis (6)	
П	MATH7201	Topics in geometry (6)	
П	MATH7202	Complex manifolds (6)	
П	MATH7217	Topics in financial mathematics (6)	
П	MATH7219	Topics in applied functional analysis (6)	
П	MATH7224	Topics in advanced probability theory (6)	
П	MATH7501	Topics in algebra (6)	
П	MATH7502	Topics in applied discrete mathematics (6)	
П	MATH7503	Topics in mathematical programming and optimization (6)	
П	MATH7504	Geometric topology (6)	
П	MATH7505	Real analysis (6)	
П	3. Capstone requirement (6 cr	edits)	
П	At least 6 credits selected from	m the following courses:	
П	MATH3999	Directed studies in mathematics (6)	
П	MATH4910	Senior mathematics seminar (6)	
Ш	MATH4911	Mathematics capstone project (6)	
П	MATH4966	Mathematics internship (6)	
П	MATH4999	Mathematics project (12)	
Ш			

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 5. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

#### Remarks

Major Title Major in Mathematics

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

The Major in Mathematics provides students with a solid and comprehensive undergraduate education in the subject. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving, and capability to tackle novel situations and ill-defined problems. Core courses in the curriculum emphasize fundamental knowledge and concepts in Mathematics and elective courses provide training in both pure and applied aspects of Mathematics. Throughout the curriculum there is also emphasis on experiential learning through guided studies, projects, seminars and summer internships. With the diversity of courses offered in the major, various specializations are available. These will lead to careers in a wide range of sectors including education, economics and finance, analytics and data science, logistics, management, research and further studies.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and present fundamental concepts in mathematics (by means of coursework and learning activities in the major or minor curriculum)
- PLO 2: apply mathematical theory and techniques to different areas of Sciences, and appraise the related ethical issues (by means of coursework and learning activities in the major or minor curriculum)
- PLO 3: communicate in mathematical language and present scientific arguments (by means of coursework, seminars, guided studies and projects)
- PLO 4: collaborate and work with other students in an effective manner (by means of guided studies, projects and seminars)
- PLO 5: appreciate the beauty and power of mathematics (by means of guided studies, projects and seminars)

#### Impermissible Combinations:

Major in Mathematics (Intensive)

Major in Mathematics/Physics

Minor in Computational & Financial Mathematics

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

## Required courses (96 credits)

## 1. Introductory level courses (48 credits)

## Disciplinary Core Courses: Science Foundation Courses (12 credits) SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

MATH1013 University mathematics II (6)

MATH2012 Fundamental concepts of mathematics (6)

MATH2101 Linear algebra I (6)
MATH2102 Linear algebra II (6)
MATH2211 Multivariable calculus (6)

MATH2241 Introduction to mathematical analysis (6)

## 2. Advanced level courses (42 credits)

## **Disciplinary Core Course (6 credits)**

MATH3401 Analysis I (6)

## Disciplinary Electives (36 credits)

At least 36 credits advanced level Mathematics courses (MATH3XXX or MATH4XXX or MATH7XXX level), of which at least 12 credits are selected from List A and at least 12 credits should be from MATH4XXX or MATH7XXX level, subject to pre-requisite requirements. The current list includes courses in List A, List B and those courses not selected to fulfill the capstone requirements, but excluding MATH4966 Mathematics Internship.

List A

MATH3301 Algebra I (6)

MATH3403 Functions of a complex variable (6)
MATH3601 Numerical analysis (6)
MATH3603 Probability theory (6)
MATH3904 Introduction to optimization (6)

List B

MATH3001 Development of mathematical ideas (6)

MATH3002 Mathematics seminar (6)

MATH3303 Matrix theory and its applications (6)
MATH3304 Introduction to number theory (6)
MATH3405 Differential equations (6)

MATH3408 Computational methods and differential equations with

applications (6)

MATH3541 Introduction to topology (6)
MATH3600 Discrete mathematics (6)
MATH3901 Operations research I (6)
MATH3905 Queueing theory and simulation (6)

MATH3906 Financial calculus (6)
MATH3911 Game theory and strategy (6)

MATH3943 Network models in operations research (6)

MATH4302 Algebra II (6)
MATH4402 Analysis II (6)

l	MATH4404	Functional analysis (6)	
П	MATH4406	Introduction to partial differential equations (6)	
П	MATH4501	Geometry (6)	
П	MATH4511	Introduction to differentiable manifolds (6)	
П	MATH4602	Scientific computing (6)	
П	MATH4902	Operations research II (6)	
П	MATH4907	Numerical methods for financial calculus (6)	
П	MATH7101	Intermediate complex analysis (6)	
П	MATH7201	Topics in geometry (6)	
П	MATH7202	Complex manifolds (6)	
П	MATH7217	Topics in financial mathematics (6)	
П	MATH7219	Topics in applied functional analysis (6)	
П	MATH7224	Topics in advanced probability theory (6)	
П	MATH7501	Topics in algebra (6)	
П	MATH7502	Topics in applied discrete mathematics (6)	
П	MATH7503	Topics in mathematical programming and optimization (6)	
П	MATH7504	Geometric topology (6)	
П	MATH7505	Real analysis (6)	
П	3. Capstone requirement (6		
П		from the following courses:	
П	MATH3999	Directed studies in mathematics (6)	
П	MATH4910	Senior mathematics seminar (6)	
П	MATH4911	Mathematics capstone project (6)	
	MATH4966	Mathematics internship (6)	
	MATH4999	Mathematics project (12)	
П			

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 5. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

#### Remarks

Major Title Major in Mathematics

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

The Major in Mathematics provides students with a solid and comprehensive undergraduate education in the subject. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving, and capability to tackle novel situations and ill-defined problems. Core courses in the curriculum emphasize fundamental knowledge and concepts in Mathematics and elective courses provide training in both pure and applied aspects of Mathematics. Throughout the curriculum there is also emphasis on experiential learning through guided studies, projects, seminars and summer internships. With the diversity of courses offered in the major, various specializations are available. These will lead to careers in a wide range of sectors including education, economics and finance, analytics and data science, logistics, management, research and further studies.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and present fundamental concepts in mathematics (by means of coursework and learning activities in the major or minor curriculum)
- PLO 2: apply mathematical theory and techniques to different areas of Sciences, and appraise the related ethical issues (by means of coursework and learning activities in the major or minor curriculum)
- PLO 3: communicate in mathematical language and present scientific arguments (by means of coursework, seminars, guided studies and projects)
- PLO 4: collaborate and work with other students in an effective manner (by means of guided studies, projects and seminars)
- PLO 5: appreciate the beauty and power of mathematics (by means of guided studies, projects and seminars)

#### Impermissible Combinations:

Major in Mathematics/Physics

Minor in Computational & Financial Mathematics

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

## Required courses (96 credits)

## 1. Introductory level courses (48 credits)

# Disciplinary Core Courses: Science Foundation Courses (12 credits) SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

SCNC1112 Fundame
Disciplinary Core Courses (36 credits)

MATH1013 University mathematics II (6)

MATH2012 Fundamental concepts of mathematics (6)

MATH2101 Linear algebra I (6)
MATH2102 Linear algebra II (6)
MATH2211 Multivariable calculus (6)

MATH2241 Introduction to mathematical analysis (6)

## 2. Advanced level courses (42 credits)

## Disciplinary Core Course (6 credits)

MATH3401 Analysis I (6)

## Disciplinary Electives (36 credits)

At least 36 credits advanced level Mathematics courses (MATH3XXX or MATH4XXX or MATH7XXX level), of which at least 12 credits are selected from List A and at least 12 credits should be from MATH4XXX or MATH7XXX level, subject to pre-requisite requirements. The current list includes courses in List A, List B and those courses not selected to fulfill the capstone requirements, but excluding MATH4966 Mathematics Internship.

List A

MATH3301 Algebra I (6)

MATH3403 Functions of a complex variable (6) MATH3601 Numerical analysis (6)

MATH3603 Probability theory (6)
MATH3904 Introduction to optimization (6)

List B

MATH3001 Development of mathematical ideas (6)

MATH3001

MATH3002

Mathematics seminar (6)

MATH3303

Matrix theory and its applications (6)

MATH3304

Introduction to number theory (6)

MATH3405 Differential equations (6)

MATH3408 Computational methods and differential equations with

applications (6)

MATH3541 Introduction to topology (6)
MATH3600 Discrete mathematics (6)
MATH3901 Operations research I (6)

MATH3905 Queueing theory and simulation (6)
MATH3906 Financial calculus (6)
MATH3911 Game theory and strategy (6)

MATH3943 Network models in operations research (6)

MATH4302 Algebra II (6)
MATH4402 Analysis II (6)
MATH4404 Functional analysis (6)

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l	MATH4406	Introduction to partial differential equations (6)	
П	MATH4501	Geometry (6)	
П	MATH4511	Introduction to differentiable manifolds (6)	
П	MATH4602	Scientific computing (6)	
П	MATH4902	Operations research II (6)	
П	MATH4907	Numerical methods for financial calculus (6)	
П	MATH7101	Intermediate complex analysis (6)	
П	MATH7201	Topics in geometry (6)	
П	MATH7202	Complex manifolds (6)	
П	MATH7217	Topics in financial mathematics (6)	
П	MATH7219	Topics in applied functional analysis (6)	
П	MATH7224	Topics in advanced probability theory (6)	
П	MATH7501	Topics in algebra (6)	
П	MATH7502	Topics in applied discrete mathematics (6)	
П	MATH7503	Topics in mathematical programming and optimization (6)	
П	MATH7504	Geometric topology (6)	
П	MATH7505	Real analysis (6)	
П	3. Capstone requirement (6 cre	edits)	
П	At least 6 credits selected from	m the following courses:	
П	MATH3999	Directed studies in mathematics (6)	
П	MATH4910	Senior mathematics seminar (6)	
П	MATH4911	Mathematics capstone project (6)	
Ш	MATH4966	Mathematics internship (6)	
Ш	MATH4999	Mathematics project (12)	
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- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 5. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

#### Remarks:

Major Title Major in Mathematics

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

The Major in Mathematics provides students with a solid and comprehensive undergraduate education in the subject. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving, and capability to tackle novel situations and ill-defined problems. Core courses in the curriculum emphasize fundamental knowledge and concepts in Mathematics and elective courses provide training in both pure and applied aspects of Mathematics. Throughout the curriculum there is also emphasis on experiential learning through guided studies, projects, seminars and summer internships. With the diversity of courses offered in the major, various specializations are available. These will lead to careers in a wide range of sectors including education, economics and finance, analytics and data science, logistics, management, research and further studies.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and present fundamental concepts in mathematics (by means of coursework and learning activities in the major or minor curriculum)
- PLO 2: apply mathematical theory and techniques to different areas of Sciences, and appraise the related ethical issues (by means of coursework and learning activities in the major or minor curriculum)
- PLO 3: communicate in mathematical language and present scientific arguments (by means of coursework, seminars, guided studies and projects)
- PLO 4: collaborate and work with other students in an effective manner (by means of guided studies, projects and seminars)
- PLO 5: appreciate the beauty and power of mathematics (by means of guided studies, projects and seminars)

#### Impermissible Combinations:

Major in Mathematics/Physics

Minor in Computational & Financial Mathematics

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

## Required courses (96 credits)

#### 1. Introductory level courses (48 credits)

# Disciplinary Core Courses: Science Foundation Courses (12 credits) SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

Disciplinary Core Courses (36 credits)

MATH1013 University mathematics II (6)

MATH2012 Fundamental concepts of mathematics (6)

MATH2101 Linear algebra I (6)
MATH2102 Linear algebra II (6)
MATH2211 Multivariable calculus (6)

MATH2241 Introduction to mathematical analysis (6)

## 2. Advanced level courses (42 credits)

Disciplinary Core Courses (18 credits)

MATH3301 Algebra I (6) MATH3401 Analysis I (6)

MATH3403 Functions of a complex variable (6)

## **Disciplinary Electives (24 credits)**

At least 24 credits advanced level Mathematics courses (MATH3XXX or MATH4XXX or MATH7XXX level), of which at least 12 credits should be from MATH4XXX or MATH7XXX level, subject to pre-requisite requirements. The current list includes courses in List A and those courses not selected to fulfill the capstone requirements, but excluding MATH4966 Mathematics Internship.

List	Α
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MATH3001 Development of mathematical ideas (6)

MATH3002 Mathematics seminar (6)

MATH3303 Matrix theory and its applications (6) MATH3304 Introduction to number theory (6)

MATH3405 Differential equations (6)

MATH3408 Computational methods and differential equations with

applications (6)

MATH3541 Introduction to topology (6)
MATH3600 Discrete mathematics (6)
MATH3601 Numerical analysis (6)
MATH3603 Probability theory (6)
MATH3901 Operations research I (6)
MATH3904 Introduction to optimization (6)
MATH3905 Queueing theory and simulation (6)

MATH3906 Financial calculus (6)
MATH3911 Game theory and strategy (6)
MATH3914 Sharper and strategy (7)
MATH3915 Sharper and strategy (8)

MATH3943 Network models in operations research (6)

MATH4302 Algebra II (6)
MATH4402 Analysis II (6)
MATH4404 Functional analysis (6)

MATH4406 Introduction to partial differential equations (6)

l	MATH4501	Geometry (6)	
П	MATH4511	Introduction to differentiable manifolds (6)	
П	MATH4602	Scientific computing (6)	
П	MATH4902	Operations research II (6)	
П	MATH4907	Numerical methods for financial calculus (6)	
П	MATH7101	Intermediate complex analysis (6)	
П	MATH7201	Topics in geometry (6)	
П	MATH7202	Complex manifolds (6)	
П	MATH7217	Topics in financial mathematics (6)	
П	MATH7219	Topics in applied functional analysis (6)	
П	MATH7224	Topics in advanced probability theory (6)	
П	MATH7501	Topics in algebra (6)	
П	MATH7502	Topics in applied discrete mathematics (6)	
П	MATH7503	Topics in mathematical programming and optimization (6)	
П	MATH7504	Geometric topology (6)	
П	MATH7505	Real analysis (6)	
П	3. Capstone requirement (6	6 credits)	
П	At least 6 credits selected	from the following courses:	
П	MATH3999	Directed studies in mathematics (6)	
П	MATH4910	Senior mathematics seminar (6)	
П	MATH4911	Mathematics capstone project (6)	
П	MATH4966	Mathematics internship (6)	
П	MATH4999	Mathematics project (12)	
П			

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 5. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

#### Remarks:

Major Title Major in Mathematics

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

The Major in Mathematics provides students with a solid and comprehensive undergraduate education in the subject. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving, and capability to tackle novel situations and ill-defined problems. Core courses in the curriculum emphasize fundamental knowledge and concepts in Mathematics and elective courses provide training in both pure and applied aspects of Mathematics. Throughout the curriculum there is also emphasis on experiential learning through guided studies, projects, seminars and summer internships. With the diversity of courses offered in the major, various specializations are available. These will lead to careers in a wide range of sectors including education, economics and finance, analytics and data science, logistics, management, research and further studies.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and present fundamental concepts in mathematics (by means of coursework and learning activities in the major or minor curriculum)
- PLO 2: apply mathematical theory and techniques to different areas of Sciences, and appraise the related ethical issues (by means of coursework and learning activities in the major or minor curriculum)
- PLO 3: communicate in mathematical language and present scientific arguments (by means of coursework, seminars, guided studies and projects)
- PLO 4: collaborate and work with other students in an effective manner (by means of guided studies, projects and seminars)
- PLO 5: appreciate the beauty and power of mathematics (by means of guided studies, projects and seminars)

#### Impermissible Combinations:

Major in Mathematics/Physics

Minor in Computational & Financial Mathematics

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

## Required courses (96 credits)

#### 1. Introductory level courses (48 credits)

# Disciplinary Core Courses: Science Foundation Courses (12 credits) SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

MATH1013 University mathematics II (6)

MATH2012 Fundamental concepts of mathematics (6)

MATH2101 Linear algebra I (6)
MATH2102 Linear algebra II (6)
MATH2211 Multivariable calculus (6)

MATH2241 Introduction to mathematical analysis (6)

## 2. Advanced level courses (42 credits)

Disciplinary Core Courses (18 credits)

MATH3301 Algebra I (6) MATH3401 Analysis I (6)

MATH3403 Functions of a complex variable (6)

## **Disciplinary Electives (24 credits)**

At least 24 credits advanced level Mathematics courses (MATH3XXX or MATH4XXX or MATH7XXX level), of which at least 12 credits should be from MATH4XXX or MATH7XXX level, subject to pre-requisite requirements. The current list includes courses in List A and those courses not selected to fulfill the capstone requirements, but excluding MATH4966 Mathematics Internship.

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MATH3001 Development of mathematical ideas (6)

MATH3002 Mathematics seminar (6)

MATH3303 Matrix theory and its applications (6) MATH3304 Introduction to number theory (6)

MATH3405 Differential equations (6)

MATH3408 Computational methods and differential equations with

applications (6)

MATH3541 Introduction to topology (6)
MATH3600 Discrete mathematics (6)
MATH3601 Numerical analysis (6)
MATH3603 Probability theory (6)
MATH3901 Operations research I (6)
MATH3904 Introduction to optimization (6)
MATH3905 Queueing theory and simulation (6)

MATH3906 Financial calculus (6)
MATH3911 Game theory and strategy (6)

MATH3943 Network models in operations research (6)

MATH4302 Algebra II (6)
MATH4402 Analysis II (6)
MATH4404 Functional analysis (6)

MATH4406 Introduction to partial differential equations (6)

	MATH4501	Geometry (6)	
	MATH4511	Introduction to differentiable manifolds (6)	
	MATH4602	Scientific computing (6)	
	MATH4902	Operations research II (6)	
	MATH4907	Numerical methods for financial calculus (6)	
	MATH7101	Intermediate complex analysis (6)	
	MATH7201	Topics in geometry (6)	
	MATH7202	Complex manifolds (6)	
	MATH7217	Topics in financial mathematics (6)	
	MATH7219	Topics in applied functional analysis (6)	
	MATH7224	Topics in advanced probability theory (6)	
	MATH7501	Topics in algebra (6)	
	MATH7502	Topics in applied discrete mathematics (6)	
	MATH7503	Topics in mathematical programming and optimization (6)	
	MATH7504	Geometric topology (6)	
	MATH7505	Real analysis (6)	
	3. Capstone requirement (	6 credits)	
	At least 6 credits selected	from the following courses:	
	MATH3999	Directed studies in mathematics (6)	
	MATH4910	Senior mathematics seminar (6)	
	MATH4911	Mathematics capstone project (6)	
	MATH4966	Mathematics internship (6)	
	MATH4999	Mathematics project (12)	
П			

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 5. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

#### Remarks:

Major Title Major in Mathematics

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

The Major in Mathematics provides students with a solid and comprehensive undergraduate education in the subject. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving, and capability to tackle novel situations and ill-defined problems. Core courses in the curriculum emphasize fundamental knowledge and concepts in Mathematics and elective courses provide training in both pure and applied aspects of Mathematics. Throughout the curriculum there is also emphasis on experiential learning through guided studies, projects, seminars and summer internships. With the diversity of courses offered in the major, various specializations are available. These will lead to careers in a wide range of sectors including education, economics and finance, analytics and data science, logistics, management, research and further studies.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and present fundamental concepts in mathematics (by means of coursework and learning activities in the major or minor curriculum)
- PLO 2: apply mathematical theory and techniques to different areas of Sciences, and appraise the related ethical issues (by means of coursework and learning activities in the major or minor curriculum)
- PLO 3: communicate in mathematical language and present scientific arguments (by means of coursework, seminars, guided studies and projects)
- PLO 4: collaborate and work with other students in an effective manner (by means of guided studies, projects and seminars)
- PLO 5: appreciate the beauty and power of mathematics (by means of guided studies, projects and seminars)

#### Impermissible Combinations:

Major in Mathematics/Physics

Minor in Computational & Financial Mathematics

Minor in Mathematics

#### Required courses (96 credits)

#### 1. Introductory level courses (48 credits)

#### Disciplinary Core Courses: Science Foundation Courses (12 credits) SCNC1111 Scientific method and reasoning (6)

SCNC1111 Scientific fried and reasoning (b)
SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

MATH1013 University mathematics II (6)

MATH2012 Fundamental concepts of mathematics (6)

MATH2101 Linear algebra I (6)
MATH2102 Linear algebra II (6)
MATH2211 Multivariable calculus (6)

MATH2241 Introduction to mathematical analysis (6)

2. Advanced level courses (42 credits)

Disciplinary Core Courses (18 credits)

MATH3301 Algebra I (6) MATH3401 Analysis I (6)

MATH3403 Functions of a complex variable (6)

## Disciplinary Electives (24 credits)

At least 24 credits advanced level Mathematics courses (MATH3XXX or MATH4XXX or MATH7XXX level), of which at least 12 credits should be from MATH4XXX or MATH7XXX level, subject to pre-requisite requirements. The current list includes courses in List A and those courses not selected to fulfill the capstone requirements, but excluding MATH4966 Mathematics Internship.

List A

MATH3001 Development of mathematical ideas (6)

MATH3002 Mathematics seminar (6)

MATH3303 Matrix theory and its applications (6) MATH3304 Introduction to number theory (6)

MATH3405 Differential equations (6)
MATH3408 Computational methods and differential equations with

applications (6)

MATH3541 Introduction to topology (6)
MATH3600 Discrete mathematics (6)
MATH3601 Numerical analysis (6)
MATH3603 Probability theory (6)
MATH3901 Operations research I (6)
MATH3904 Introduction to optimization (6)
MATH3905 Queueing theory and simulation (6)

MATH3906 Financial calculus (6)
MATH3911 Game theory and strategy (6)

MATH3943 Network models in operations research (6)

MATH4302 Algebra II (6) MATH4402 Analysis II (6)

MATH4404 Functional analysis (6)
MATH4406 Introduction to partial differential equations (6)

MATH4501 Geometry (6)

١.		
П	MATH4511	Introduction to differentiable manifolds (6)
П	MATH4602	Scientific computing (6)
П	MATH4902	Operations research II (6)
П	MATH4907	Numerical methods for financial calculus (6)
П	MATH7101	Intermediate complex analysis (6)
П	MATH7201	Topics in geometry (6)
П	MATH7202	Complex manifolds (6)
П	MATH7217	Topics in financial mathematics (6)
П	MATH7219	Topics in applied functional analysis (6)
П	MATH7224	Topics in advanced probability theory (6)
П	MATH7501	Topics in algebra (6)
П	MATH7502	Topics in applied discrete mathematics (6)
П	MATH7503	Topics in mathematical programming and optimization (6)
П	MATH7504	Geometric topology (6)
П	MATH7505	Real analysis (6)
П	3. Capstone requirement	(6 credits)
П	At least 6 credits selecte	ed from the following courses:
П	MATH3999	Directed studies in mathematics (6)
П	MATH4910	Senior mathematics seminar (6)
П	MATH4911	Mathematics capstone project (6)
	MATH4966	Mathematics internship (6)
	MATH4999	Mathematics project (12)

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 5. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

## Remarks:

Major Title Major in Mathematics (Intensive)

Offered to students 2021

admitted to Year 1 in

## Objectives:

The Intensive Major in Mathematics provides students with a solid and comprehensive undergraduate education in the subject. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving, and capability to tackle novel situations and ill-defined problems. Core courses in the curriculum emphasize a firm foundation in Mathematics. The strong emphasis on experiential learning in guided studies, projects, seminars or summer internships provides more opportunities for students to carry out research based studies and to develop their expertise. Graduates are expected to have strong academic ability to pursue graduate studies or professional careers that require in-depth mathematical training.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and present a variety of concepts and theories in mathematics (by means of coursework and learning activities in the curriculum)
- PLO 2: apply mathematical theory and techniques to handle research-style questions, scrutinize problems, and appraise the related ethical issues (by means of coursework and learning activities in the curriculum)
- PLO 3: communicate in mathematical language, and present mathematical ideas and scientific arguments (by means of coursework, seminars, guided studies and projects)
- PLO 4: collaborate and work with other students in an effective manner (by means of guided studies, projects and seminars)
- PLO 5: appreciate the beauty and power of mathematics (by means of guided studies, projects and seminars)

## Impermissible Combinations:

Major in Mathematics

Minor in Computational & Financial Mathematics

Minor in Mathematics

Required courses (14	4 cradits)	
•	•	
I. Introductory level co		
	ses: Science Foundation Courses (12 credits)	(Nata 4)
SCNC1111	Scientific method and reasoning (6)	(Note 1)
SCNC1112	Fundamentals of modern science (6)	(Note 1)
Disciplinary Core Cour		(1)-(-4)
MATH1013	University mathematics II (6)	(Note 1)
MATH2012	Fundamental concepts of mathematics (6)	(Note 1)
MATH2101	Linear algebra I (6)	(Note 1)
MATH2102	Linear algebra II (6)	(Note 1)
MATH2211	Multivariable calculus (6)	(Note 1)
MATH2241	Introduction to mathematical analysis (6)	(Note 1)
2. Advanced level cour		
Disciplinary Core Cour		
MATH3002	Mathematics seminar (6)	
MATH3301	Algebra I (6)	
MATH3401	Analysis I (6)	(Note 1)
MATH3403	Functions of a complex variable (6)	
MATH3405	Differential equations (6)	
MATH3600	Discrete mathematics (6)	
MATH3603	Probability theory (6)	
MATH3904	Introduction to optimization (6)	
MATH4404	Functional analysis (6)	
MATH4406	Introduction to partial differential equations (6)	
Disciplinary Electives (	24 credits)	
Select Stream (A) or S	Stream (B):	
	(at least 24 credits with 12 credits from MATH7XXX level, subject to	pre-requisite requirement)
`MATH3541	Introduction to topology (6)	
MATH4302	Algebra II (6)	
MATH4402	Analysis II (6)	
MATH4501	Geometry (6)	
MATH4511	Introduction to differentiable manifolds (6)	
MATH7101	Intermediate complex analysis (6)	
MATH7201	Topics in geometry (6)	
MATH7202	Complex manifolds (6)	
MATH7501	Topics in algebra (6)	
MATH7505	Real analysis (6)	
	ics (at least 24 credits with 12 credits from MATH4XXX or MATH7X.	VV lovel subject to pro-
requisite requirement	ios (at icast 27 orcuits with 12 orcuits from MATTIAAAA OF WATTIAA	AA IGVGI, SUDJECT TO PIE-
MATH3601	Numerical analysis (6)	
	Operations research I (6)	
MATH3901	Financial calculus (6)	
MATH3906	Game theory and strategy (6)	
MATH3911	• • • • • • • • • • • • • • • • • • • •	
MATH3943	Network models in operations research (6)	

MATH4602 Scientific computing (6)
MATH4902 Operations research II (6)

MATH4907 Numerical methods for financial calculus (6)
MATH7217 Topics in financial mathematics (6)
MATH7224 Topics in advanced probability theory (6)
MATH7502 Topics in applied discrete mathematics (6)

MATH7503 Topics in mathematical programming and optimization (6)

3. Capstone requirement (12 credits)

At least 12 credits selected from the following courses:

MATH3999 Directed studies in mathematics (6)
MATH4910 Senior mathematics seminar (6)
MATH4911 Mathematics capstone project (6)
MATH4966 Mathematics internship (6)
MATH4999 Mathematics project (12)

#### Notes:

- 1. These are core courses in the regular Mathematics Major (96 credits) curriculum.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.
- 4. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis
- 5. Candidates who have been admitted to Year 1 in 2021-22 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1112. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Biology, Chemistry, and Physics in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Biology, Chemistry, and Physics Higher Level in International Baccalaureate (IB)
- Grade B or above in Biology, Chemistry, and Physics in General Certificate of Education Advanced Level (GCEAL)
- Biology, Chemistry, and Physics qualification in Gao Kao will be considered on a case-by-case basis

#### Remarks

Major Title Major in Mathematics (Intensive)

Offered to students 2020

admitted to Year 1 in

#### Objectives:

The Intensive Major in Mathematics provides students with a solid and comprehensive undergraduate education in the subject. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving, and capability to tackle novel situations and ill-defined problems. Core courses in the curriculum emphasize a firm foundation in Mathematics. The strong emphasis on experiential learning in guided studies, projects, seminars or summer internships provides more opportunities for students to carry out research based studies and to develop their expertise. Graduates are expected to have strong academic ability to pursue graduate studies or professional careers that require in-depth mathematical training.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and present a variety of concepts and theories in mathematics (by means of coursework and learning activities in the curriculum)
- PLO 2: apply mathematical theory and techniques to handle research-style questions, scrutinize problems, and appraise the related ethical issues (by means of coursework and learning activities in the curriculum)
- PLO 3: communicate in mathematical language, and present mathematical ideas and scientific arguments (by means of coursework, seminars, guided studies and projects)
- PLO 4: collaborate and work with other students in an effective manner (by means of guided studies, projects and seminars)
- PLO 5: appreciate the beauty and power of mathematics (by means of guided studies, projects and seminars)

## Impermissible Combinations:

Major in Mathematics

Minor in Computational & Financial Mathematics

Minor in Mathematics

Required courses (14	4 cradits)	
•	•	
I. Introductory level co		
	ses: Science Foundation Courses (12 credits)	(Nata 4)
SCNC1111	Scientific method and reasoning (6)	(Note 1)
SCNC1112	Fundamentals of modern science (6)	(Note 1)
Disciplinary Core Cour		(1)-(-4)
MATH1013	University mathematics II (6)	(Note 1)
MATH2012	Fundamental concepts of mathematics (6)	(Note 1)
MATH2101	Linear algebra I (6)	(Note 1)
MATH2102	Linear algebra II (6)	(Note 1)
MATH2211	Multivariable calculus (6)	(Note 1)
MATH2241	Introduction to mathematical analysis (6)	(Note 1)
2. Advanced level cour		
Disciplinary Core Cour		
MATH3002	Mathematics seminar (6)	
MATH3301	Algebra I (6)	
MATH3401	Analysis I (6)	(Note 1)
MATH3403	Functions of a complex variable (6)	
MATH3405	Differential equations (6)	
MATH3600	Discrete mathematics (6)	
MATH3603	Probability theory (6)	
MATH3904	Introduction to optimization (6)	
MATH4404	Functional analysis (6)	
MATH4406	Introduction to partial differential equations (6)	
Disciplinary Electives (	24 credits)	
Select Stream (A) or S	Stream (B):	
	(at least 24 credits with 12 credits from MATH7XXX level, subject to	pre-requisite requirement)
`MATH3541	Introduction to topology (6)	
MATH4302	Algebra II (6)	
MATH4402	Analysis II (6)	
MATH4501	Geometry (6)	
MATH4511	Introduction to differentiable manifolds (6)	
MATH7101	Intermediate complex analysis (6)	
MATH7201	Topics in geometry (6)	
MATH7202	Complex manifolds (6)	
MATH7501	Topics in algebra (6)	
MATH7505	Real analysis (6)	
	ics (at least 24 credits with 12 credits from MATH4XXX or MATH7X.	VV lovel subject to pro-
requisite requirement	ios (at icast 27 orcuits with 12 orcuits from MATTIAAAA OF WATTIAA	AA IGVGI, SUDJECT TO PIE-
MATH3601	Numerical analysis (6)	
	Operations research I (6)	
MATH3901	Financial calculus (6)	
MATH3906	Game theory and strategy (6)	
MATH3911	• • • • • • • • • • • • • • • • • • • •	
MATH3943	Network models in operations research (6)	

MATH4602 Scientific computing (6)
MATH4902 Operations research II (6)

MATH4907 Numerical methods for financial calculus (6)
MATH7217 Topics in financial mathematics (6)
MATH7224 Topics in advanced probability theory (6)
MATH7502 Topics in applied discrete mathematics (6)

MATH7503 Topics in mathematical programming and optimization (6)

3. Capstone requirement (12 credits)

At least 12 credits selected from the following courses:

MATH3999 Directed studies in mathematics (6)
MATH4910 Senior mathematics seminar (6)
MATH4911 Mathematics capstone project (6)
MATH4966 Mathematics internship (6)
MATH4999 Mathematics project (12)

#### Notes:

- 1. These are core courses in the regular Mathematics Major (96 credits) curriculum.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.
- 4. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis

#### Remarks

Major Title Major in Mathematics (Intensive)

Offered to students 2019

admitted to Year 1 in

#### Objectives:

The Intensive Major in Mathematics provides students with a solid and comprehensive undergraduate education in the subject. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving, and capability to tackle novel situations and ill-defined problems. Core courses in the curriculum emphasize a firm foundation in Mathematics. The strong emphasis on experiential learning in guided studies, projects, seminars or summer internships provides more opportunities for students to carry out research based studies and to develop their expertise. Graduates are expected to have strong academic ability to pursue graduate studies or professional careers that require in-depth mathematical training.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and present a variety of concepts and theories in mathematics (by means of coursework and learning activities in the curriculum)
- PLO 2: apply mathematical theory and techniques to handle research-style questions, scrutinize problems, and appraise the related ethical issues (by means of coursework and learning activities in the curriculum)
- PLO 3: communicate in mathematical language, and present mathematical ideas and scientific arguments (by means of coursework, seminars, guided studies and projects)
- PLO 4: collaborate and work with other students in an effective manner (by means of guided studies, projects and seminars)
- PLO 5: appreciate the beauty and power of mathematics (by means of guided studies, projects and seminars)

## Impermissible Combinations:

Major in Mathematics

Minor in Computational & Financial Mathematics

Minor in Mathematics

linor in Operations Resea	rch & Mathematical Programming	
Required courses (14	4 credits)	
1. Introductory level co	•	
	ses: Science Foundation Courses (12 credits)	
SCNC1111	Scientific method and reasoning (6)	(Note 1)
SCNC1112	Fundamentals of modern science (6)	(Note 1)
Disciplinary Core Cour	ses (36 credits)	,
MATH1013	University mathematics II (6)	(Note 1)
MATH2012	Fundamental concepts of mathematics (6)	(Note 1)
MATH2101	Linear algebra I (6)	(Note 1)
MATH2102	Linear algebra II (6)	(Note 1)
MATH2211	Multivariable calculus (6)	(Note 1)
MATH2241	Introduction to mathematical analysis (6)	(Note 1)
2. Advanced level cour	ses (84 credits)	
<b>Disciplinary Core Cour</b>		
MATH3002	Mathematics seminar (6)	
MATH3301	Algebra I (6)	
MATH3401	Analysis I (6)	(Note 1)
MATH3403	Functions of a complex variable (6)	
MATH3405	Differential equations (6)	
MATH3600	Discrete mathematics (6)	
MATH3603	Probability theory (6)	
MATH3904	Introduction to optimization (6)	
MATH4404	Functional analysis (6)	
MATH4406	Introduction to partial differential equations (6)	
Disciplinary Electives (	24 credits)	
Select Stream (A) or S		
(A) Pure Mathematics	s (at least 24 credits with 12 credits from MATH7XXX level, subjec	t to pre-requisite requirement)
MATH3541	Introduction to topology (6)	
MATH4302	Algebra II (6)	
MATH4402	Analysis II (6)	
MATH4501	Geometry (6)	
MATH4511	Introduction to differentiable manifolds (6)	
MATH7101	Intermediate complex analysis (6)	
MATH7201	Topics in geometry (6)	
MATH7202	Complex manifolds (6)	
MATH7501	Topics in algebra (6)	
MATH7505	Real analysis (6)	
	tics (at least 24 credits with 12 credits from MATH4XXX or MATH7	7XXX level, subject to pre-
requisite requirement,		
MATH3601	Numerical analysis (6)	
MATH3901	Operations research I (6)	
MATH3906	Financial calculus (6)	
MATH3911	Game theory and strategy (6)	
MATH3943	Network models in operations research (6)	

MATH4602 Scientific computing (6)
MATH4902 Operations research II (6)

MATH4907 Numerical methods for financial calculus (6)
MATH7217 Topics in financial mathematics (6)
MATH7224 Topics in advanced probability theory (6)
MATH7502 Topics in applied discrete mathematics (6)

MATH7503 Topics in mathematical programming and optimization (6)

## 3. Capstone requirement (12 credits)

At least 12 credits selected from the following courses:

MATH3999 Directed studies in mathematics (6)
MATH4910 Senior mathematics seminar (6)
MATH4911 Mathematics capstone project (6)
MATH4966 Mathematics internship (6)
MATH4999 Mathematics project (12)

## Notes:

- 1. These are core courses in the regular Mathematics Major (96 credits) curriculum.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

#### Remarks

Major Title Major in Mathematics (Intensive)

Offered to students 2018

admitted to Year 1 in

## Objectives:

The Intensive Major in Mathematics provides students with a solid and comprehensive undergraduate education in the subject. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving, and capability to tackle novel situations and ill-defined problems. Core courses in the curriculum emphasize a firm foundation in Mathematics. The strong emphasis on experiential learning in guided studies, projects, seminars or summer internships provides more opportunities for students to carry out research based studies and to develop their expertise. Graduates are expected to have strong academic ability to pursue graduate studies or professional careers that require in-depth mathematical training.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and present a variety of concepts and theories in mathematics (by means of coursework and learning activities in the curriculum)
- PLO 2: apply mathematical theory and techniques to handle research-style questions, scrutinize problems, and appraise the related ethical issues (by means of coursework and learning activities in the curriculum)
- PLO 3: communicate in mathematical language, and present mathematical ideas and scientific arguments (by means of coursework, seminars, guided studies and projects)
- PLO 4: collaborate and work with other students in an effective manner (by means of guided studies, projects and seminars)
- PLO 5: appreciate the beauty and power of mathematics (by means of guided studies, projects and seminars)

## Impermissible Combinations:

Major in Mathematics

Minor in Computational & Financial Mathematics

Minor in Mathematics

Required courses (14	4 cradits)	
•	•	
I. Introductory level co		
	ses: Science Foundation Courses (12 credits)	(Nata 4)
SCNC1111	Scientific method and reasoning (6)	(Note 1)
SCNC1112	Fundamentals of modern science (6)	(Note 1)
Disciplinary Core Cour		(1)-(-4)
MATH1013	University mathematics II (6)	(Note 1)
MATH2012	Fundamental concepts of mathematics (6)	(Note 1)
MATH2101	Linear algebra I (6)	(Note 1)
MATH2102	Linear algebra II (6)	(Note 1)
MATH2211	Multivariable calculus (6)	(Note 1)
MATH2241	Introduction to mathematical analysis (6)	(Note 1)
2. Advanced level cour		
Disciplinary Core Cour		
MATH3002	Mathematics seminar (6)	
MATH3301	Algebra I (6)	
MATH3401	Analysis I (6)	(Note 1)
MATH3403	Functions of a complex variable (6)	
MATH3405	Differential equations (6)	
MATH3600	Discrete mathematics (6)	
MATH3603	Probability theory (6)	
MATH3904	Introduction to optimization (6)	
MATH4404	Functional analysis (6)	
MATH4406	Introduction to partial differential equations (6)	
Disciplinary Electives (	24 credits)	
Select Stream (A) or S	Stream (B):	
	(at least 24 credits with 12 credits from MATH7XXX level, subject to	pre-requisite requirement)
`MATH3541	Introduction to topology (6)	
MATH4302	Algebra II (6)	
MATH4402	Analysis II (6)	
MATH4501	Geometry (6)	
MATH4511	Introduction to differentiable manifolds (6)	
MATH7101	Intermediate complex analysis (6)	
MATH7201	Topics in geometry (6)	
MATH7202	Complex manifolds (6)	
MATH7501	Topics in algebra (6)	
MATH7505	Real analysis (6)	
	ics (at least 24 credits with 12 credits from MATH4XXX or MATH7X.	VV lovel subject to pro-
requisite requirement	ios (at icast 27 orcuits with 12 orcuits from MATTIAAAA OF WATTIAA	AA IGVGI, SUDJECT TO PIE-
MATH3601	Numerical analysis (6)	
	Operations research I (6)	
MATH3901	Financial calculus (6)	
MATH3906	Game theory and strategy (6)	
MATH3911	• • • • • • • • • • • • • • • • • • • •	
MATH3943	Network models in operations research (6)	

MATH4602 Scientific computing (6)
MATH4902 Operations research II (6)

MATH4907 Numerical methods for financial calculus (6)
MATH7217 Topics in financial mathematics (6)
MATH7224 Topics in advanced probability theory (6)
MATH7502 Topics in applied discrete mathematics (6)

MATH7503 Topics in mathematical programming and optimization (6)

## 3. Capstone requirement (12 credits)

At least 12 credits selected from the following courses:

MATH3999 Directed studies in mathematics (6)
MATH4910 Senior mathematics seminar (6)
MATH4911 Mathematics capstone project (6)
MATH4966 Mathematics internship (6)
MATH4999 Mathematics project (12)

## Notes:

- 1. These are core courses in the regular Mathematics Major (96 credits) curriculum.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

#### Remarks

Major Title Major in Mathematics (Intensive)

Offered to students 2017

admitted to Year 1 in

## Objectives:

The Intensive Major in Mathematics provides students with a solid and comprehensive undergraduate education in the subject. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving, and capability to tackle novel situations and ill-defined problems. Core courses in the curriculum emphasize a firm foundation in Mathematics. The strong emphasis on experiential learning in guided studies, projects, seminars or summer internships provides more opportunities for students to carry out research based studies and to develop their expertise. Graduates are expected to have strong academic ability to pursue graduate studies or professional careers that require in-depth mathematical training.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and present a variety of concepts and theories in mathematics (by means of coursework and learning activities in the curriculum)
- PLO 2: apply mathematical theory and techniques to handle research-style questions, scrutinize problems, and appraise the related ethical issues (by means of coursework and learning activities in the curriculum)
- PLO 3: communicate in mathematical language, and present mathematical ideas and scientific arguments (by means of coursework, seminars, guided studies and projects)
- PLO 4: collaborate and work with other students in an effective manner (by means of guided studies, projects and seminars)
- PLO 5: appreciate the beauty and power of mathematics (by means of guided studies, projects and seminars)

## Impermissible Combinations:

Major in Mathematics

Major in Mathematics/Physics

Minor in Computational & Financial Mathematics

Minor in Mathematics

equired courses (144	credits)	
. Introductory level cou	•	
	es: Science Foundation Courses (12 credits)	
SCNC1111	Scientific method and reasoning (6)	(Note 1)
SCNC1112	Fundamentals of modern science (6)	(Note 1)
Disciplinary Core Cours	` ,	(14010-1)
MATH1013	University mathematics II (6)	(Note 1)
MATH2012	Fundamental concepts of mathematics (6)	(Note 1)
MATH2101	Linear algebra I (6)	(Note 1)
MATH2102	Linear algebra II (6)	(Note 1)
MATH2211	Multivariable calculus (6)	(Note 1)
MATH2241	Introduction to mathematical analysis (6)	(Note 1)
. Advanced level cours		(11010-1)
Disciplinary Core Cours		
MATH3002	Mathematics seminar (6)	
MATH3301	Algebra I (6)	
MATH3401	Analysis I (6)	(Note 1)
MATH3403	Functions of a complex variable (6)	(11010-1)
MATH3405	Differential equations (6)	
MATH3600	Discrete mathematics (6)	
MATH3603	Probability theory (6)	
MATH3904	Introduction to optimization (6)	
MATH4404	Functional analysis (6)	
MATH4406	Introduction to partial differential equations (6)	
Disciplinary Electives (2	, ,	
Select Stream (A) or S		
	(at least 24 credits with 12 credits from MATH7XXX level, subject to p	ore-requisite requirement)
MATH3541	Introduction to topology (6)	oro roquiono roquiromenti
MATH4302	Algebra II (6)	
MATH4402	Analysis II (6)	
MATH4501	Geometry (6)	
MATH4511	Introduction to differentiable manifolds (6)	
MATH7101	Intermediate complex analysis (6)	
MATH7201	Topics in geometry (6)	
MATH7202	Complex manifolds (6)	
MATH7501	Topics in algebra (6)	
MATH7505	Real analysis (6)	
	cs (at least 24 credits with 12 credits from MATH4XXX or MATH7XXX	K level, subject to pre-
requisite requirement)		,, ,
MATH3601	Numerical analysis (6)	
MATH3901	Operations research I (6)	
MATH3906	Financial calculus (6)	
MATH3911	Game theory and strategy (6)	

MATH3943 Network models in operations research (6)

MATH4602 Scientific computing (6)
MATH4902 Operations research II (6)

MATH4907 Numerical methods for financial calculus (6) MATH7217 Topics in financial mathematics (6)

MATH7224 Topics in advanced probability theory (6)
MATH7502 Topics in applied discrete mathematics (6)

MATH7503 Topics in mathematical programming and optimization (6)

## 3. Capstone requirement (12 credits)

At least 12 credits selected from the following courses:

MATH3999 Directed studies in mathematics (6)
MATH4910 Senior mathematics seminar (6)
MATH4911 Mathematics capstone project (6)
MATH4966 Mathematics internship (6)
MATH4999 Mathematics project (12)

## Notes:

- 1. These are core courses in the regular Mathematics Major (96 credits) curriculum.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

#### Remarks:

Major Title Major in Mathematics (Intensive)

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

The Intensive Major in Mathematics provides students with a solid and comprehensive undergraduate education in the subject. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving, and capability to tackle novel situations and ill-defined problems. Core courses in the curriculum emphasize a firm foundation in Mathematics. The strong emphasis on experiential learning in guided studies, projects, seminars or summer internships provides more opportunities for students to carry out research based studies and to develop their expertise. Graduates are expected to have strong academic ability to pursue graduate studies or professional careers that require in-depth mathematical training.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and present a variety of concepts and theories in mathematics (by means of coursework and learning activities in the curriculum)
- PLO 2: apply mathematical theory and techniques to handle research-style questions, scrutinize problems, and appraise the related ethical issues (by means of coursework and learning activities in the curriculum)
- PLO 3: communicate in mathematical language, and present mathematical ideas and scientific arguments (by means of coursework, seminars, guided studies and projects)
- PLO 4: collaborate and work with other students in an effective manner (by means of guided studies, projects and seminars)
- PLO 5: appreciate the beauty and power of mathematics (by means of guided studies, projects and seminars)

## Impermissible Combinations:

Major in Mathematics

Major in Mathematics/Physics

Minor in Computational & Financial Mathematics

Minor in Mathematics

equired courses (144	4 credits)	
I. Introductory level co	urses (48 credits)	
Disciplinary Core Cours	ses: Science Foundation Courses (12 credits)	
SCNC1111	Scientific method and reasoning (6)	(Note 1)
SCNC1112	Fundamentals of modern science (6)	(Note 1)
Disciplinary Core Cours	ses (36 credits)	
MATH1013	University mathematics II (6)	(Note 1)
MATH2012	Fundamental concepts of mathematics (6)	(Note 1)
MATH2101	Linear algebra I (6)	(Note 1)
MATH2102	Linear algebra II (6)	(Note 1)
MATH2211	Multivariable calculus (6)	(Note 1)
MATH2241	Introduction to mathematical analysis (6)	(Note 1)
2. Advanced level cours	ses (84 credits)	
Disciplinary Core Cours		
MATH3002	Mathematics seminar (6)	
MATH3301	Algebra I (6)	
MATH3401	Analysis I (6)	(Note 1)
MATH3403	Functions of a complex variable (6)	
MATH3405	Differential equations (6)	
MATH3600	Discrete mathematics (6)	
MATH3603	Probability theory (6)	
MATH3904	Introduction to optimization (6)	
MATH4404	Functional analysis (6)	
MATH4406	Introduction to partial differential equations (6)	
Disciplinary Electives (2	24 credits)	
Select Stream (A) or S		
	(at least 24 credits with 12 credits from MATH7XXX level, subject to	pre-requisite requirement)
`MATH3541	Introduction to topology (6)	
MATH4302	Algebra II (6)	
MATH4402	Analysis II (6)	
MATH4501	Geometry (6)	
MATH4511	Introduction to differentiable manifolds (6)	
MATH7101	Intermediate complex analysis (6)	
MATH7201	Topics in geometry (6)	
MATH7202	Complex manifolds (6)	
MATH7501	Topics in algebra (6)	
MATH7505	Real analysis (6)	
(B) Applied Mathemati	ics (at least 24 credits with 12 credits from MATH4XXX or MATH7XX	X level, subject to pre-
requisite requirement)		· ·
MATH3601	Numerical analysis (6)	
MATH3901	Operations research I (6)	
MATH3906	Financial calculus (6)	
MATH3911	Game theory and strategy (6)	

MATH3943 Network models in operations research (6)

MATH4602 Scientific computing (6) Operations research II (6)

MATH4902

MATH4907 Numerical methods for financial calculus (6) MATH7217 Topics in financial mathematics (6) Topics in advanced probability theory (6) MATH7224 MATH7502 Topics in applied discrete mathematics (6)

Topics in mathematical programming and optimization (6) MATH7503

## 3. Capstone requirement (12 credits)

At least 12 credits selected from the following courses:

Directed studies in mathematics (6) MATH3999 MATH4910 Senior mathematics seminar (6) Mathematics capstone project (6) MATH4911 Mathematics project (12) MATH4999 Mathematics internship (6) MATH4966

#### Notes:

- 1. These are core courses in the regular Mathematics Major (96 credits) curriculum.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

#### Remarks:

Major Title Major in Mathematics/Physics

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

The Major in Mathematics/Physics aims to provide students with a solid foundation in both physics and mathematics. This major is catered especially for students interested in the more theoretical aspects of physics. It covers a wide range of core areas in both disciplines which form the blocks of fundamental knowledge for further specializations, e.g. quantum mechanics, statistical mechanics, classical mechanics, electrodynamics, linear algebra, mathematical analysis, abstract algebra, complex variables, differential equations, modern differential geometry, etc. A large selection of elective courses is provided for students to pursue a broad spectrum of professional knowledge in mathematical and theoretical physics. Analytical thinking, quantitative reasoning and innovative ideas are fostered through the effective design of courses and research projects. The curriculum emphasizes experiential learning through internships, field studies and research projects supervised by experts. With the comprehensive training received, graduates are expected to be well-prepared for further studies and to pursue careers in many fields of science and engineering.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with a rigorous representation using their professional knowledge (by means of coursework and tutorial classes in the curriculum)
- PLO 2: have developed their scientific intuition, abilities and techniques to tackle physical problems with intellectual rigor theoretically (by means of coursework, tutorial classes and assessments in the curriculum)
- PLO 3: apply mathematical theory and techniques to analyze physical problems qualitatively and quantitatively, and appraise the related ethical issues (by means of coursework, tutorial classes and research-based projects in the curriculum)
- PLO 4: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)
- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-world setting (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

## Impermissible Combinations:

Major in Mathematics

Major in Physics

Minor in Computational & Financial Mathematics

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

Minor in Physics

## Required courses (96 credits)

## 1. Introductory level courses (48 credits)

## Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

## **Disciplinary Core Courses (30 credits)**

MATH1013 University mathematics II (6)
MATH2101 Linear algebra I (6)
MATH2211 Multivariable calculus (6)
PHYS1250 Fundamental physics (6)
PHYS2265 Introductory quantum physics (6)

## **Disciplinary Electives (6 credits)**

At least 6 credits selected from the following courses:
PHYS1150 Problem solving in physics (6)

PHYS1150 Problem solving in physics PHYS2055 Introductory relativity (6)
PHYS2150 Methods in physics I (6)
PHYS2155 Methods in physics II (6)

PHYS2160 Introductory computational physics (6)

PHYS2250 Introductory mechanics (6)

PHYS2255 Introductory electricity and magnetism (6)

PHYS2260 Heat and waves (6)

## 2. Advanced level courses (42 credits)

## Disciplinary Core Courses (36 credits)

MATH3301 Algebra I (6)
MATH3401 Analysis I (6)
MATH4501 Geometry (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)
PHYS4351 Advanced quantum mechanics (6)

## **Disciplinary Electives (6 credits)**

At least 6 credits of advanced level Mathematics or Physics courses (MATH3XXX or MATH4XXX or MATH7XXX or PHYS3XXX or PHYS7XXX level), subject to prerequisite requirements. The current list of courses include courses in List A and those courses not selected to fulfill the capstone requirement, but excluding MATH4966 Mathematics Internship.

List A

MATH2001	Development of mathematical ideas (6)	
MATH3001	•	
MATH3002	Mathematics seminar (6)	
MATH3303	Matrix theory and its applications (6)	
MATH3304	Introduction to number theory (6)	
MATH3403	Functions of a complex variable (6)	
MATH3405	Differential equations (6)	
	• • • • • • • • • • • • • • • • • • • •	
MATH3408	Computational methods and differential equations with	
NAATI 10544	applications (6)	
MATH3541	Introduction to topology (6)	
MATH3600	Discrete mathematics (6)	
MATH3601	Numerical analysis (6)	
MATH3603	Probability theory (6)	
	* * * * *	
MATH3901	Operations research I (6)	
MATH3904	Introduction to optimization (6)	
MATH3905	Queueing theory and simulation (6)	
MATH3906	Financial calculus (6)	
MATH3911	Game theory and strategy (6)	
	Network models in operations research (6)	
MATH3943	. , ,	
MATH4302	Algebra II (6)	
MATH4402	Analysis II (6)	
MATH4404	Functional analysis (6)	
MATH4406	Introduction to partial differential equations (6)	
MATH4511	Introduction to differentiable manifolds (6)	
MATH4602	Scientific computing (6)	
MATH4902	Operations research II (6)	
MATH4907	Numerical methods for financial calculus (6)	
MATH7101	Intermediate complex analysis (6)	
	• • • • • • • • • • • • • • • • • • • •	
MATH7201	Topics in geometry (6)	
MATH7202	Complex manifolds (6)	
MATH7217	Topics in financial mathematics (6)	
MATH7219	Topics in applied functional analysis (6)	
MATH7224	Topics in advanced probability theory (6)	
MATH7501	Topics in algebra (6)	
MATH7502	Topics in applied discrete mathematics (6)	
MATH7503	Topics in mathematical programming and optimization (6)	
MATH7504	Geometric topology (6)	
MATH7505	Real analysis (6)	
	Theoretical physics (6)	
PHYS3150		
PHYS3151	Machine learning in physics (6)	
PHYS3450	Electromagnetism (6)	
PHYS3550	Statistical mechanics & thermodynamics (6)	
PHYS3551	Introductory solid state physics (6)	
PHYS3650	Observational astronomy (6)	
PHYS3651	The physical universe (6)	
PHYS3652	Principles of astronomy (6)	
PHYS3653	Astrophysics (6)	
PHYS3660	Astronomy laboratory (6)	
PHYS3750	Laser and spectroscopy (6)	
	Physics of nanomaterials (6)	
PHYS3751	• • • • • • • • • • • • • • • • • • • •	
PHYS3760	Physics laboratory (6)	
PHYS3850	Physical Optics (6)	[previous title: Waves and optics
		(6) ]
PHYS3851	Atomic and nuclear physics (6)	
PHYS4150	Computational physics (6)	
PHYS4151	Data analysis and modeling in physics (6)	
PHYS4350	Advanced classical mechanics (6)	
	` ,	
PHYS4450	Advanced electromagnetism (6)	
PHYS4550	Advanced statistical mechanics (6)	
PHYS4551	Solid state physics (6)	
PHYS4650	Stellar physics (6)	
	Selected topics in astrophysics (6)	
PHYS4651		
PHYS4652	Planetary science (6)	
PHYS4653	Cosmology (6)	
PHYS4654	General relativity (6)	
PHYS4655	Interstellar medium (6)	
	• •	
PHYS4656	Advanced astrophysics (6)	
PHYS4750	Experimental physics (6)	
PHYS4850	Particle physics (6)	
PHYS7350	Graduate classical mechanics (6)	
PHYS7351	Graduate quantum mechanics (6)	
PHYS7450	Graduate electromagnetism (6)	
PHYS7550	Graduate statistical mechanics (6)	
PHYS7551	Graduate solid state physics (6)	
PHYS7650	Stellar atmospheres (6)	
PHYS7750	Nanophysics (6)	
F11137730		
3. Capstone requirement	(6 credits)	

At least 6 credits selected from the following courses:

Directed studies in mathematics (6) MATH3999 MATH4910 Senior mathematics seminar (6) MATH4911 Mathematics capstone project (6) Mathematics internship (6) MATH4966 MATH4999 Mathematics project (12) Directed studies in physics (6) PHYS3999 Physics internship (6) PHYS4966 PHYS4999 Physics project (12)

#### Notes:

- 1. Students are strongly advised to consult departmental course selection advisors for course and career planning before selecting the courses.
- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 6. (a) Students must have level 3 or above in HKDSE Physics or HKDSE Combined Science with Physics component or equivalent to take this major. Students who do not fufill this requirement are advised to take PHYS1240 Physics by inquiry; and
- (b) Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fufill this requirement are advised to take MATH1011 University mathematics I.
- 7. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

#### Remarks:

Major Title Major in Mathematics/Physics

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

The Major in Mathematics/Physics aims to provide students with a solid foundation in both physics and mathematics. This major is catered especially for students interested in the more theoretical aspects of physics. It covers a wide range of core areas in both disciplines which form the blocks of fundamental knowledge for further specializations, e.g. quantum mechanics, statistical mechanics, classical mechanics, electrodynamics, linear algebra, mathematical analysis, abstract algebra, complex variables, differential equations, modern differential geometry, etc. A large selection of elective courses is provided for students to pursue a broad spectrum of professional knowledge in mathematical and theoretical physics. Analytical thinking, quantitative reasoning and innovative ideas are fostered through the effective design of courses and research projects. The curriculum emphasizes experiential learning through internships, field studies and research projects supervised by experts. With the comprehensive training received, graduates are expected to be well-prepared for further studies and to pursue careers in many fields of science and engineering.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with a rigorous representation using their professional knowledge (by means of coursework and tutorial classes in the curriculum)
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- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-world setting (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

## Impermissible Combinations:

Major in Mathematics

Major in Physics

Minor in Computational & Financial Mathematics

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

Minor in Physics

## Required courses (96 credits)

## 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits) SCNC1111 Scientific method and reasoning (6)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

MATH1013 University mathematics II (6)
MATH2101 Linear algebra I (6)
MATH2211 Multivariable calculus (6)
PHYS1250 Fundamental physics (6)
PHYS2265 Introductory quantum physics (6)

## **Disciplinary Electives (6 credits)**

At least 6 credits selected from the following courses:
PHYS1150 Problem solving in physics (6)

PHYS2055 Introductory relativity (6)
PHYS2150 Methods in physics I (6)
PHYS2155 Methods in physics II (6)
PHYS2250 Introductory mechanics (6)

PHYS2255 Introductory electricity and magnetism (6)

PHYS2260 Heat and waves (6)

## 2. Advanced level courses (42 credits)

## Disciplinary Core Courses (36 credits)

MATH3301 Algebra I (6)
MATH3401 Analysis I (6)
MATH4501 Geometry (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)
PHYS4351 Advanced quantum mechanics (6)

## Disciplinary Electives (6 credits)

At least 6 credits of advanced level Mathematics or Physics courses (MATH3XXX or MATH4XXX or MATH7XXX or PHYS3XXX or PHYS7XXX level), subject to prerequisite requirements. The current list of courses include courses in List A and those courses not selected to fulfill the capstone requirement, but excluding MATH4966 Mathematics Internship.

List A

MATH3001 Development of mathematical ideas (6)

MATH3002	Mathematics seminar (6)	
	Matrix theory and its applications (6)	
MATH3303	• • • • • • • • • • • • • • • • • • • •	
MATH3304	Introduction to number theory (6)	
MATH3403	Functions of a complex variable (6)	
MATH3405	Differential equations (6)	
	Computational methods and differential equations with	
MATH3408	·	
	applications (6)	
MATH3541	Introduction to topology (6)	
MATH3600	Discrete mathematics (6)	
MATH3601	Numerical analysis (6)	
MATH3603	Probability theory (6)	
MATH3901	Operations research I (6)	
MATH3904	Introduction to optimization (6)	
MATH3905	Queueing theory and simulation (6)	
MATH3906	Financial calculus (6)	
MATH3911	Game theory and strategy (6)	
MATH3943	Network models in operations research (6)	
MATH4302	Algebra II (6)	
MATH4402	Analysis II (6)	
MATH4404	Functional analysis (6)	
MATH4406	Introduction to partial differential equations (6)	
MATH4511	Introduction to differentiable manifolds (6)	
MATH4602	Scientific computing (6)	
	Operations research II (6)	
MATH4902		
MATH4907	Numerical methods for financial calculus (6)	
MATH7101	Intermediate complex analysis (6)	
MATH7201	Topics in geometry (6)	
MATH7202	Complex manifolds (6)	
	. , ,	
MATH7217	Topics in financial mathematics (6)	
MATH7219	Topics in applied functional analysis (6)	
MATH7224	Topics in advanced probability theory (6)	
MATH7501	Topics in algebra (6)	
MATH7502	Topics in applied discrete mathematics (6)	
MATH7503	Topics in mathematical programming and optimization (6)	
MATH7504	Geometric topology (6)	
MATH7505	Real analysis (6)	
	* * *	
PHYS3150	Theoretical physics (6)	
PHYS3151	Machine learning in physics (6)	
PHYS3450	Electromagnetism (6)	
PHYS3550	Statistical mechanics & thermodynamics (6)	
PHYS3551	Introductory solid state physics (6)	
	, , , ,	
PHYS3650	Observational astronomy (6)	
PHYS3651	The physical universe (6)	
PHYS3652	Principles of astronomy (6)	
PHYS3653	Astrophysics (6)	
PHYS3660	Astronomy laboratory (6)	
DI IV (0.0750		
PHYS3750	Laser and spectroscopy (6)	
PHYS3751	Physics of nanomaterials (6)	
PHYS3760	Physics laboratory (6)	
	Physical Optics (6)	[previous title: Waves and optics
PHYS3850	Friysical Optics (0)	· · · · · · · · · · · · · · · · · ·
DI D. 000054	At	(6) ]
PHYS3851	Atomic and nuclear physics (6)	
PHYS4150	Computational physics (6)	
PHYS4151	Data analysis and modeling in physics (6)	
PHYS4350	Advanced classical mechanics (6)	
	( )	
PHYS4450	Advanced electromagnetism (6)	
PHYS4550	Advanced statistical mechanics (6)	
PHYS4551	Solid state physics (6)	
PHYS4650	Stellar physics (6)	
PHYS4651	Selected topics in astrophysics (6)	
PHYS4652	Planetary science (6)	
PHYS4653	Cosmology (6)	
PHYS4654	General relativity (6)	
PHYS4655	Interstellar medium (6)	
PHYS4656	Advanced astrophysics (6)	
	• • • •	
PHYS4750	Experimental physics (6)	
PHYS4850	Particle physics (6)	
PHYS7350	Graduate classical mechanics (6)	
PHYS7351	Graduate quantum mechanics (6)	
	Graduate electromagnetism (6)	
PHYS7450	• • • • • • • • • • • • • • • • • • • •	
PHYS7550	Graduate statistical mechanics (6)	
PHYS7551	Graduate solid state physics (6)	
PHYS7650	Stellar atmospheres (6)	
PHYS7750	Nanophysics (6)	
3. Capstone requirement (	. , , ,	
At least 6 credits selected	from the following courses:	
II		

MATH3999 MATH4910 MATH4911 MATH4966 MATH4999 PHYS3999 PHYS3999	Directed studies in mathematics (6) Senior mathematics seminar (6) Mathematics capstone project (6) Mathematics internship (6) Mathematics project (12) Directed studies in physics (6) Physics internship (6)
PHYS4999	Physics project (12)

- 1. Students are strongly advised to consult departmental course selection advisors for course and career planning before selecting the courses.
- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 6. (a) Students must have level 3 or above in HKDSE Physics or HKDSE Combined Science with Physics component or equivalent to take this major. Students who do not fufill this requirement are advised to take PHYS1240 Physics by inquiry; and
- (b) Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fufill this requirement are advised to take MATH1011 University mathematics I.
- 7. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

#### Remarks:

Major Title Major in Mathematics/Physics

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

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## Impermissible Combinations:

Major in Mathematics

Major in Physics

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

Minor in Physics

#### Required courses (96 credits)

## 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)
SCNC1111 Scientific method and reasoning (6)
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**Disciplinary Core Courses (30 credits)** 

MATH1013 University mathematics II (6)
MATH2101 Linear algebra I (6)
MATH2211 Multivariable calculus (6)
PHYS1250 Fundamental physics (6)
PHYS2265 Introductory quantum physics (6)

## Disciplinary Electives (6 credits)

At least 6 credits selected from the following courses:
PHYS1150 Problem solving in physics (6)
PHYS2055 Introductory relativity (6)
PHYS2150 Methods in physics I (6)
PHYS2155 Methods in physics II (6)
PHYS2250 Introductory mechanics (6)

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PHYS2260 Heat and waves (6)

## 2. Advanced level courses (42 credits)

## Disciplinary Core Courses (36 credits) MATH3301 Algebra I (6)

MATH3401 Analysis I (6)
MATH4501 Geometry (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)
PHYS4351 Advanced quantum mechanics (6)

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List A

MATH3001 Development of mathematical ideas (6)

MATH3002 Mathematics seminar (6)

```
MATH3303
                                   Matrix theory and its applications (6)
   MATH3304
                                   Introduction to number theory (6)
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   MATH3403
                                   Differential equations (6)
   MATH3405
                                   Computational methods and differential equations with
   MATH3408
                                   applications (6)
                                   Introduction to topology (6)
   MATH3541
   MATH3600
                                   Discrete mathematics (6)
                                   Numerical analysis (6)
   MATH3601
                                   Probability theory (6)
   MATH3603
   MATH3901
                                   Operations research I (6)
   MATH3904
                                   Introduction to optimization (6)
   MATH3905
                                   Queueing theory and simulation (6)
                                   Financial calculus (6)
   MATH3906
                                   Game theory and strategy (6)
   MATH3911
   MATH3943
                                   Network models in operations research (6)
   MATH4302
                                   Algebra II (6)
   MATH4402
                                   Analysis II (6)
                                   Functional analysis (6)
   MATH4404
                                   Introduction to partial differential equations (6)
   MATH4406
   MATH4511
                                   Introduction to differentiable manifolds (6)
   MATH4602
                                   Scientific computing (6)
                                   Operations research II (6)
   MATH4902
   MATH4907
                                   Numerical methods for financial calculus (6)
                                   Intermediate complex analysis (6)
   MATH7101
   MATH7201
                                   Topics in geometry (6)
                                   Complex manifolds (6)
   MATH7202
                                   Topics in financial mathematics (6)
   MATH7217
                                   Topics in applied functional analysis (6)
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                                   Topics in advanced probability theory (6)
   MATH7224
   MATH7501
                                   Topics in algebra (6)
                                   Topics in applied discrete mathematics (6)
   MATH7502
   MATH7503
                                   Topics in mathematical programming and optimization (6)
                                   Geometric topology (6)
   MATH7504
   MATH7505
                                   Real analysis (6)
   PHYS3150
                                   Theoretical physics (6)
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   PHYS3450
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                                   Statistical mechanics & thermodynamics (6)
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   PHYS3551
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                                   Observational astronomy (6)
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   PHYS3652
   PHYS3653
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   PHYS3750
                                   Laser and spectroscopy (6)
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   PHYS3850
                                   Physical Optics (6)
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   PHYS3851
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   PHYS4350
   PHYS4450
                                   Advanced electromagnetism (6)
   PHYS4550
                                   Advanced statistical mechanics (6)
                                   Solid state physics (6)
   PHYS4551
   PHYS4650
                                   Stellar physics (6)
   PHYS4651
                                   Selected topics in astrophysics (6)
   PHYS4652
                                   Planetary science (6)
   PHYS4653
                                   Cosmology (6)
   PHYS4654
                                   General relativity (6)
                                   Interstellar medium (6)
   PHYS4655
   PHYS4656
                                   Advanced astrophysics (6)
                                   Experimental physics (6)
   PHYS4750
   PHYS4850
                                   Particle physics (6)
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   PHYS7350
                                   Graduate quantum mechanics (6)
   PHYS7351
                                   Graduate electromagnetism (6)
   PHYS7450
                                   Graduate statistical mechanics (6)
   PHYS7550
   PHYS7551
                                   Graduate solid state physics (6)
                                   Stellar atmospheres (6)
   PHYS7650
                                   Nanophysics (6)
   PHYS7750
3. Capstone requirement (6 credits)
   At least 6 credits selected from the following courses:
   MATH3999
                                   Directed studies in mathematics (6)
```

MATH4910	Senior mathematics seminar (6)
MATH4911	Mathematics capstone project (6)
MATH4966	Mathematics internship (6)
MATH4999	Mathematics project (12)
PHYS3999	Directed studies in physics (6)
PHYS4966	Physics internship (6)
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MATH3541 Introduction to topology (6)
MATH3600 Discrete mathematics (6)
MATH3601 Numerical analysis (6)

MATH3603	Probability theory (6)	
MATH3901	Operations research I (6)	
	. , ,	
MATH3904	Introduction to optimization (6)	
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MATH3906	Financial calculus (6)	
MATH3911	Game theory and strategy (6)	
MATH3943	Network models in operations research (6)	
MATH4302	Algebra II (6)	
MATH4402	Analysis II (6)	
MATH4404	Functional analysis (6)	
	Introduction to partial differential equations (6)	
MATH4406	• • • • • • • • • • • • • • • • • • • •	
MATH4511	Introduction to differentiable manifolds (6)	
MATH4602	Scientific computing (6)	
MATH4902	Operations research II (6)	
MATH4907	Numerical methods for financial calculus (6)	
MATH7101	Intermediate complex analysis (6)	
MATH7201	Topics in geometry (6)	
MATH7202	Complex manifolds (6)	
MATH7217	Topics in financial mathematics (6)	
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PHYS3150	Theoretical physics (6)	
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PHYS3450	Electromagnetism (6)	
PHYS3550	Statistical mechanics & thermodynamics (6)	
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PHYS3751	Physics of nanomaterials (6) Physical Ontics (6)	Inrevious title: Waves and ontics
	Physics of nanomaterials (6) Physical Optics (6)	[previous title: Waves and optics
PHYS3751 PHYS3850	Physical Optics (6)	[previous title: Waves and optics (6)]
PHYS3751 PHYS3850 PHYS3851	Physical Optics (6)  Atomic and nuclear physics (6)	
PHYS3751 PHYS3850 PHYS3851 PHYS4150	Physical Optics (6)  Atomic and nuclear physics (6)  Computational physics (6)	
PHYS3751 PHYS3850 PHYS3851 PHYS4150 PHYS4151	Physical Optics (6)  Atomic and nuclear physics (6)  Computational physics (6)  Data analysis and modeling in physics (6)	
PHYS3751 PHYS3850 PHYS3851 PHYS4150 PHYS4151 PHYS4350	Physical Optics (6)  Atomic and nuclear physics (6)  Computational physics (6)  Data analysis and modeling in physics (6)  Advanced classical mechanics (6)	
PHYS3751 PHYS3850 PHYS3851 PHYS4150 PHYS4151 PHYS4350 PHYS4450	Physical Optics (6)  Atomic and nuclear physics (6)  Computational physics (6)  Data analysis and modeling in physics (6)  Advanced classical mechanics (6)  Advanced electromagnetism (6)	
PHYS3751 PHYS3850 PHYS3851 PHYS4150 PHYS4151 PHYS4350	Physical Optics (6)  Atomic and nuclear physics (6)  Computational physics (6)  Data analysis and modeling in physics (6)  Advanced classical mechanics (6)	
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PHYS3751 PHYS3850 PHYS3851 PHYS4150 PHYS4151 PHYS4350 PHYS4450 PHYS4550	Physical Optics (6)  Atomic and nuclear physics (6) Computational physics (6) Data analysis and modeling in physics (6) Advanced classical mechanics (6) Advanced electromagnetism (6) Advanced statistical mechanics (6)	
PHYS3751 PHYS3850 PHYS3851 PHYS4150 PHYS4151 PHYS4350 PHYS4450 PHYS4550 PHYS4551	Physical Optics (6)  Atomic and nuclear physics (6) Computational physics (6) Data analysis and modeling in physics (6) Advanced classical mechanics (6) Advanced electromagnetism (6) Advanced statistical mechanics (6) Solid state physics (6)	
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<sup>1.</sup> Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details
- 5. (a) Students must have level 3 or above in HKDSE Physics or HKDSE Combined Science with Physics component or equivalent to take this major. Students who do not fufill this requirement are advised to take PHYS1240 Physics by inquiry; and
- (b) Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fufill this requirement are advised to take MATH1011 University mathematics I.
- 6. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

#### Remarks

Major Title Major in Mathematics/Physics

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

The Major in Mathematics/Physics aims to provide students with a solid foundation in both physics and mathematics. This major is catered especially for students interested in the more theoretical aspects of physics. It covers a wide range of core areas in both disciplines which form the blocks of fundamental knowledge for further specializations, e.g. quantum mechanics, statistical mechanics, classical mechanics, electrodynamics, linear algebra, mathematical analysis, abstract algebra, complex variables, differential equations, modern differential geometry, etc. A large selection of elective courses is provided for students to pursue a broad spectrum of professional knowledge in mathematical and theoretical physics. Analytical thinking, quantitative reasoning and innovative ideas are fostered through the effective design of courses and research projects. The curriculum emphasizes experiential learning through internships, field studies and research projects supervised by experts. With the comprehensive training received, graduates are expected to be well-prepared for further studies and to pursue careers in many fields of science and engineering.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with a rigorous representation using their professional knowledge (by means of coursework and tutorial classes in the curriculum)
- PLO 2: have developed their scientific intuition, abilities and techniques to tackle physical problems with intellectual rigor theoretically (by means of coursework, tutorial classes and assessments in the curriculum)
- PLO 3: apply mathematical theory and techniques to analyze physical problems qualitatively and quantitatively, and appraise the related ethical issues (by means of coursework, tutorial classes and research-based projects in the curriculum)
- PLO 4: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)
- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-world setting (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

## Impermissible Combinations:

Major in Mathematics

Major in Physics

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

Minor in Physics

#### Required courses (96 credits)

## 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)
SCNC1111 Scientific method and reasoning (6)
SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

MATH1013 University mathematics II (6)
MATH2101 Linear algebra I (6)
MATH2211 Multivariable calculus (6)
PHYS1250 Fundamental physics (6)
PHYS2250 Introductory mechanics (6)
PHYS2265 Introductory quantum physics (6)

## 2. Advanced level courses (42 credits)

## **Disciplinary Core Courses (36 credits)**

MATH3301 Algebra I (6)
MATH3401 Analysis I (6)
MATH4501 Geometry (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)
PHYS4351 Advanced quantum mechanics (6)

## **Disciplinary Electives (6 credits)**

At least 6 credits of advanced level Mathematics or Physics courses (MATH3XXX or MATH4XXX or MATH7XXX or PHYS3XXX or PHYS7XXX level), subject to prerequisite requirements. The current list of courses include courses in List A and those courses not selected to fulfill the capstone requirement, but excluding MATH4966 Mathematics Internship.

List A

MATH3001 Development of mathematical ideas (6)

MATH3002 Mathematics seminar (6)

MATH3303 Matrix theory and its applications (6)
MATH3304 Introduction to number theory (6)
MATH3403 Functions of a complex variable (6)

MATH3405 Differential equations (6)

MATH3408 Computational methods and differential equations with

applications (6)

MATH3541 Introduction to topology (6)
MATH3600 Discrete mathematics (6)
MATH3601 Numerical analysis (6)

MATH3603	Probability theory (6)	
MATH3901	Operations research I (6)	
MATH3904	Introduction to optimization (6)	
MATH3904 MATH3905	Queueing theory and simulation (6)	
MATH3906	Financial calculus (6)	
MATH3911	Game theory and strategy (6)	
MATH3943	Network models in operations research (6)	
MATH4302	Algebra II (6)	
MATH4402	Analysis II (6)	
MATH4404	Functional analysis (6)	
	Introduction to partial differential equations (6)	
MATH4406		
MATH4511	Introduction to differentiable manifolds (6)	
MATH4602	Scientific computing (6)	
MATH4902	Operations research II (6)	
MATH4907	Numerical methods for financial calculus (6)	
MATH7101	Intermediate complex analysis (6)	
MATH7201	Topics in geometry (6)	
MATH7202	Complex manifolds (6)	
MATH7217	Topics in financial mathematics (6)	
MATH7219	Topics in applied functional analysis (6)	
MATH7224	Topics in advanced probability theory (6)	
MATH7501	Topics in algebra (6)	
MATH7502	Topics in applied discrete mathematics (6)	
MATH7503	Topics in mathematical programming and optimization (6)	
MATH7503 MATH7504	Geometric topology (6)	
MATH7505	Real analysis (6)	
PHYS3150	Theoretical physics (6)	
PHYS3450	Electromagnetism (6)	
PHYS3550	Statistical mechanics & thermodynamics (6)	
PHYS3551	Introductory solid state physics (6)	
PHYS3650	Observational astronomy (6)	
PHYS3651	The physical universe (6)	
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PHYS3652	Principles of astronomy (6)	
PHYS3750	Laser and spectroscopy (6)	
PHYS3751	Physics of nanomaterials (6)	
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PHYS3850	Physical Optics (6)	[previous title: Waves and optics
	Physical Optics (6)	[previous title: Waves and optics (6)]
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<sup>1.</sup> Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details
- 5. (a) Students must have level 3 or above in HKDSE Physics or HKDSE Combined Science with Physics component or equivalent to take this major. Students who do not fufill this requirement are advised to take PHYS1240 Physics by inquiry; and
- (b) Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fufill this requirement are advised to take MATH1011 University mathematics I.
- 6. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

#### Remarks

Major Title Major in Mathematics/Physics

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

The Major in Mathematics/Physics aims to provide students with a solid foundation in both physics and mathematics. This major is catered especially for students interested in the more theoretical aspects of physics. It covers a wide range of core areas in both disciplines which form the blocks of fundamental knowledge for further specializations, e.g. quantum mechanics, statistical mechanics, classical mechanics, electrodynamics, linear algebra, mathematical analysis, abstract algebra, complex variables, differential equations, modern differential geometry, etc. A large selection of elective courses is provided for students to pursue a broad spectrum of professional knowledge in mathematical and theoretical physics. Analytical thinking, quantitative reasoning and innovative ideas are fostered through the effective design of courses and research projects. The curriculum emphasizes experiential learning through internships, field studies and research projects supervised by experts. With the comprehensive training received, graduates are expected to be well-prepared for further studies and to pursue careers in many fields of science and engineering.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with a rigorous representation using their professional knowledge (by means of coursework and tutorial classes in the curriculum)
- PLO 2: have developed their scientific intuition, abilities and techniques to tackle physical problems with intellectual rigor theoretically (by means of coursework, tutorial classes and assessments in the curriculum)
- PLO 3: apply mathematical theory and techniques to analyze physical problems qualitatively and quantitatively, and appraise the related ethical issues (by means of coursework, tutorial classes and research-based projects in the curriculum)
- PLO 4: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)
- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-world setting (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

# Impermissible Combinations:

Major in Mathematics Major in Physics Minor in Mathematics Minor in Physics

## Required courses (96 credits)

# 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6)

SCNC1112 Fundamentals of modern science (6)

#### **Disciplinary Core Courses (36 credits)**

MATH1013 University mathematics II (6)
MATH2101 Linear algebra I (6)
MATH2211 Multivariable calculus (6)
PHYS1250 Fundamental physics (6)
PHYS2250 Introductory mechanics (6)
PHYS2265 Introductory quantum physics (6)

# 2. Advanced level courses (42 credits)

#### **Disciplinary Core Courses (36 credits)**

MATH3301 Algebra I (6)
MATH3401 Analysis I (6)
MATH4501 Geometry (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)

PHYS4351 Advanced quantum mechanics (6)

# **Disciplinary Electives (6 credits)**

At least 6 credits of advanced level Mathematics or Physics courses (MATH3XXX or MATH4XXX or MATH7XXX or PHYS3XXX or PHYS7XXX level), subject to prerequisite requirements. The current list of courses include courses in List A and those courses not selected to fulfill the capstone requirement, but excluding MATH4966 Mathematics Internship.

List A

MATH3001 Development of mathematical ideas (6)

MATH3002 Mathematics seminar (6)

MATH3303 Matrix theory and its applications (6)
MATH3304 Introduction to number theory (6)
MATH3403 Functions of a complex variable (6)

MATH3405 Differential equations (6)

MATH3408 Computational methods and differential equations with

applications (6)

MATH3541 Introduction to topology (6)
MATH3600 Discrete mathematics (6)
MATH3601 Numerical analysis (6)
MATH3603 Probability theory (6)

MATH3901	Operations research I (6)	
MATH3904	Introduction to optimization (6)	
MATH3905	Queueing theory and simulation (6)	
MATH3906	Financial calculus (6)	
MATH3911	Game theory and strategy (6)	
MATH3943	Network models in operations research (6)	
MATH4302	Algebra II (6)	
MATH4402	Analysis II (6)	
MATH4404	Functional analysis (6)	
MATH4406	Introduction to partial differential equations (6)	
MATH4511	Introduction to differentiable manifolds (6)	
MATH4602	Scientific computing (6)	
	Operations research II (6)	
MATH4902	Numerical methods for financial calculus (6)	
MATH4907	` '	
MATH7101	Intermediate complex analysis (6)	
MATH7201	Topics in geometry (6)	
MATH7202	Complex manifolds (6)	
MATH7217	Topics in financial mathematics (6)	
MATH7219	Topics in applied functional analysis (6)	
MATH7224	Topics in advanced probability theory (6)	
MATH7501	Topics in algebra (6)	
MATH7502	Topics in applied discrete mathematics (6)	
MATH7503	Topics in mathematical programming and optimization (6)	
MATH7504	Geometric topology (6)	
MATH7505	Real analysis (6)	
PHYS3150	Theoretical physics (6)	
PHYS3450	Electromagnetism (6)	
PHYS3550	Statistical mechanics & thermodynamics (6)	
PHYS3551	Introductory solid state physics (6)	
PHYS3650	Observational astronomy (6)	
PHYS3651	The physical universe (6)	
PHYS3652	Principles of astronomy (6)	
PHYS3750	Laser and spectroscopy (6)	
PHYS3751	Physics of nanomaterials (6)	
	Physical Ontics (6)	Inrevious title: Waves and ontics
PHYS3850	Physical Optics (6)	[previous title: Waves and optics
	Physical Optics (6)  Atomic and nuclear physics (6)	[previous title: Waves and optics (6)]
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PHYS3850 PHYS3851 PHYS4150	Atomic and nuclear physics (6) Computational physics (6)	
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# Notes:

<sup>1.</sup> Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.

- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 5. (a) Students must have level 3 or above in HKDSE Physics or HKDSE Combined Science with Physics component or equivalent to take this major. Students who do not fufill this requirement are advised to take PHYS1240 Physics by inquiry; and
- (b) Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fufill this requirement are advised to take MATH1011 University mathematics I.
- 6. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

#### Remarks

Offered to students 2021

admitted to Year 1 in

#### **Objectives:**

Recent advancements in Molecular Biology & Biotechnology have not only cracked important and fundamental problems in life sciences, but also emerged as a mainstay of science and technologies of the 21st century. Innovations from advances in these fields have substantially transformed our daily lives, society and environment. This Major offers specialized training in state-of-the-art molecular and cell biology, and in the translation of basic knowledge into modern industrial and medical applications. Students will be able to gain an understanding of cutting edge molecular biology and biotechnological applications, ranging from exploitation of bioactive substances, genetic engineering for agricultural production, fisheries and aquaculture, biomedical researches for pharmaceutical and clinical purposes, biofuels as alternative energy sources, bioremediation for cleaning up contaminated environments, and wastewater treatment. Built upon a sound theoretical foundation, students will further develop various essential skills in molecular biology and biotechnology through hands-on laboratory trainings and experimental biology-based projects. A feature of this major is to provide key transferable skills by engaging students in inquiry, critical thinking, and problem solving in their learning.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe key concepts in molecular biology and modern biotechnology using knowledge from cell biology, microbiology, biochemistry, immunology, omics and systems biology (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 2: apply laboratory techniques essential to modern molecular science (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 3: communicate in written and oral communication skills and collaborate with other students effectively (by means of coursework, research-based learning and presentation opportunities in the curriculum)
- PLO 4: acquire scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate debated problems in the field and develop solutions, and appraise the related ethical issues (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 5: gain insights into real-life experience in the applications of biotechnology for human health, agriculture, and the environment (by means of coursework, laboratory-based and experiential learning in the curriculum)

#### Impermissible Combinations:

Major in Biological Sciences (Intensive)

Major in Molecular Biology & Biotechnology (Intensive)

Minor in Molecular Biology & Biotechnology

## Required courses (96 credits)

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Scientific method and reasoning (6) Fundamentals of modern science (6)

**Disciplinary Core Courses (24 credits)** 

BIOL1110 From molecules to cells (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

Basic biochemistry (6)

BIOL2220 Principles of biochemistry (6)

Take either BIOL2220 or BIOC2600 to fulfill this 24 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually

exclusive.

exclusive.

Take either BIOL2220 or BIOC2600 to fulfill this 24 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually

**Disciplinary Electives (6 credits)** 

BIOC2600

At least 6 credits selected from the following courses:

BIOL1309 Evolutionary diversity (6)

BIOL2409 Biotechnology industry and entrepreneurship (6)

# 2. Advanced level courses (48 credits)

**Disciplinary Core Courses (24 credits)** 

BIOL3401 Molecular biology (6)
BIOL3402 Cell biology and cell technology (6)
BIOL4411 Plant and food biotechnology (6)
BIOL4415 Healthcare biotechnology (6)

# **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

BIOL3403 Immunology (6)

BIOL3404 Protein structure and function (6)

BIOL3406 Reproduction and reproductive biotechnology (6)

BIOL3408 Genetics (6)

BIOL3508 Microbial physiology and biotechnology (6)

BIOL4409 General virology (6)

BIOL4416 Stem cells and regenerative biology (6)
BIOL4417 'Omics' and systems biology (6)
ENVS4110 Environmental remediation (6)

390

#### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

Directed studies in Molecular biology & biotechnology (6) BIOL3993

BIOL4963 Molecular biology & biotechnology internship (6) **BIOL4993** Molecular biology & biotechnology project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis
- 5. Candidates who have been admitted to Year 1 in 2021-22 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1112. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Biology, Chemistry, and Physics in the Hong Kong Diploma of Secondary Education (HKDSE)
   Level 5 or above in Biology, Chemistry, and Physics Higher Level in International Baccalaureate (IB)
- Grade B or above in Biology, Chemistry, and Physics in General Certificate of Education Advanced Level (GCEAL)
- Biology, Chemistry, and Physics qualification in Gao Kao will be considered on a case-by-case basis

#### Remarks:

2020

Offered to students

admitted to Year 1 in

#### **Objectives:**

Recent advancements in Molecular Biology & Biotechnology have not only cracked important and fundamental problems in life sciences, but also emerged as a mainstay of science and technologies of the 21st century. Innovations from advances in these fields have substantially transformed our daily lives, society and environment. This Major offers specialized training in state-of-the-art molecular and cell biology, and in the translation of basic knowledge into modern industrial and medical applications. Students will be able to gain an understanding of cutting edge molecular biology and biotechnological applications, ranging from exploitation of bioactive substances, genetic engineering for agricultural production, fisheries and aquaculture, biomedical researches for pharmaceutical and clinical purposes, biofuels as alternative energy sources, bioremediation for cleaning up contaminated environments, and wastewater treatment. Built upon a sound theoretical foundation, students will further develop various essential skills in molecular biology and biotechnology through hands-on laboratory trainings and experimental biology-based projects. A feature of this major is to provide key transferable skills by engaging students in inquiry, critical thinking, and problem solving in their learning.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe key concepts in molecular biology and modern biotechnology using knowledge from cell biology, microbiology, biochemistry, immunology, omics and systems biology (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 2: apply laboratory techniques essential to modern molecular science (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 3: communicate in written and oral communication skills and collaborate with other students effectively (by means of coursework, research-based learning and presentation opportunities in the curriculum)
- PLO 4: acquire scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate debated problems in the field and develop solutions, and appraise the related ethical issues (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 5: gain insights into real-life experience in the applications of biotechnology for human health, agriculture, and the environment (by means of coursework, laboratory-based and experiential learning in the curriculum)

#### Impermissible Combinations:

Major in Biological Sciences (Intensive)

Major in Molecular Biology & Biotechnology (Intensive)

Minor in Molecular Biology & Biotechnology

## Required courses (96 credits)

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (24 credits)** 

BIOL1110 From molecules to cells (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

BIOC2600 Basic biochemistry (6)

**Disciplinary Electives (6 credits)** 

BIOL1309 Evolutionary diversity (6)
BIOL2306 Ecology and evolution (6)

2. Advanced level courses (48 credits) Disciplinary Core Courses (24 credits)

BIOL3401 Molecular biology (6)
BIOL3402 Cell biology and cell technology (6)

BIOL3402 Cell biology and cell technology (6)
BIOL4411 Plant and food biotechnology (6)
BIOL4415 Healthcare biotechnology (6)

**Disciplinary Electives (24 credits)** 

At least 24 credits selected from the following courses:

BIOL3403 Immunology (6)

BIOL3404 Protein structure and function (6)

BIOL3406 Reproduction and reproductive biotechnology (6)

BIOL3408 Genetics (6)

BIOL3508 Microbial physiology and biotechnology (6)
BIOL4401 Medical microbiology and applied immunology (6)

BIOL4409 General virology (6)

BIOL4416 Stem cells and regenerative biology (6) BIOL4417 'Omics' and systems biology (6) Take either BIOL2220 or BIOC2600 to fulfill this 24 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL2220 or BIOC2600 to fulfill this 24 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL1309 or BIOL2306 to fulfill this 6 credits requirement, but not both. Take either BIOL1309 or BIOL2306 to fulfill this 6 credits requirement, but not both.

ENVS4110 Environmental remediation (6)

#### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

BIOL3993 Directed studies in Molecular biology & biotechnology (6)

BIOL4963 Molecular biology & biotechnology internship (6) BIOL4993 Molecular biology & biotechnology project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis

#### Remarks:

2019

Offered to students

admitted to Year 1 in

#### Objectives:

Recent advancements in Molecular Biology & Biotechnology have not only cracked important and fundamental problems in life sciences, but also emerged as a mainstay of science and technologies of the 21st century. Innovations from advances in these fields have substantially transformed our daily lives, society and environment. This Major offers specialized training in state-of-the-art molecular and cell biology, and in the translation of basic knowledge into modern industrial and medical applications. Students will be able to gain an understanding of cutting edge molecular biology and biotechnological applications, ranging from exploitation of bioactive substances, genetic engineering for agricultural production, fisheries and aquaculture, biomedical researches for pharmaceutical and clinical purposes, biofuels as alternative energy sources, bioremediation for cleaning up contaminated environments, and wastewater treatment. Built upon a sound theoretical foundation, students will further develop various essential skills in molecular biology and biotechnology through hands-on laboratory trainings and experimental biology-based projects. A feature of this major is to provide key transferable skills by engaging students in inquiry, critical thinking, and problem solving in their learning.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe key concepts in molecular biology and modern biotechnology using knowledge from cell biology, microbiology, biochemistry, immunology, omics and systems biology (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 2: apply laboratory techniques essential to modern molecular science (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 3: communicate in written and oral communication skills and collaborate with other students effectively (by means of coursework, research-based learning and presentation opportunities in the curriculum)
- PLO 4: acquire scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate debated problems in the field and develop solutions, and appraise the related ethical issues (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 5: gain insights into real-life experience in the applications of biotechnology for human health, agriculture, and the environment (by means of coursework, laboratory-based and experiential learning in the curriculum)

#### Impermissible Combinations:

Major in Biological Sciences (Intensive)

Major in Molecular Biology & Biotechnology (Intensive)

Minor in Molecular Biology & Biotechnology

## Required courses (96 credits)

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (24 credits)** 

BIOL1110 From molecules to cells (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

BIOC2600 Basic biochemistry (6)

**Disciplinary Electives (6 credits)** 

BIOL1309 Evolutionary diversity (6)
BIOL2306 Ecology and evolution (6)

#### 2. Advanced level courses (48 credits) Disciplinary Core Courses (24 credits)

BIOL3401 Molecular biology (6)

BIOL3402 Cell biology and cell technology (6)
BIOL4411 Plant and food biotechnology (6)
BIOL4415 Healthcare biotechnology (6)

**Disciplinary Electives (24 credits)** 

At least 24 credits selected from the following courses:

BIOL3403 Immunology (6)

BIOL3404 Protein structure and function (6)

BIOL3406 Reproduction and reproductive biotechnology (6)

BIOL3408 Genetics (6)

BIOL3508 Microbial physiology and biotechnology (6)
BIOL4401 Medical microbiology and applied immunology (6)

BIOL4409 General virology (6)

BIOL4416 Stem cells and regenerative biology (6) BIOL4417 'Omics' and systems biology (6) Take either BIOL2220 or BIOC2600 to fulfill this 24 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL2220 or BIOC2600 to fulfill this 24 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL1309 or BIOL2306 to fulfill this 6 credits requirement, but not both. Take either BIOL1309 or BIOL2306 to fulfill this 6 credits requirement, but not both. ENVS4110 Environmental remediation (6)

## 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

BIOL3993 Directed studies in Molecular biology & biotechnology (6)

BIOL4963 Molecular biology & biotechnology internship (6) BIOL4993 Molecular biology & biotechnology project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

#### Remarks:

2018

Offered to students

admitted to Year 1 in

#### **Objectives:**

Recent advancements in Molecular Biology & Biotechnology have not only cracked important and fundamental problems in life sciences, but also emerged as a mainstay of science and technologies of the 21st century. Innovations from advances in these fields have substantially transformed our daily lives, society and environment. This Major offers specialized training in state-of-the-art molecular and cell biology, and in the translation of basic knowledge into modern industrial and medical applications. Students will be able to gain an understanding of cutting edge molecular biology and biotechnological applications, ranging from exploitation of bioactive substances, genetic engineering for agricultural production, fisheries and aquaculture, biomedical researches for pharmaceutical and clinical purposes, biofuels as alternative energy sources, bioremediation for cleaning up contaminated environments, and wastewater treatment. Built upon a sound theoretical foundation, students will further develop various essential skills in molecular biology and biotechnology through hands-on laboratory trainings and experimental biology-based projects. A feature of this major is to provide key transferable skills by engaging students in inquiry, critical thinking, and problem solving in their learning.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe key concepts in molecular biology and modern biotechnology using knowledge from cell biology, microbiology, biochemistry, immunology, omics and systems biology (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 2: apply laboratory techniques essential to modern molecular science (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 3: communicate in written and oral communication skills and collaborate with other students effectively (by means of coursework, research-based learning and presentation opportunities in the curriculum)
- PLO 4: acquire scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate debated problems in the field and develop solutions, and appraise the related ethical issues (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 5: gain insights into real-life experience in the applications of biotechnology for human health, agriculture, and the environment (by means of coursework, laboratory-based and experiential learning in the curriculum)

#### Impermissible Combinations:

Major in Biological Sciences (Intensive)

Major in Molecular Biology & Biotechnology (Intensive)

Minor in Molecular Biology & Biotechnology

## Required courses (96 credits)

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (24 credits)** 

BIOL1110 From molecules to cells (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

BIOC2600 Basic biochemistry (6)

**Disciplinary Electives (6 credits)** 

BIOL1309 Evolutionary diversity (6)
BIOL2306 Ecology and evolution (6)

2. Advanced level courses (48 credits) Disciplinary Core Courses (24 credits)

BIOL3401 Molecular biology (6)
BIOL3402 Cell biology and cell techn

BIOL3402 Cell biology and cell technology (6)
BIOL4411 Plant and food biotechnology (6)
BIOL4415 Healthcare biotechnology (6)

**Disciplinary Electives (24 credits)** 

At least 24 credits selected from the following courses:

BIOL3403 Immunology (6)

BIOL3404 Protein structure and function (6)

BIOL3406 Reproduction and reproductive biotechnology (6)

BIOL3408 Genetics (6)

BIOL3508 Microbial physiology and biotechnology (6)
BIOL4401 Medical microbiology and applied immunology (6)

BIOL4409 General virology (6)

BIOL4416 Stem cells and regenerative biology (6) BIOL4417 'Omics' and systems biology (6) Take either BIOL2220 or BIOC2600 to fulfill this 24 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL2220 or BIOC2600 to fulfill this 24 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL1309 or BIOL2306 to fulfill this 6 credits requirement, but not both. Take either BIOL1309 or BIOL2306 to fulfill this 6 credits requirement, but not both. ENVS4110 Environmental remediation (6)

## 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

BIOL3993 Directed studies in Molecular biology & biotechnology (6)

BIOL4963 Molecular biology & biotechnology internship (6) BIOL4993 Molecular biology & biotechnology project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

#### Remarks:

2017

Offered to students

admitted to Year 1 in

#### **Objectives:**

Recent advancements in Molecular Biology & Biotechnology have not only cracked important and fundamental problems in life sciences, but also emerged as a mainstay of science and technologies of the 21st century. Innovations from advances in these fields have substantially transformed our daily lives, society and environment. This Major offers specialized training in state-ofthe-art molecular and cell biology, and in the translation of basic knowledge into modern industrial and medical applications. Students will be able to gain an understanding of cutting edge molecular biology and biotechnological applications, ranging from exploitation of bioactive substances, genetic engineering for agricultural production, fisheries and aquaculture, biomedical researches for pharmaceutical and clinical purposes, biofuels as alternative energy sources, bioremediation for cleaning up contaminated environments, and wastewater treatment. Built upon a sound theoretical foundation, students will further develop various essential skills in molecular biology and biotechnology through hands-on laboratory trainings and experimental biology-based projects. A feature of this major is to provide key transferable skills by engaging students in inquiry, critical thinking, and problem solving in their learning.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe key concepts in molecular biology and modern biotechnology using knowledge from cell biology, microbiology, biochemistry, immunology, omics and systems biology (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 2: apply laboratory techniques essential to modern molecular science (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 3: communicate in written and oral communication skills and collaborate with other students effectively (by means of coursework, research-based learning and presentation opportunities in the curriculum)
- PLO 4: acquire scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate debated problems in the field and develop solutions, and appraise the related ethical issues (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 5: gain insights into real-life experience in the applications of biotechnology for human health, agriculture, and the environment (by means of coursework, laboratory-based and experiential learning in the curriculum)

#### Impermissible Combinations:

Major in Biological Sciences (Intensive)

Major in Molecular Biology & Biotechnology (Intensive)

Minor in Molecular Biology & Biotechnology

## Required courses (96 credits)

#### 1. Introductory level courses (42 credits)

## Disciplinary Core Courses: Science Foundation Courses (12 credits)

Scientific method and reasoning (6) SCNC1111 Fundamentals of modern science (6) SCNC1112

#### **Disciplinary Core Courses (24 credits)**

BIOL1110 From molecules to cells (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

Principles of biochemistry (6) **BIOL2220** 

Basic biochemistry (6) BIOC2600

**Disciplinary Electives (6 credits)** 

BIOL1309 Evolutionary diversity (6) **BIOL2306** Ecology and evolution (6)

#### 2. Advanced level courses (48 credits) **Disciplinary Core Courses (30 credits)**

Molecular biology (6) BIOL3401

Cell biology and cell technology (6) BIOL3402 BIOL3508 Microbial physiology and biotechnology (6) BIOL4411 Plant and food biotechnology (6)

Healthcare biotechnology (6) **Disciplinary Electives (18 credits)** 

**BIOI 4415** 

At least 18 credits selected from the following courses:

Immunology (6) BIOL3403

BIOL3404 Protein structure and function (6)

BIOL3406 Reproduction and reproductive biotechnology (6)

Genetics (6) BIOL3408

Business aspects of biotechnology (6) BIOL3409

BIOL4401 Medical microbiology and applied immunology (6)

**BIOL4409** General virology (6)

**BIOL4416** Stem cells and regenerative biology (6) Take either BIOL2220 or BIOC2600 to fulfill this 24 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL2220 or BIOC2600 to fulfill this 24 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL1309 or BIOL2306 to fulfill this 6 credits requirement, but not both. Take either BIOL1309 or BIOL2306 to fulfill this 6 credits requirement, but not both.

BIOL4417 'Omics' and systems biology (6) ENVS4110 Environmental remediation (6)

## 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

BIOL3993 Directed studies in Molecular biology & biotechnology (6)
BIOL4963 Molecular biology & biotechnology internship (6)

BIOL4963 Molecular biology & biotechnology internship (6 BIOL4993 Molecular biology & biotechnology project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

#### Remarks:

2016

Offered to students

admitted to Year 1 in

#### **Objectives:**

Recent advancements in Molecular Biology & Biotechnology have not only cracked important and fundamental problems in life sciences, but also emerged as a mainstay of science and technologies of the 21st century. Innovations from advances in these fields have substantially transformed our daily lives, society and environment. This Major offers specialized training in state-of-the-art molecular and cell biology, and in the translation of basic knowledge into modern industrial and medical applications. Students will be able to gain an understanding of cutting edge molecular biology and biotechnological applications, ranging from exploitation of bioactive substances, genetic engineering for agricultural production, fisheries and aquaculture, biomedical researches for pharmaceutical and clinical purposes, biofuels as alternative energy sources, bioremediation for cleaning up contaminated environments, and wastewater treatment. Built upon a sound theoretical foundation, students will further develop various essential skills in molecular biology and biotechnology through hands-on laboratory trainings and experimental biology-based projects. A feature of this major is to provide key transferable skills by engaging students in inquiry, critical thinking, and problem solving in their learning.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe key concepts in molecular biology and modern biotechnology using knowledge from cell biology, microbiology, biochemistry, immunology, omics and systems biology (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 2: apply laboratory techniques essential to modern molecular science (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 3: communicate in written and oral communication skills and collaborate with other students effectively (by means of coursework, research-based learning and presentation opportunities in the curriculum)
- PLO 4: acquire scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate debated problems in the field and develop solutions, and appraise the related ethical issues (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 5: gain insights into real-life experience in the applications of biotechnology for human health, agriculture, and the environment (by means of coursework, laboratory-based and experiential learning in the curriculum)

#### Impermissible Combinations:

Major in Molecular Biology & Biotechnology (Intensive)

Minor in Molecular Biology & Biotechnology

# Required courses (96 credits)

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (24 credits)** 

BIOL1110 From molecules to cells (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

BIOC2600 Basic biochemistry (6)

**Disciplinary Electives (6 credits)** 

BIOL1309 Evolutionary diversity (6)
BIOL2306 Ecology and evolution (6)

2. Advanced level courses (48 credits)

**Disciplinary Core Courses (30 credits)** 

BIOL3401 Molecular biology (6) BIOL3402 Cell biology and cell technology (6)

BIOL3508 Microbial physiology and biotechnology (6)
BIOL4411 Plant and food biotechnology (6)
BIOL4415 Healthcare biotechnology (6)

**Disciplinary Electives (18 credits)** 

At least 18 credits selected from the following courses:

BIOL3403 Immunology (6)

BIOL3404 Protein structure and function (6)

BIOL3406 Reproduction and reproductive biotechnology (6)

BIOL3408 Genetics (6)

BIOL3409 Business aspects of biotechnology (6)

BIOL4401 Medical microbiology and applied immunology (6)

BIOL4409 General virology (6)

BIOL4416 Stem cells and regenerative biology (6)
BIOL4417 'Omics' and systems biology (6)

Take either BIOL2220 or BIOC2600 to fulfill this 24 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL2220 or BIOC2600 to fulfill this 24 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL1309 or BIOL2306 to fulfill this 6 credits requirement, but not both. Take either BIOL1309 or BIOL2306 to fulfill this 6 credits requirement, but not both. ENVS4110 Environmental remediation (6)

#### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

BIOL3993 Directed studies in Molecular biology & biotechnology (6)

BIOL4963 Molecular biology & biotechnology internship (6) BIOL4993 Molecular biology & biotechnology project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

#### Remarks:

2015

Offered to students

admitted to Year 1 in

#### **Objectives:**

Recent advancements in Molecular Biology & Biotechnology have not only cracked important and fundamental problems in life sciences, but also emerged as a mainstay of science and technologies of the 21st century. Innovations from advances in these fields have substantially transformed our daily lives, society and environment. This Major offers specialized training in state-ofthe-art molecular and cell biology, and in the translation of basic knowledge into modern industrial and medical applications. Students will be able to gain an understanding of cutting edge molecular biology and biotechnological applications, ranging from exploitation of bioactive substances, genetic engineering for agricultural production, fisheries and aquaculture, biomedical researches for pharmaceutical and clinical purposes, biofuels as alternative energy sources, bioremediation for cleaning up contaminated environments, and wastewater treatment. Built upon a sound theoretical foundation, students will further develop various essential skills in molecular biology and biotechnology through hands-on laboratory trainings and experimental biology-based projects. A feature of this major is to provide key transferable skills by engaging students in inquiry, critical thinking, and problem solving in their learning.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe key concepts in molecular biology and modern biotechnology using knowledge from cell biology, microbiology, biochemistry, immunology, omics and systems biology (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 2: apply laboratory techniques essential to modern molecular science (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 3: communicate in written and oral communication skills and collaborate with other students effectively (by means of coursework, research-based learning and presentation opportunities in the curriculum)
- PLO 4: acquire scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate debated problems in the field and develop solutions, and appraise the related ethical issues (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 5: gain insights into real-life experience in the applications of biotechnology for human health, agriculture, and the environment (by means of coursework, laboratory-based and experiential learning in the curriculum)

#### Impermissible Combinations:

Major in Molecular Biology & Biotechnology (Intensive)

Minor in Molecular Biology & Biotechnology

# Required courses (96 credits)

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

**SCNC1111** Scientific method and reasoning (6) Fundamentals of modern science (6) SCNC1112

**Disciplinary Core Courses (24 credits)** 

BIOL1110 From molecules to cells (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

**BIOL2220** Principles of biochemistry (6)

BIOC2600 Basic biochemistry (6)

**Disciplinary Electives (6 credits)** 

Evolutionary diversity (6) BIOL1309 BIOL2306 Ecology and evolution (6)

2. Advanced level courses (48 credits)

**Disciplinary Core Courses (30 credits)** 

Molecular biology (6) **BIOL 3401** Cell biology and cell technology (6) BIOL3402

Microbial physiology and biotechnology (6) **BIOL3508** 

BIOL4402 Microbial biotechnology (6)

**BIOL4411** Plant and food biotechnology (6) **BIOL4415** Healthcare biotechnology (6)

**Disciplinary Electives (18 credits)** 

At least 18 credits selected from the following courses:

BIOL3403 Immunology (6)

BIOL3404 Protein structure and function (6) Molecular microbiology (6) **BIOL3405** 

Take either BIOL2220 or BIOC2600 to fulfill this 24 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL2220 or BIOC2600 to fulfill this 24 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually

Take either BIOI 1309 or BIOI 2306 to fulfill this 6 credits requirement, but not both. Take either BIOL1309 or BIOL2306 to fulfill this 6 credits requirement, but not both.

Take either BIOL3508 or BIOL4402 to fulfill this 30 credits requirement, but not both. BIOL3508 and BIOL4402 are mutually

exclusive.

Take either BIOL3508 or BIOL4402 to fulfill this 30 credits requirement, but not both. BIOL3508 and BIOL4402 are mutually

exclusive.

BIOL3406	Reproduction and reproductive biotechnology (6)
BIOL3408	Genetics (6)
BIOL3409	Business aspects of biotechnology (6)
BIOL4401	Medical microbiology and applied immunology (6)
BIOL4409	General virology (6)
BIOL4416	Stem cells and regenerative biology (6)
BIOL4417	'Omics' and systems biology (6)
ENVS4110	Environmental remediation (6)

## 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

BIOL3993 Directed studies in Molecular biology & biotechnology (6)
BIOL4963 Molecular biology & biotechnology internship (6)
BIOL4993 Molecular biology & biotechnology project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

#### Remarks:

2014

Offered to students

admitted to Year 1 in

#### **Objectives:**

Recent advancements in Molecular Biology & Biotechnology have not only cracked important and fundamental problems in life sciences, but also emerged as a mainstay of science and technologies of the 21st century. Innovations from advances in these fields have substantially transformed our daily lives, society and environment. This Major offers specialized training in state-of-the-art molecular and cell biology, and in the translation of basic knowledge into modern industrial and medical applications. Students will be able to gain an understanding of cutting edge molecular biology and biotechnological applications, ranging from exploitation of bioactive substances, genetic engineering for agricultural production, fisheries and aquaculture, biomedical researches for pharmaceutical and clinical purposes, biofuels as alternative energy sources, bioremediation for cleaning up contaminated environments, and wastewater treatment. Built upon a sound theoretical foundation, students will further develop various essential skills in molecular biology and biotechnology through hands-on laboratory trainings and experimental biology-based projects. A feature of this major is to provide key transferable skills by engaging students in inquiry, critical thinking, and problem solving in their learning.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe key concepts in molecular biology and modern biotechnology using knowledge from cell biology, microbiology, biochemistry, immunology, omics and systems biology (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 2: apply laboratory techniques essential to modern molecular science (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 3: communicate in written and oral communication skills and collaborate with other students effectively (by means of coursework, research-based learning and presentation opportunities in the curriculum)
- PLO 4: acquire scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate debated problems in the field and develop solutions, and appraise the related ethical issues (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 5: gain insights into real-life experience in the applications of biotechnology for human health, agriculture, and the environment (by means of coursework, laboratory-based and experiential learning in the curriculum)

#### Impermissible Combinations:

Minor in Molecular Biology & Biotechnology

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (24 credit)** 

BIOL1110 From molecules to cells (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

BIOC2600 Basic biochemistry (6)

**Disciplinary Electives (6 credits)** 

BIOL1309 Evolutionary diversity (6)

BIOL2306 Ecology and evolution (6)

2. Advanced level courses (48 credits) Disciplinary Core Courses (30 credits)

BIOL3401 Molecular biology (6)

BIOL3402 Cell biology and cell technology (6)
BIOL3508 Microbial physiology and biotechnology (6)

BIOL4402 Microbial biotechnology (6)

BIOL4411 Plant and food biotechnology (6)
BIOL4415 Healthcare biotechnology (6)

**Disciplinary Electives (18 credit)** 

At least 18 credits selected from the following courses:

BIOL3403 Immunology (6)

BIOL3404 Protein structure and function (6) BIOL3405 Molecular microbiology (6)

BIOL3406 Reproduction and reproductive biotechnology (6)

Take either BIOL2220 or BIOC2600 to fulfill this 24 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually

exclusive.

Take either BIOL2220 or BIOC2600 to fulfill this 24 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL1309 or BIOL2306 to fulfill this 6 credits requirement, but not both. Take either BIOL1309 or BIOL2306 to fulfill this 6 credits requirement, but not both.

Take either BIOL3508 or BIOL4402 to fulfill this 30 credits requirement, but not both. BIOL3508 and BIOL4402 are mutually exclusive.

Take either BIOL3508 or BIOL4402 to fulfill this 30 credits requirement, but not both. BIOL3508 and BIOL4402 are mutually exclusive.

ı.		
ı	BIOL3408	Genetics (6)
ı	BIOL3409	Business aspects of biotechnology (6)
ı	BIOL4401	Medical microbiology and applied immunology (6)
ı	BIOL4409	General virology (6)
ı	BIOL4416	Stem cells and regenerative biology (6)
ı	BIOL4417	'Omics' and systems biology (6)
ı	ENVS4110	Environmental remediation (6)
ı	3. Capstone require	rement (6 credits)
ı	At least 6 credits	selected from the following courses:
ı	BIOL3993	Directed studies in Molecular biology & biotechnology (6)
ı	BIOL4963	Molecular biology & biotechnology internship (6)
ı	BIOL4993	Molecular biology & biotechnology project (12)
П		

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

#### Remarks:

2013

Offered to students

admitted to Year 1 in

#### **Objectives:**

Recent advancements in Molecular Biology & Biotechnology have not only cracked important and fundamental problems in life sciences, but also emerged as a mainstay of science and technologies of the 21st century. Innovations from advances in these fields have substantially transformed our daily lives, society and environment. This Major offers specialized training in state-of-the-art molecular and cell biology, and in the translation of basic knowledge into modern industrial and medical applications. Students will be able to gain an understanding of cutting edge molecular biology and biotechnological applications, ranging from exploitation of bioactive substances, genetic engineering for agricultural production, fisheries and aquaculture, biomedical researches for pharmaceutical and clinical purposes, biofuels as alternative energy sources, bioremediation for cleaning up contaminated environments, and wastewater treatment. Built upon a sound theoretical foundation, students will further develop various essential skills in molecular biology and biotechnology through hands-on laboratory trainings and experimental biology-based projects. A feature of this major is to provide key transferable skills by engaging students in inquiry, critical thinking, and problem solving in their learning.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe key concepts in molecular biology and modern biotechnology using knowledge from cell biology, microbiology, biochemistry, immunology, omics and systems biology (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 2: apply laboratory techniques essential to modern molecular science (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 3: communicate in written and oral communication skills and collaborate with other students effectively (by means of coursework, research-based learning and presentation opportunities in the curriculum)
- PLO 4: acquire scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate debated problems in the field and develop solutions, and appraise the related ethical issues (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 5: gain insights into real-life experience in the applications of biotechnology for human health, agriculture, and the environment (by means of coursework, laboratory-based and experiential learning in the curriculum)

#### Impermissible Combinations:

Minor in Molecular Biology & Biotechnology

Required	COURSES	(96	credits)	١

## 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (24 credits)** 

BIOL1110 From molecules to cells (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

BIOC2600 Basic biochemistry (6)

**Disciplinary Electives (6 credits)** 

BIOL1309 Evolutionary diversity (6)

BIOL2306 Ecology and evolution (6)

2. Advanced level courses (48 credits) Disciplinary Core Courses (30 credits)

BIOL3401 Molecular biology (6)

BIOL3402 Cell biology and cell technology (6)
BIOL3508 Microbial physiology and biotechnology (6)

BIOL4402 Microbial biotechnology (6)

BIOL4411 Plant and food biotechnology (6)
BIOL4415 Healthcare biotechnology (6)

Disciplinary Electives (18 credits)

At least 18 credits selected from the following courses:

BIOL3403 Immunology (6)

BIOL3404 Protein structure and function (6) BIOL3405 Molecular microbiology (6)

BIOL3406 Reproduction and reproductive biotechnology (6)

Take either BIOL2220 or BIOC2600 to fulfill this 24 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually

exclusive.

Take either BIOL2220 or BIOC2600 to fulfill this 24 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL1309 or BIOL2306 to fulfill this 6 credits requirement, but not both. Take either BIOL1309 or BIOL2306 to fulfill this 6 credits requirement, but not both.

Take either BIOL3508 or BIOL4402 to fulfill this 30 credits requirement, but not both. BIOL3508 and BIOL4402 are mutually exclusive.

Take either BIOL3508 or BIOL4402 to fulfill this 30 credits requirement, but not both. BIOL3508 and BIOL4402 are mutually exclusive.

BIOL3408	Genetics (6)
BIOL3409	Business aspects of biotechnology (6)
BIOL4401	Medical microbiology and applied immunology (6)
BIOL4409	General virology (6)
BIOL4416	Stem cells and regenerative biology (6)
BIOL4417	'Omics' and systems biology (6)
ENVS4110	Environmental remediation (6)
3. Capstone requir	ement (6 credits)
At least 6 credits	selected from the following courses:
BIOL3993	Directed studies in Molecular biology & biotechnology (6)
BIOL4963	Molecular biology & biotechnology internship (6)

Molecular biology & biotechnology project (12)

# Notes:

BIOL4963 BIOL4993

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

#### Remarks:

2012

Offered to students

admitted to Year 1 in

#### **Objectives:**

Recent advancements in Molecular Biology & Biotechnology have not only cracked important and fundamental problems in life sciences, but also emerged as a mainstay of science and technologies of the 21st century. Innovations from advances in these fields have substantially transformed our daily lives, society and environment. This Major offers specialized training in state-of-the-art molecular and cell biology, and in the translation of basic knowledge into modern industrial and medical applications. Students will be able to gain an understanding of cutting edge molecular biology and biotechnological applications, ranging from exploitation of bioactive substances, genetic engineering for agricultural production, fisheries and aquaculture, biomedical researches for pharmaceutical and clinical purposes, biofuels as alternative energy sources, bioremediation for cleaning up contaminated environments, and wastewater treatment. Built upon a sound theoretical foundation, students will further develop various essential skills in molecular biology and biotechnology through hands-on laboratory trainings and experimental biology-based projects. A feature of this major is to provide key transferable skills by engaging students in inquiry, critical thinking, and problem solving in their learning.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe key concepts in molecular biology and modern biotechnology using knowledge from cell biology, microbiology, biochemistry, immunology, omics and systems biology (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 2: apply laboratory techniques essential to modern molecular science (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 3: communicate in written and oral communication skills and collaborate with other students effectively (by means of coursework, research-based learning and presentation opportunities in the curriculum)
- PLO 4: acquire scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate debated problems in the field and develop solutions, and appraise the related ethical issues (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 5: gain insights into real-life experience in the applications of biotechnology for human health, agriculture, and the environment (by means of coursework, laboratory-based and experiential learning in the curriculum)

#### Impermissible Combinations:

Minor in Molecular Biology & Biotechnology

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (24 credits)** 

BIOL1110 From molecules to cells (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

BIOC2600 Basic biochemistry (6)

**Disciplinary Electives (6 credits)** 

BIOL1309 Evolutionary diversity (6)

BIOL2306 Ecology and evolution (6)

2. Advanced level courses (48 credits) Disciplinary Core Courses (30 credits)

BIOL3401 Molecular biology (6)

BIOL3402 Cell biology and cell technology (6)
BIOL3508 Microbial physiology and biotechnology (6)

BIOL4402 Microbial biotechnology (6)

BIOL4411 Plant and food biotechnology (6)
BIOL4415 Healthcare biotechnology (6)

Disciplinary Electives (18 credits)

At least 18 credits selected from the following courses:

BIOL3403 Immunology (6)

BIOL3404 Protein structure and function (6) BIOL3405 Molecular microbiology (6)

BIOL3406 Reproduction and reproductive biotechnology (6)

Take either BIOL2220 or BIOC2600 to fulfill this 24 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually

exclusive.

Take either BIOL2220 or BIOC2600 to fulfill this 24 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL1309 or BIOL2306 to fulfill this 6 credits requirement, but not both. Take either BIOL1309 or BIOL2306 to fulfill this 6 credits requirement, but not both.

Take either BIOL3508 or BIOL4402 to fulfill this 30 credits requirement, but not both. BIOL3508 and BIOL4402 are mutually exclusive.

Take either BIOL3508 or BIOL4402 to fulfill this 30 credits requirement, but not both. BIOL3508 and BIOL4402 are mutually exclusive.

BIOL3408	Genetics (6)
BIOL3409	Business aspects of biotechnology (6)
BIOL4401	Medical microbiology and applied immunology (6)
BIOL4409	General virology (6)
BIOL4416	Stem cells and regenerative biology (6)
BIOL4417	'Omics' and systems biology (6)
ENVS4110	Environmental remediation (6)
3. Capstone requir	rement (6 credits)
At least 6 credits	selected from the following courses:
BIOL3993	Directed studies in Molecular biology & biotechnology (

Molecular biology & biotechnology internship (6)

BIOL4993 Molecular biology & biotechnology project (12)

#### Notes:

BIOL4963

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.

#### Remarks:

Major Title Major in Molecular Biology & Biotechnology (Intensive)

Offered to students 2021

admitted to Year 1 in

#### **Objectives:**

Recent advancements in Molecular Biology & Biotechnology have not only cracked important and fundamental problems in life sciences, but also emerged as a mainstay of science and technologies of the 21st century. Innovations from advances in these fields have substantially transformed our daily lives, society and environment. This Major aims to provide comprehensive training in state-of-the-art molecular and cell biology, and in the translation of basic knowledge into modern industrial and medical applications. Students will be able to gain an understanding of cutting edge molecular biology and biotechnological applications, ranging from exploitation of bioactive substances, genetic engineering for agricultural production, fisheries and aquaculture, biomedical researches for pharmaceutical and clinical purposes, biofuels as alternative energy sources, bioremediation for cleaning up contaminated environments, and wastewater treatment. Built upon a sound theoretical foundation, students will further develop various essential skills in molecular biology and biotechnology through hands-on laboratory trainings and experimental biology-based projects. A feature of this major is to provide key transferable skills by engaging students in inquiry, critical thinking, and problem solving in their learning.

The intensive major involves additional coursework and research/capstone experience. It is designed for students with interest on a fuller scope of the discipline or planning to pursue research studies for a higher degree in any area of life science.

This intensive major has been accredited by the Royal Society of Biology (RSB), UK, for the purpose of meeting in part the academic and experience requirement for the Membership and Chartered Biologist (CBiol).

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe key concepts in molecular biology and modern biotechnology using knowledge from cell biology, microbiology, biochemistry, immunology, omics and systems biology (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 2: apply laboratory techniques essential to modern molecular science (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 3: communicate in written and oral communication skills and collaborate with other students effectively (by means of coursework, research-based learning and presentation opportunities in the curriculum)
- PLO 4: acquire scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate debated problems in the field and develop solutions, and appraise the related ethical issues (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 5: gain insights into real-life experience in the applications of biotechnology for human health, agriculture, and the environment (by means of coursework, laboratory-based and experiential learning in the curriculum)
- PLO 6: equip with knowledges in chemistry, mathematics, statistics, or computer programming, with sufficient depth and breadth to apply these knowledges within a biological context (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 7: solve a scientific question empirically by designing and implementing experiments, learning new experimental skills and tackling experimental errors, reporting results unbiasedly and systematically (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)

## Impermissible Combinations:

Major in Biological Sciences

Major in Biological Sciences (Intensive)

Major in Molecular Biology & Biotechnology

Minor in Molecular Biology & Biotechnology

#### Required courses (144 credits) 1. Introductory level courses (66 credits) Disciplinary Core Courses: Science Foundation Courses (12 credits) Scientific method and reasoning (6) SCNC1111 (Note 1) Fundamentals of modern science (6) SCNC1112 (Note 1) **Disciplinary Core Courses (42 credits)** From molecules to cells (6) (Note 1) BIOL1110 General chemistry I (6) CHEM1042 General chemistry II (6) CHEM1043 Biostatistics (6) (Note 1) **BIOL2102** BIOL2103 Biological sciences laboratory course (6) (Note 1) **BIOL2220** Principles of biochemistry (6) Take either BIOL2220 or BIOC2600 to fulfill this 42 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive. (Note 1) Biotechnology industry and entrepreneurship (6) **BIOL2409** Basic biochemistry (6) **BIOC2600** Take either BIOL2220 or BIOC2600 to fulfill this 42 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive. (Note 1) **Disciplinary Electives (12 credits)** Plus at least 12 credits selected from the following courses: Evolutionary diversity (6) May take either BIOL1309 or BIOL2306 to **BIOL1309** fulfill this 12 credits requirement, but not both. **BIOL2306** Ecology and evolution (6)

May take either BIOL1309 or BIOL2306 to fulfill this 12 credits requirement, but not both.

**BIOL2408** Green earth-plants and mankind (6) Computer programming (6) COMP1117 University mathematics I (6) MATH1011 University mathematics II (6) MATH1013

## 2. Advanced level courses (66 credits) **Disciplinary Core Courses (30 credits)**

Molecular biology (6) BIOL3401 BIOL3402

(Note 1) Cell biology and cell technology (6) (Note 1) BIOL4411 Plant and food biotechnology (6) (Note 1) **BIOL4415** Healthcare biotechnology (6) (Note 1) **BIOL4417** 'Omics' and systems biology (6)

**Disciplinary Electives (36 credits)** 

Plus at least 36 credits selected from the following courses:

BIOL3205 Human physiology (6) BIOL3403 Immunology (6)

Protein structure and function (6) BIOL3404

**BIOL3406** Reproduction and reproductive biotechnology (6)

BIOL3408 Genetics (6)

**BIOL3508** Microbial physiology and biotechnology (6) Plant physiology and climate change (6) ENVS3202

General virology (6) BIOL4409

**BIOL4416** Stem cells and regenerative biology (6) Environmental remediation (6) ENVS4110

3. Capstone requirement (12 credits)

Molecular biology & biotechnology project (12) **BIOL4993** 

#### Notes:

- 1. These are core courses in the regular Molecular Biology and Biotechnology Major (96 credits) curriculum.
- 2. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis
- 3. Candidates who have been admitted to Year 1 in 2021-22 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1112. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Biology, Chemistry, and Physics in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Biology, Chemistry, and Physics Higher Level in International Baccalaureate (IB)
- Grade B or above in Biology, Chemistry, and Physics in General Certificate of Education Advanced Level (GCEAL)
- Biology, Chemistry, and Physics qualification in Gao Kao will be considered on a case-by-case basis
- 4. As this curriculum is accredited by the Royal Society of Biology (RSB), students must follow the curriculum in full (i.e. no replacement courses are possible) in order to graduate with this accredited programme.

## Remarks:

Major Title Major in Molecular Biology & Biotechnology (Intensive)

Offered to students 2020

admitted to Year 1 in

#### **Objectives:**

Recent advancements in Molecular Biology & Biotechnology have not only cracked important and fundamental problems in life sciences, but also emerged as a mainstay of science and technologies of the 21st century. Innovations from advances in these fields have substantially transformed our daily lives, society and environment. This Major aims to provide comprehensive training in state-of-the-art molecular and cell biology, and in the translation of basic knowledge into modern industrial and medical applications. Students will be able to gain an understanding of cutting edge molecular biology and biotechnological applications, ranging from exploitation of bioactive substances, genetic engineering for agricultural production, fisheries and aquaculture, biomedical researches for pharmaceutical and clinical purposes, biofuels as alternative energy sources, bioremediation for cleaning up contaminated environments, and wastewater treatment. Built upon a sound theoretical foundation, students will further develop various essential skills in molecular biology and biotechnology through hands-on laboratory trainings and experimental biology-based projects. A feature of this major is to provide key transferable skills by engaging students in inquiry, critical thinking, and problem solving in their learning.

The intensive major involves additional coursework and research/capstone experience. It is designed for students with interest on a fuller scope of the discipline or planning to pursue research studies for a higher degree in any area of life science.

This intensive major has been accredited by the Royal Society of Biology (RSB), UK, for the purpose of meeting in part the academic and experience requirement for the Membership and Chartered Biologist (CBiol).

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe key concepts in molecular biology and modern biotechnology using knowledge from cell biology, microbiology, biochemistry, immunology, omics and systems biology (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 2: apply laboratory techniques essential to modern molecular science (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 3: communicate in written and oral communication skills and collaborate with other students effectively (by means of coursework, research-based learning and presentation opportunities in the curriculum)
- PLO 4: acquire scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate debated problems in the field and develop solutions, and appraise the related ethical issues (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 5: gain insights into real-life experience in the applications of biotechnology for human health, agriculture, and the environment (by means of coursework, laboratory-based and experiential learning in the curriculum)
- PLO 6: equip with knowledges in chemistry, mathematics, statistics, or computer programming, with sufficient depth and breadth to apply these knowledges within a biological context (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 7: solve a scientific question empirically by designing and implementing experiments, learning new experimental skills and tackling experimental errors, reporting results unbiasedly and systematically (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)

## Impermissible Combinations:

Major in Biological Sciences

Major in Biological Sciences (Intensive)

Major in Molecular Biology & Biotechnology

Minor in Molecular Biology & Biotechnology

## Required courses (144 credits)

1. Introductor	y level courses	(66 credits)
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Disciplinary Core	Courses: Science Foundation Courses (12 credits)	
SCNC1111	Scientific method and reasoning (6)	

SCNC1111 Scientific method and reasoning (6) (Note 1) SCNC1112 Fundamentals of modern science (6) (Note 1)

**Disciplinary Core Courses (42 credits)** 

BIOL1110 From molecules to cells (6) (Note 1)
CHEM1042 General chemistry I (6)
CHEM1043 General chemistry II (6)

BIOL2102 Biostatistics (6) (Note 1)
BIOL2103 Biological sciences laboratory course (6) (Note 1)

BIOL2220 Principles of biochemistry (6)

Take either BIOL2220 or BIOC2600 to fulfill this 42 credits requirement, but not both.

BIOL2220 and BIOC2600 are mutually

BIOL2409 Biotechnology industry and entrepreneurship (6)

BIOC2600 Basic biochemistry (6)

Take either BIOL2220 or BIOC2600 to fulfill this 42 credits requirement, but not both.

BIOL2220 and BIOC2600 are mutually

exclusive. (Note 1)

**Disciplinary Electives (12 credits)** 

Plus at least 12 credits selected from the following courses:

BIOL1309 Evolutionary diversity (6)

May take either BIOL1309 or BIOL2306 to fulfill this 12 credits requirement, but not both.

BIOL2306 Ecology and evolution (6)

May take either BIOL1309 or BIOL2306 to fulfill this 12 credits requirement, but not both. **BIOL2408** Green earth-plants and mankind (6) Computer programming (6) COMP1117 University mathematics I (6) MATH1011 University mathematics II (6) MATH1013 2. Advanced level courses (66 credits) **Disciplinary Core Courses (30 credits)** Molecular biology (6) BIOL3401 (Note 1) Cell biology and cell technology (6) (Note 1) BIOL3402 BIOL4411 Plant and food biotechnology (6) (Note 1) **BIOL4415** Healthcare biotechnology (6) (Note 1) **BIOL4417** 'Omics' and systems biology (6) **Disciplinary Electives (36 credits)** Plus at least 36 credits selected from the following courses: BIOL3205 Human physiology (6) BIOL3403 Immunology (6) BIOL3404 Protein structure and function (6) **BIOL3406** Reproduction and reproductive biotechnology (6) BIOL3408 Genetics (6) **BIOL3508** Microbial physiology and biotechnology (6) Plant physiology and climate change (6) ENVS3202 Medical microbiology and applied immunology (6) BIOL4401

#### Notes:

**BIOL4409** 

BIOL4416 ENVS4110

BIOL4993

3. Capstone requirement (12 credits)

1. These are core courses in the regular Molecular Biology and Biotechnology Major (96 credits) curriculum.

Molecular biology & biotechnology project (12)

Stem cells and regenerative biology (6)

Environmental remediation (6)

- 2. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)

General virology (6)

- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis
- 3. As this curriculum is accredited by the Royal Society of Biology (RSB), students must follow the curriculum in full (i.e. no replacement courses are possible) in order to graduate with this accredited programme.

#### Remarks

Major Title Major in Molecular Biology & Biotechnology (Intensive)

Offered to students 2019

admitted to Year 1 in

#### **Objectives:**

Recent advancements in Molecular Biology & Biotechnology have not only cracked important and fundamental problems in life sciences, but also emerged as a mainstay of science and technologies of the 21st century. Innovations from advances in these fields have substantially transformed our daily lives, society and environment. This Major aims to provide comprehensive training in state-of-the-art molecular and cell biology, and in the translation of basic knowledge into modern industrial and medical applications. Students will be able to gain an understanding of cutting edge molecular biology and biotechnological applications, ranging from exploitation of bioactive substances, genetic engineering for agricultural production, fisheries and aquaculture, biomedical researches for pharmaceutical and clinical purposes, biofuels as alternative energy sources, bioremediation for cleaning up contaminated environments, and wastewater treatment. Built upon a sound theoretical foundation, students will further develop various essential skills in molecular biology and biotechnology through hands-on laboratory trainings and experimental biology-based projects. A feature of this major is to provide key transferable skills by engaging students in inquiry, critical thinking, and problem solving in their learning.

The intensive major involves additional coursework and research/capstone experience. It is designed for students with interest on a fuller scope of the discipline or planning to pursue research studies for a higher degree in any area of life science.

This intensive major has been accredited by the Royal Society of Biology (RSB), UK, for the purpose of meeting in part the academic and experience requirement for the Membership and Chartered Biologist (CBiol).

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe key concepts in molecular biology and modern biotechnology using knowledge from cell biology, microbiology, biochemistry, immunology, omics and systems biology (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 2: apply laboratory techniques essential to modern molecular science (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 3: communicate in written and oral communication skills and collaborate with other students effectively (by means of coursework, research-based learning and presentation opportunities in the curriculum)
- PLO 4: acquire scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate debated problems in the field and develop solutions, and appraise the related ethical issues (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 5: gain insights into real-life experience in the applications of biotechnology for human health, agriculture, and the environment (by means of coursework, laboratory-based and experiential learning in the curriculum)
- PLO 6: equip with knowledges in chemistry, mathematics, statistics, or computer programming, with sufficient depth and breadth to apply these knowledges within a biological context (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 7: solve a scientific question empirically by designing and implementing experiments, learning new experimental skills and tackling experimental errors, reporting results unbiasedly and systematically (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)

## Impermissible Combinations:

Major in Biological Sciences

Major in Biological Sciences (Intensive)

Major in Molecular Biology & Biotechnology

Minor in Molecular Biology & Biotechnology

#### Required courses (144 credits) 1. Introductory level courses (66 credits) Disciplinary Core Courses: Science Foundation Courses (12 credits) Scientific method and reasoning (6) SCNC1111 (Note 1) Fundamentals of modern science (6) SCNC1112 (Note 1) **Disciplinary Core Courses (42 credits)** From molecules to cells (6) (Note 1) BIOL1110 General chemistry I (6) CHEM1042 General chemistry II (6) CHEM1043 Biostatistics (6) (Note 1) **BIOL2102** BIOL2103 Biological sciences laboratory course (6) (Note 1) **BIOL2220** Principles of biochemistry (6) Take either BIOL2220 or BIOC2600 to fulfill this 42 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive. (Note 1) **BIOL2409** Biotechnology industry and entrepreneurship (6) Basic biochemistry (6) **BIOC2600** Take either BIOL2220 or BIOC2600 to fulfill this 42 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive. (Note 1) **Disciplinary Electives (12 credits)** Plus at least 12 credits selected from the following courses: May take either BIOL1309 or BIOL2306 to Evolutionary diversity (6) **BIOI 1309** fulfill this 12 credits requirement, but not both. **BIOL2306** Ecology and evolution (6)

		May take either BIOL1309 or BIOL2306 to fulfill this 12 credits requirement, but not both.
BIOL2408	Green earth-plants and mankind (6)	rumii uns 12 creatis requirement, but not both.
COMP1117	Computer programming (6)	
MATH1011	University mathematics I (6)	
MATH1013	University mathematics II (6)	
2. Advanced level co	ourses (66 credits)	
Disciplinary Core Co	ourses (30 credits)	
BIOL3401	Molecular biology (6)	(Note 1)
BIOL3402	Cell biology and cell technology (6)	(Note 1)
BIOL4411	Plant and food biotechnology (6)	(Note 1)
BIOL4415	Healthcare biotechnology (6)	(Note 1)
BIOL4417	'Omics' and systems biology (6)	
Disciplinary Elective	` '	
	edits selected from the following courses:	
BIOL3107	Plant physiology (6)	Take either BIOL3107 or ENVS3202 to fulfill this 36 credits requirement, but not both. BIOL3107 and ENVS3202 are mutually exclusive.
BIOL3205	Human physiology (6)	oxoldor o
BIOL3403	Immunology (6)	
BIOL3404	Protein structure and function (6)	
BIOL3406	Reproduction and reproductive biotechnology (6)	
BIOL3408	Genetics (6)	
BIOL3508	Microbial physiology and biotechnology (6)	
ENVS3202	Plant physiology and climate change (6)	Take either BIOL3107 or ENVS3202 to fulfill this 36 credits requirement, but not both. BIOL3107 and ENVS3202 are mutually exclusive.
BIOL4401	Medical microbiology and applied immunology (6)	
BIOL4409	General virology (6)	
BIOL4416	Stem cells and regenerative biology (6)	
ENVS4110	Environmental remediation (6)	
3. Capstone require		
BIOL4993	Molecular biology & biotechnology project (12)	

# Notes:

1. These are core courses in the regular Molecular Biology and Biotechnology Major (96 credits) curriculum.

Major Title Major in Molecular Biology & Biotechnology (Intensive)

2018

Offered to students

admitted to Year 1 in

#### **Objectives:**

Recent advancements in Molecular Biology & Biotechnology have not only cracked important and fundamental problems in life sciences, but also emerged as a mainstay of science and technologies of the 21st century. Innovations from advances in these fields have substantially transformed our daily lives, society and environment. This Major aims to provide comprehensive training in state-of-the-art molecular and cell biology, and in the translation of basic knowledge into modern industrial and medical applications. Students will be able to gain an understanding of cutting edge molecular biology and biotechnological applications, ranging from exploitation of bioactive substances, genetic engineering for agricultural production, fisheries and aquaculture, biomedical researches for pharmaceutical and clinical purposes, biofuels as alternative energy sources, bioremediation for cleaning up contaminated environments, and wastewater treatment. Built upon a sound theoretical foundation, students will further develop various essential skills in molecular biology and biotechnology through hands-on laboratory trainings and experimental biology-based projects. A feature of this major is to provide key transferable skills by engaging students in inquiry, critical thinking, and problem solving in their learning.

The intensive major involves additional coursework and research/capstone experience. It is designed for students with interest on a fuller scope of the discipline or planning to pursue research studies for a higher degree in any area of life science.

This intensive major has been accredited by the Royal Society of Biology (RSB), UK, for the purpose of meeting in part the academic and experience requirement for the Membership and Chartered Biologist (CBiol).

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe key concepts in molecular biology and modern biotechnology using knowledge from cell biology, microbiology, biochemistry, immunology, omics and systems biology (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 2: apply laboratory techniques essential to modern molecular science (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 3: communicate in written and oral communication skills and collaborate with other students effectively (by means of coursework, research-based learning and presentation opportunities in the curriculum)
- PLO 4: acquire scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate debated problems in the field and develop solutions, and appraise the related ethical issues (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 5: gain insights into real-life experience in the applications of biotechnology for human health, agriculture, and the environment (by means of coursework, laboratory-based and experiential learning in the curriculum)
- PLO 6: equip with knowledges in chemistry, mathematics, statistics, or computer programming, with sufficient depth and breadth to apply these knowledges within a biological context (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 7: solve a scientific question empirically by designing and implementing experiments, learning new experimental skills and tackling experimental errors, reporting results unbiasedly and systematically (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)

## Impermissible Combinations:

Major in Biological Sciences

Major in Biological Sciences (Intensive)

Major in Molecular Biology & Biotechnology

Minor in Molecular Biology & Biotechnology

#### Required courses (144 credits)

# 1. Introductory level courses (66 credits)

<b>Disciplinary Core Courses:</b>	Science Foundation	Courses (12 credits)
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SCNC1111 Scientific method and reasoning (6) (Note 1) SCNC1112 Fundamentals of modern science (6) (Note 1)

**Disciplinary Core Courses (42 credits)** 

BIOL1110 From molecules to cells (6) (Note 1)
CHEM1042 General chemistry I (6)
CHEM1043 General chemistry II (6)

BIOL2102 Biostatistics (6) (Note 1)
BIOL2103 Biological sciences laboratory course (6) (Note 1)

BIOL2220 Principles of biochemistry (6)

Take either BIOL2220 or BIOC2600 to fulfill this 42 credits requirement, but not both.

BIOL2220 and BIOC2600 are mutually

BIOL2409 Biotechnology industry and entrepreneurship (6)

BIOC2600 Basic biochemistry (6)

Take either BIOL2220 or BIOC2600 to fulfill this 42 credits requirement, but not both.

BIOL2220 and BIOC2600 are mutually exclusive. (Note 1)

## **Disciplinary Electives (12 credits)**

Plus at least 12 credits selected from the following courses:

BIOL1309 Evolutionary diversity (6)

May take either BIOL1309 or BIOL2306 to fulfill this 12 credits requirement, but not both.

BIOL2306 Ecology and evolution (6)

		May take either BIOL1309 or BIOL2306 to fulfill this 12 credits requirement, but not both.
BIOL2408	Green earth-plants and mankind (6)	rumii uns 12 creans requirement, but not both.
COMP1117	Computer programming (6)	
MATH1011	University mathematics I (6)	
MATH1013	University mathematics II (6)	
2. Advanced level	courses (66 credits)	
	Courses (30 credits)	
BIOL3401	Molecular biology (6)	(Note 1)
BIOL3402	Cell biology and cell technology (6)	(Note 1)
BIOL4411	Plant and food biotechnology (6)	(Note 1)
BIOL4415	Healthcare biotechnology (6)	(Note 1)
BIOL4417	'Omics' and systems biology (6)	
Disciplinary Electi		
Plus at least 36 o	credits selected from the following courses:	
BIOL3107	Plant physiology (6)	Take either BIOL3107 or ENVS3202 to fulfill this 36 credits requirement, but not both. BIOL3107 and ENVS3202 are mutually exclusive.
BIOL3205	Human physiology (6)	oxoldor o
BIOL3403	Immunology (6)	
BIOL3404	Protein structure and function (6)	
BIOL3406	Reproduction and reproductive biotechnology (6)	
BIOL3408	Genetics (6)	
BIOL3508	Microbial physiology and biotechnology (6)	
ENVS3202	Plant physiology and climate change (6)	Take either BIOL3107 or ENVS3202 to fulfill this 36 credits requirement, but not both. BIOL3107 and ENVS3202 are mutually exclusive.
BIOL4401	Medical microbiology and applied immunology (6)	
BIOL4409	General virology (6)	
BIOL4416	Stem cells and regenerative biology (6)	
ENVS4110	Environmental remediation (6)	
	rement (12 credits)	
BIOL4993	Molecular biology & biotechnology project (12)	

# Notes:

1. These are core courses in the regular Molecular Biology and Biotechnology Major (96 credits) curriculum.

Major Title Major in Molecular Biology & Biotechnology (Intensive)

2017

Offered to students

admitted to Year 1 in

#### **Objectives:**

Recent advancements in Molecular Biology & Biotechnology have not only cracked important and fundamental problems in life sciences, but also emerged as a mainstay of science and technologies of the 21st century. Innovations from advances in these fields have substantially transformed our daily lives, society and environment. This Major aims to provide comprehensive training in state-of-the-art molecular and cell biology, and in the translation of basic knowledge into modern industrial and medical applications. Students will be able to gain an understanding of cutting edge molecular biology and biotechnological applications, ranging from exploitation of bioactive substances, genetic engineering for agricultural production, fisheries and aquaculture, biomedical researches for pharmaceutical and clinical purposes, biofuels as alternative energy sources, bioremediation for cleaning up contaminated environments, and wastewater treatment. Built upon a sound theoretical foundation, students will further develop various essential skills in molecular biology and biotechnology through hands-on laboratory trainings and experimental biology-based projects. A feature of this major is to provide key transferable skills by engaging students in inquiry, critical thinking, and problem solving in their learning.

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#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe key concepts in molecular biology and modern biotechnology using knowledge from cell biology, microbiology, biochemistry, immunology, omics and systems biology (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 2: apply laboratory techniques essential to modern molecular science (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 3: communicate in written and oral communication skills and collaborate with other students effectively (by means of coursework, research-based learning and presentation opportunities in the curriculum)
- PLO 4: acquire scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate debated problems in the field and develop solutions, and appraise the related ethical issues (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 5: gain insights into real-life experience in the applications of biotechnology for human health, agriculture, and the environment (by means of coursework, laboratory-based and experiential learning in the curriculum)
- PLO 6: equip with knowledges in chemistry, mathematics, statistics, or computer programming, with sufficient depth and breadth to apply these knowledges within a biological context (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 7: solve a scientific question empirically by designing and implementing experiments, learning new experimental skills and tackling experimental errors, reporting results unbiasedly and systematically (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)

## Impermissible Combinations:

Major in Biological Sciences

Major in Biological Sciences (Intensive)

Major in Molecular Biology & Biotechnology

Minor in Molecular Biology & Biotechnology

# Required courses (144 credits)

1. Introductory	level courses	(66 credits)
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Disciplinary Co	re Courses: Science l	Foundation (	Courses (12	? credits)
SCNC1111	Scientific method	d and reasoning	a (6)	

SCNC1111 Scientific fried and reasoning (b)
SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (42 credits)** 

BIOL1110 From molecules to cells (6)
CHEM1042 General chemistry I (6)
CHEM1043 General chemistry II (6)

BIOL2102 Biostatistics (6) (Note 1)
BIOL2103 Biological sciences laboratory course (6) (Note 1)

BIOL2220 Principles of biochemistry (6)

Take either BIOL2220 or BIOC2600 to fulfill this 42 credits requirement, but not both.

BIOL2220 and BIOC2600 are mutually exclusive. (Note 1)

BIOL2409 Biotechnology industry and entrepreneurship (6)

BIOC2600 Basic biochemistry (6)

this 42 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive. (Note 1)

# Disciplinary Electives (12 credits)

Plus at least 12 credits selected from the following courses:

BIOL1309 Evolutionary diversity (6)

BIOL2306 Ecology and evolution (6)

May take either BIOL1309 or BIOL2306 to fulfill this 12 credits requirement, but not both.

Take either BIOL2220 or BIOC2600 to fulfill

(Note 1)

(Note 1)

(Note 1)

		May take either BIOL1309 or BIOL2306 to fulfill this 12 credits requirement, but not both.
BIOL2408	Green earth-plants and mankind (6)	runni uns 12 creans requirement, par not pour.
COMP1117	Computer programming (6)	
MATH1011	University mathematics I (6)	
MATH1013	University mathematics II (6)	
2. Advanced level	courses (66 credits)	
	Courses (30 credits)	
BIOL3401	Molecular biology (6)	(Note 1)
BIOL3402	Cell biology and cell technology (6)	(Note 1)
BIOL4411	Plant and food biotechnology (6)	(Note 1)
BIOL4415	Healthcare biotechnology (6)	(Note 1)
BIOL4417	'Omics' and systems biology (6)	
Disciplinary Elective	ves (36 credits)	
Plus at least 36 o	credits selected from the following courses:	
BIOL3107	Plant physiology (6)	Take either BIOL3107 or ENVS3202 to fulfill this 36 credits requirement, but not both. BIOL3107 and ENVS3202 are mutually exclusive.
BIOL3205	Human physiology (6)	onoise of the second of the se
BIOL3403	Immunology (6)	
BIOL3404	Protein structure and function (6)	
BIOL3406	Reproduction and reproductive biotechnology (6)	
BIOL3408	Genetics (6)	
BIOL3508	Microbial physiology and biotechnology (6)	
ENVS3202	Plant physiology and climate change (6)	Take either BIOL3107 or ENVS3202 to fulfill this 36 credits requirement, but not both. BIOL3107 and ENVS3202 are mutually exclusive.
BIOL4401	Medical microbiology and applied immunology (6)	
BIOL4409	General virology (6)	
BIOL4416	Stem cells and regenerative biology (6)	
ENVS4110	Environmental remediation (6)	
3. Capstone requir	rement (12 credits)	
BIOL4993	Molecular biology & biotechnology project (12)	

# Notes:

1. These are core courses in the regular Molecular Biology and Biotechnology Major (96 credits) curriculum.

Major Title Major in Molecular Biology & Biotechnology (Intensive)

2016

Offered to students

admitted to Year 1 in

#### **Objectives:**

Recent advancements in Molecular Biology & Biotechnology have not only cracked important and fundamental problems in life sciences, but also emerged as a mainstay of science and technologies of the 21st century. Innovations from advances in these fields have substantially transformed our daily lives, society and environment. This Major aims to provide comprehensive training in state-of-the-art molecular and cell biology, and in the translation of basic knowledge into modern industrial and medical applications. Students will be able to gain an understanding of cutting edge molecular biology and biotechnological applications, ranging from exploitation of bioactive substances, genetic engineering for agricultural production, fisheries and aquaculture, biomedical researches for pharmaceutical and clinical purposes, biofuels as alternative energy sources, bioremediation for cleaning up contaminated environments, and wastewater treatment. Built upon a sound theoretical foundation, students will further develop various essential skills in molecular biology and biotechnology through hands-on laboratory trainings and experimental biology-based projects. A feature of this major is to provide key transferable skills by engaging students in inquiry, critical thinking, and problem solving in their learning.

The intensive major involves additional coursework and research/capstone experience. It is designed for students with interest on a fuller scope of the discipline or planning to pursue research studies for a higher degree in any area of life science.

This intensive major has been accredited by the Royal Society of Biology (RSB), UK, for the purpose of meeting in part the academic and experience requirement for the Membership and Chartered Biologist (CBiol).

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe key concepts in molecular biology and modern biotechnology using knowledge from cell biology, microbiology, biochemistry, immunology, omics and systems biology (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 2: apply laboratory techniques essential to modern molecular science (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 3: communicate in written and oral communication skills and collaborate with other students effectively (by means of coursework, research-based learning and presentation opportunities in the curriculum)
- PLO 4: acquire scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate debated problems in the field and develop solutions, and appraise the related ethical issues (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 5: gain insights into real-life experience in the applications of biotechnology for human health, agriculture, and the environment (by means of coursework, laboratory-based and experiential learning in the curriculum)
- PLO 6: equip with knowledges in chemistry, mathematics, statistics, or computer programming, with sufficient depth and breadth to apply these knowledges within a biological context (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 7: solve a scientific question empirically by designing and implementing experiments, learning new experimental skills and tackling experimental errors, reporting results unbiasedly and systematically (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)

## Impermissible Combinations:

Major in Biological Sciences

**BIOL2306** 

Ecology and evolution (6)

Major in Molecular Biology & Biotechnology

Minor in Molecular Biology & Biotechnology

	Required courses (144 credits)					
	1. Introductory leve	I. Introductory level courses (66 credits)				
Disciplinary Core Courses: Science Foundation Courses (12 credits)						
	SCNC1111	Scientific method and reasoning (6)	(Note 1)			
	SCNC1112	Fundamentals of modern science (6)	(Note 1)			
	Disciplinary Core C	Courses (42 credits)				
	BIOL1110	From molecules to cells (6)	(Note 1)			
	CHEM1042	General chemistry I (6)				
	CHEM1043	General chemistry II (6)				
	BIOL2102	Biostatistics (6)	(Note 1)			
	BIOL2103	Biological sciences laboratory course (6)	(Note 1)			
	BIOL2220	Principles of biochemistry (6)	Take either BIOL2220 or BIOC2600 to fulfill this 42 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive. (Note 1)			
	BIOL2409	Biotechnology industry and entrepreneurship (6)				
	BIOC2600	Basic biochemistry (6)	Take either BIOL2220 or BIOC2600 to fulfill this 42 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive. (Note 1)			
	Disciplinary Electiv	res (12 credits)	, ,			
	Plus at least 12 c	redits selected from the following courses:				
	BIOL1309	Evolutionary diversity (6)	May take either BIOL1309 or BIOL2306 to fulfill this 12 credits requirement, but not both.			

May take either BIOL1309 or BIOL2306 to

fulfill this 12 credits requirement, but not both.

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e either BIOL3107 or ENVS3202 to fulfill 36 credits requirement, but not both. L3107 and ENVS3202 are mutually usive.
e either BIOL3107 or ENVS3202 to fulfill 36 credits requirement, but not both. L3107 and ENVS3202 are mutually usive.

# Notes:

1. These are core courses in the regular Molecular Biology and Biotechnology Major (96 credits) curriculum.

Major Title Major in Molecular Biology & Biotechnology (Intensive)

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

Recent advancements in Molecular Biology & Biotechnology have not only cracked important and fundamental problems in life sciences, but also emerged as a mainstay of science and technologies of the 21st century. Innovations from advances in these fields have substantially transformed our daily lives, society and environment. This Major aims to provide comprehensive training in state-of-the-art molecular and cell biology, and in the translation of basic knowledge into modern industrial and medical applications. Students will be able to gain an understanding of cutting edge molecular biology and biotechnological applications, ranging from exploitation of bioactive substances, genetic engineering for agricultural production, fisheries and aquaculture, biomedical researches for pharmaceutical and clinical purposes, biofuels as alternative energy sources, bioremediation for cleaning up contaminated environments, and wastewater treatment. Built upon a sound theoretical foundation, students will further develop various essential skills in molecular biology and biotechnology through hands-on laboratory trainings and experimental biology-based projects. A feature of this major is to provide key transferable skills by engaging students in inquiry, critical thinking, and problem solving in their learning.

The intensive major involves additional coursework and research/capstone experience. It is designed for students with interest on a fuller scope of the discipline or planning to pursue research studies for a higher degree in any area of life science.

This intensive major has been accredited by the Royal Society of Biology (RSB), UK, for the purpose of meeting in part the academic and experience requirement for the Membership and Chartered Biologist (CBiol).

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe key concepts in molecular biology and modern biotechnology using knowledge from cell biology, microbiology, biochemistry, immunology, omics and systems biology (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 2: apply laboratory techniques essential to modern molecular science (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 3: communicate in written and oral communication skills and collaborate with other students effectively (by means of coursework, research-based learning and presentation opportunities in the curriculum)
- PLO 4: acquire scientific inquiry and critical thinking skills, including the ability to understand, analyze, and evaluate debated problems in the field and develop solutions, and appraise the related ethical issues (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 5: gain insights into real-life experience in the applications of biotechnology for human health, agriculture, and the environment (by means of coursework, laboratory-based and experiential learning in the curriculum)
- PLO 6: equip with knowledges in chemistry, mathematics, statistics, or computer programming, with sufficient depth and breadth to apply these knowledges within a biological context (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
- PLO 7: solve a scientific question empirically by designing and implementing experiments, learning new experimental skills and tackling experimental errors, reporting results unbiasedly and systematically (by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)

### Impermissible Combinations:

Major in Biological Sciences

Major in Molecular Biology & Biotechnology

Minor in Molecular Biology & Biotechnology			
Required courses (144 credits)			
Introductory level courses (66 credits)     Disciplinary Core Courses: Science Foundation Courses (12 credits)			
SCNC1111	Scientific method and reasoning (6)	(Note 1)	
SCNC1112	Fundamentals of modern science (6)	(Note 1)	
Disciplinary Core	Courses (42 credits)		
BIOL1110	From molecules to cells (6)	(Note 1)	
CHEM1042	General chemistry I (6)		
CHEM1043	General chemistry II (6)		
BIOL2102	Biostatistics (6)	(Note 1)	
BIOL2103	Biological sciences laboratory course (6)	(Note 1)	
BIOL2220	Principles of biochemistry (6)	Take either BIOL2220 or BIOC2600 to fulfill this 42 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive. (Note 1)	
BIOL2409	Biotechnology industry and entrepreneurship (6)	·	
BIOC2600	Basic biochemistry (6)	Take either BIOL2220 or BIOC2600 to fulfill this 42 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive. (Note 1)	
Disciplinary Elective			
Plus at least 12 d	credits selected from the following courses:		
BIOL1309	Evolutionary diversity (6)	May take either BIOL1309 or BIOL2306 to fulfill this 12 credits requirement, but not both.	
BIOL2306	Ecology and evolution (6)	May take either BIOL1309 or BIOL2306 to fulfill this 12 credits requirement, but not both.	

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Ш	BIOL2408	Green earth-plants and mankind (6)		
Ш	COMP1117	Computer programming (6)		
Ш	MATH1011	University mathematics I (6)		
Ш	MATH1013	University mathematics II (6)		
Ш	2. Advanced level	courses (66 credits)		
Ш	Disciplinary Core	Courses (30 credits)		
Ш	BIOL3401	Molecular biology (6)	(Note 1)	
Ш	BIOL3402	Cell biology and cell technology (6)	(Note 1)	
Ш	BIOL4411	Plant and food biotechnology (6)	(Note 1)	
Ш	BIOL4415	Healthcare biotechnology (6)	(Note 1)	
Ш	BIOL4417	'Omics' and systems biology (6)		
Ш	Disciplinary Elective	ves (36 credits)		
Ш	Plus at least 36 d	credits selected from the following courses:		
Ш	BIOL3107	Plant physiology (6)		
Ш	BIOL3205	Human physiology (6)		
Ш	BIOL3403	Immunology (6)		
Ш	BIOL3404	Protein structure and function (6)		
Ш	BIOL3406	Reproduction and reproductive biotechnology (6)		
Ш	BIOL3408	Genetics (6)		
Ш	BIOL3508	Microbial physiology and biotechnology (6)		
Ш	BIOL4401	Medical microbiology and applied immunology (6)		
Ш	BIOL4409	General virology (6)		
Ш	BIOL4416	Stem cells and regenerative biology (6)		
Ш	ENVS4110	Environmental remediation (6)		
3. Capstone requirement (12 credits)				
П	BIOL4993	Molecular biology & biotechnology project (12)		
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# Notes:

1. These are core courses in the regular Molecular Biology and Biotechnology Major (96 credits) curriculum.

Major Title Major in Physics

Offered to students 2021

admitted to Year 1 in

#### **Objectives:**

The Major in Physics aims to provide students with a solid foundation on the subject. Core courses form the blocks of fundamental knowledge to pursue learning in specializations, e.g. quantum mechanics, statistical mechanics, classical mechanics and electrodynamics. A large selection of elective courses is provided for students to pursue a wide range of topics from the very small scale (i.e. subatomic particles) to the large scale (i.e. cosmology). Students will attain professional knowledge in physics, research experience and the training of analytical thinking and quantitative reasoning during their studies. Graduates are expected to have acquired the broad training which can equip them well for further studies in multiple science and technology disciplines and to work in their specialized area.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with their professional knowledge (by means of coursework and tutorial classes in the curriculum)
- PLO 2: have developed their scientific intuition, abilities and techniques to tackle problems either theoretical or experimental in nature (by means of coursework, tutorial classes and laboratory works in the curriculum)
- PLO 3: analyze problems qualitatively and quantitatively, and appraise the related ethical issues (by means of coursework, tutorial classes and research-based projects in the curriculum)
- PLO 4: communicate and collaborate effectively with people of different background, culture, gender and nationality in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)
- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-world setting (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

# Impermissible Combinations:

Major in Physics (Intensive)

Minor in Physics

#### Required courses (96 credits)

#### 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6)

SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (24 credits)** 

PHYS2250 Introductory mechanics (6)

PHYS2255 Introductory electricity and magnetism (6)
PHYS2261 Introductory heat and thermodynamics (6)
PHYS2265 Introductory quantum physics (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

PHYS1150 Problem solving in physics (6)
PHYS2055 Introductory relativity (6)
PHYS2150 Methods in physics I (6)
PHYS2155 Methods in physics II (6)

PHYS2160 Introductory computational physics (6)

# 2. Advanced level courses (42 credits)

# **Disciplinary Electives (42credits)**

At least 24 credits selected from courses in List A:

List A

PHYS3150 Theoretical physics (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)
PHYS3450 Electromagnetism (6)

PHYS3550 Statistical mechanics & thermodynamics (6)

PHYS3760 Physics laboratory (6)

Plus at least 18 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current list includes courses in Lists A and B and those courses not selected to fulfill the capstone requirements.

List B

PHYS3151 Machine learning in physics (6)
PHYS3650 Observational astronomy (6)

PHYS3653 Astrophysics (6)
PHYS3660 Astronomy laboratory (6)
PHYS3750 Laser and spectroscopy (6)

PHYS3850 Physical Optics (6)
PHYS3851 Atomic and nuclear physics (6)
PHYS4150 Computational physics (6)

PHYS4151 Data analysis and modeling in physics (6)
PHYS4351 Advanced quantum mechanics (6)
PHYS4450 Advanced electromagnetism (6)
PHYS4550 Advanced statistical mechanics (6)

PHYS4551	Solid state physics (6)
PHYS4650	Stellar physics (6)
PHYS4652	Planetary science (6)
PHYS4653	Cosmology (6)
PHYS4654	General relativity (6)
PHYS4655	Interstellar medium (6)
PHYS4656	Advanced astrophysics (6)
PHYS4850	Particle physics (6)
DUVC7250	Graduate classical mechanic

PHYS7350 Graduate classical mechanics (6)
PHYS7351 Graduate quantum mechanics (6)
PHYS7450 Graduate electromagnetism (6)
PHYS7550 Graduate statistical mechanics (6)

PHYS7750 Nanophysics (6)

#### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

PHYS3999 Directed studies in physics (6) PHYS4966 Physics internship (6)

PHYS4999 Physics project (12)

#### Notes:

Notes:

- 1. Students are strongly advised to consult departmental course selection advisors for course and career planning before selecting the courses.
- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Students must have level 3 or above in HKDSE Physics or equivalent to take this major. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.
- 6. Those who want to specialize in the astrophysics theme should pass any three of the following courses: PHYS3650 Observational astronomy, PHYS3653 Astrophysics, PHYS3660 Astronomy laboratory, PHYS4652 Planetary science, PHYS4653 Cosmology, PHYS4654 General relativity, PHYS4655 Interstellar medium, and PHYS4656 Advanced astrophysics, out of which at least one must be a 4000+ level course, as well as passing either PHYS3999 Directed studies in physics or PHYS4999 Physics project with topics of study in astrophysics.
- 7. Those who want to specialize in the computational physics theme should pass any three of the following courses: PHYS3150 Theoretical physics, PHYS3151 Machine learning in physics, PHYS4150 Computational physics, and PHYS4151 Data analysis and modeling in physics out of which at least one must be a 4000+ level course, as well as passing either PHYS3999 Directed studies in physics or PHYS4999 Physics project with topics of study in computational physics.
- 8. Those who want to specialize in the experimental physics theme should pass PHYS3760 Physics laboratory, plus any two of the following courses: PHYS3660 Astronomy laboratory, PHYS3750 Laser and spectroscopy, PHYS3850 Physical optics, PHYS3851 Atomic and nuclear physics, PHYS4151 Data analysis and modeling in physics, PHYS4551 Solid state physics, and PHYS4850 Particle physics out of which at least one must be a 4000+ level course, as well as passing either PHYS3999 Directed studies in physics or PHYS4999 Physics project with topics of study in experimental physics.
- 9. Those who want to specialize in the theoretical physics theme should pass any four of the following courses: PHYS3150 Theoretical physics, PHYS3350 Classical mechanics, PHYS3351 Quantum mechanics, PHYS3450 Electromagnetism, PHYS3550 Statistical mechanics & thermodynamics, PHYS4351 Advanced quantum mechanics, PHYS4450 Advanced electromagnetism, PHYS4551 Solid state physics, PHYS4654 General relativity, PHYS4850 Particle physics, PHYS7351 Graduate quantum mechanics, PHYS7450 Graduate electromagnetism, PHYS7550 Graduate statistical mechanics out of which at least two must be 4000+ level courses, as well as passing either PHYS3999 Directed studies in physics or PHYS4999 Physics project with topics of study in theoretical physics.
- 10. Upon prior approval, one may use PHYS4966 Physics internship to replace PHYS3999 Directed studies or PHYS4999 Physics project to fulfill the specialization in a theme.
- 11. No double counting is allowed if one wants to specialize in more than one theme. In this case, one is allowed to replace the PHYS3999 Directed studies in physics or PHYS4999 Physics project requirement in one of the theme specializations by a regular course in the same theme of specialization.
- 12. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis
- 13. Candidates who have been admitted to Year 1 in 2021-22 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1112. It is optional for them to take this course. Those who do not take this course should take a 6-credit

- disciplinary elective course of the science major in lieu.

   Level 4 or above in Biology, Chemistry, and Physics in the Hong Kong Diploma of Secondary Education (HKDSE)

   Level 5 or above in Biology, Chemistry, and Physics Higher Level in International Baccalaureate (IB)
- Grade B or above in Biology, Chemistry, and Physics in General Certificate of Education Advanced Level (GCEAL)
   Biology, Chemistry, and Physics qualification in Gao Kao will be considered on a case-by-case basis

Major Title Major in Physics

Offered to students 2020

admitted to Year 1 in

#### **Objectives:**

The Major in Physics aims to provide students with a solid foundation on the subject. Core courses form the blocks of fundamental knowledge to pursue learning in specializations, e.g. quantum mechanics, statistical mechanics, classical mechanics and electrodynamics. A large selection of elective courses is provided for students to pursue a wide range of topics from the very small scale (i.e. subatomic particles) to the large scale (i.e. cosmology). Students will attain professional knowledge in physics, research experience and the training of analytical thinking and quantitative reasoning during their studies. Graduates are expected to have acquired the broad training which can equip them well for further studies in multiple science and technology disciplines and to work in their specialized area.

# Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with their professional knowledge (by means of coursework and tutorial classes in the curriculum)
- PLO 2: have developed their scientific intuition, abilities and techniques to tackle problems either theoretical or experimental in nature (by means of coursework, tutorial classes and laboratory works in the curriculum)
- PLO 3: analyze problems qualitatively and quantitatively, and appraise the related ethical issues (by means of coursework, tutorial classes and research-based projects in the curriculum)
- PLO 4: communicate and collaborate effectively with people of different background, culture, gender and nationality in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)
- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-world setting (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

# Impermissible Combinations:

Major in Physics (Intensive)

Minor in Physics

#### Required courses (96 credits)

#### 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6)

SCNC1112 Fundamentals of modern science (6)

Disciplinary Core Courses (24 credits)

PHYS2250 Introductory mechanics (6)

PHYS2255 Introductory electricity and magnetism (6)
PHYS2261 Introductory heat and thermodynamics (6)
PHYS2265 Introductory quantum physics (6)

# Disciplinary Electives (12 credits)

At least 12 credits selected from the following courses:

PHYS1150 Problem solving in physics (6)
PHYS2055 Introductory relativity (6)
PHYS2150 Methods in physics I (6)
PHYS2155 Methods in physics II (6)

PHYS2160 Introductory computational physics (6)

# 2. Advanced level courses (42 credits)

# **Disciplinary Electives (42credits)**

At least 24 credits selected from courses in List A:

List A

PHYS3150 Theoretical physics (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)
PHYS3450 Electromagnetism (6)

PHYS3550 Statistical mechanics & thermodynamics (6)

PHYS3760 Physics laboratory (6)

Plus at least 18 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current list includes courses in Lists A and B and those courses not selected to fulfill the capstone requirements.

List B

PHYS3151 Machine learning in physics (6) PHYS3650 Observational astronomy (6)

PHYS3653 Astrophysics (6)
PHYS3660 Astronomy laboratory (6)
PHYS3750 Laser and spectroscopy (6)

PHYS3850 Physical Optics (6)
PHYS3851 Atomic and nuclear physics (6)
PHYS4150 Computational physics (6)

PHYS4151 Data analysis and modeling in physics (6)
PHYS4351 Advanced quantum mechanics (6)
PHYS4450 Advanced electromagnetism (6)
PHYS4550 Advanced statistical mechanics (6)

Solid state physics (6) PHYS4551 Stellar physics (6) **PHYS4650** Planetary science (6) PHYS4652 PHYS4653 Cosmology (6) General relativity (6) **PHYS4654 PHYS4655** Interstellar medium (6) Advanced astrophysics (6) **PHYS4656** Particle physics (6) PHYS4850

PHYS7350 Graduate classical mechanics (6)
PHYS7351 Graduate quantum mechanics (6)
PHYS7450 Graduate electromagnetism (6)
PHYS7550 Graduate statistical mechanics (6)

PHYS7750 Nanophysics (6)

#### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

PHYS3999 Directed studies in physics (6)
PHYS4966 Physics internship (6)

PHYS4999 Physics project (12)

#### Notes:

Notes:

- 1. Students are strongly advised to consult departmental course selection advisors for course and career planning before selecting the courses.
- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Students must have level 3 or above in HKDSE Physics or equivalent to take this major. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.
- 6. Those who want to specialize in the astrophysics theme should pass any three of the following courses: PHYS3650 Observational astronomy, PHYS3653 Astrophysics, PHYS3660 Astronomy laboratory, PHYS4652 Planetary science, PHYS4653 Cosmology, PHYS4654 General relativity, PHYS4655 Interstellar medium, and PHYS4656 Advanced astrophysics, out of which at least one must be a 4000+ level course, as well as passing either PHYS3999 Directed studies in physics or PHYS4999 Physics project with topics of study in astrophysics.
- 7. Those who want to specialize in the computational physics theme should pass any three of the following courses: PHYS3150 Theoretical physics, PHYS3151 Machine learning in physics, PHYS4150 Computational physics, and PHYS4151 Data analysis and modeling in physics out of which at least one must be a 4000+ level course, as well as passing either PHYS3999 Directed studies in physics or PHYS4999 Physics project with topics of study in computational physics.
- 8. Those who want to specialize in the experimental physics theme should pass PHYS3760 Physics laboratory, plus any two of the following courses: PHYS3660 Astronomy laboratory, PHYS3750 Laser and spectroscopy, PHYS3850 Physical optics, PHYS3851 Atomic and nuclear physics, PHYS4151 Data analysis and modeling in physics, PHYS4551 Solid state physics, and PHYS4850 Particle physics out of which at least one must be a 4000+ level course, as well as passing either PHYS3999 Directed studies in physics or PHYS4999 Physics project with topics of study in experimental physics.
- 9. Those who want to specialize in the theoretical physics theme should pass any four of the following courses: PHYS3150 Theoretical physics, PHYS3350 Classical mechanics, PHYS3351 Quantum mechanics, PHYS3450 Electromagnetism, PHYS3550 Statistical mechanics & thermodynamics, PHYS4351 Advanced quantum mechanics, PHYS4450 Advanced electromagnetism, PHYS4551 Solid state physics, PHYS4654 General relativity, PHYS4850 Particle physics, PHYS7351 Graduate quantum mechanics, PHYS7450 Graduate electromagnetism, PHYS7550 Graduate statistical mechanics out of which at least two must be 4000+ level courses, as well as passing either PHYS3999 Directed studies in physics or PHYS4999 Physics project with topics of study in theoretical physics.
- 10. Upon prior approval, one may use PHYS4966 Physics internship to replace PHYS3999 Directed studies or PHYS4999 Physics project to fulfill the specialization in a theme.
- 11. No double counting is allowed if one wants to specialize in more than one theme. In this case, one is allowed to replace the PHYS3999 Directed studies in physics or PHYS4999 Physics project requirement in one of the theme specializations by a regular course in the same theme of specialization.
- 12. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis

#### Remarks:

Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled.

Students must take and pass all required courses in the selected primary science major in order to satisfy the degree graduation requirements.

Major Title Major in Physics

Offered to students 2019

admitted to Year 1 in

#### **Objectives:**

The Major in Physics aims to provide students with a solid foundation on the subject. Core courses form the blocks of fundamental knowledge to pursue learning in specializations, e.g. quantum mechanics, statistical mechanics, classical mechanics and electrodynamics. A large selection of elective courses is provided for students to pursue a wide range of topics from the very small scale (i.e. subatomic particles) to the large scale (i.e. cosmology). Students will attain professional knowledge in physics, research experience and the training of analytical thinking and quantitative reasoning during their studies. Graduates are expected to have acquired the broad training which can equip them well for further studies in multiple science and technology disciplines and to work in their specialized area.

# Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with their professional knowledge (by means of coursework and tutorial classes in the curriculum)
- PLO 2: have developed their scientific intuition, abilities and techniques to tackle problems either theoretical or experimental in nature (by means of coursework, tutorial classes and laboratory works in the curriculum)
- PLO 3: analyze problems qualitatively and quantitatively, and appraise the related ethical issues (by means of coursework, tutorial classes and research-based projects in the curriculum)
- PLO 4: communicate and collaborate effectively with people of different background, culture, gender and nationality in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)
- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-world setting (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

# Impermissible Combinations:

Major in Physics (Intensive)

Minor in Physics

#### Required courses (96 credits)

#### 1. Introductory level courses (48 credits)

# Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) Fundamentals of modern science (6) **SCNC1112** 

**Disciplinary Core Courses (24 credits)** 

PHYS2250 Introductory mechanics (6)

**PHYS2255** Introductory electricity and magnetism (6) Introductory heat and thermodynamics (6) **PHYS2261** Introductory quantum physics (6) **PHYS2265** 

**Disciplinary Electives (12 credits)** 

At least 12 credits selected from the following courses: Problem solving in physics (6) PHYS1150 PHYS2055 Introductory relativity (6) PHYS2150 Methods in physics I (6) Methods in physics II (6) PHYS2155

PHYS2160 Introductory computational physics (6)

### 2. Advanced level courses (42 credits)

# **Disciplinary Electives (42credits)**

At least 24 credits selected from courses in List A:

I ist A

Theoretical physics (6) PHYS3150 PHYS3350 Classical mechanics (6) PHYS3351 Quantum mechanics (6) **PHYS3450** Electromagnetism (6)

PHYS3550 Statistical mechanics & thermodynamics (6)

PHYS3760 Physics laboratory (6)

Plus at least 18 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current list includes courses in Lists A and B and those courses not selected to fulfill the capstone requirements.

Iprevious title: Waves and optics

(6)1

List B

Machine learning in physics (6) PHYS3151 PHYS3650 Observational astronomy (6)

Astrophysics (6) PHYS3653 PHYS3660 Astronomy laboratory (6)

PHYS3750 Laser and spectroscopy (6) Physical Optics (6) **PHYS3850** 

Atomic and nuclear physics (6) PHYS3851

PHYS4150 Computational physics (6)

Data analysis and modeling in physics (6) **PHYS4151** PHYS4351 Advanced quantum mechanics (6) PHYS4450 Advanced electromagnetism (6) Advanced statistical mechanics (6) PHYS4550

Calid atata physica (6)
Solid state physics (6)
Stellar physics (6)
Planetary science (6)
Cosmology (6)
General relativity (6)
Interstellar medium (6)
Advanced astrophysics (6)
Particle physics (6)
Graduate classical mechanics (6)
Graduate quantum mechanics (6)
Graduate electromagnetism (6)
Graduate statistical mechanics (6)

PHYS7750 Nanophysics (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:
PHYS3999 Directed studies in physics (6)

PHYS4966 Physics internship (6) PHYS4999 Physics project (12)

#### Notes:

Notes:

- 1. Students are strongly advised to consult departmental course selection advisors for course and career planning before selecting the courses.
- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details
- 6. Students must have level 3 or above in HKDSE Physics or equivalent to take this major. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.
- 7. Those who want to specialize in the astrophysics theme should pass any three of the following courses: PHYS3650 Observational astronomy, PHYS3653 Astrophysics, PHYS3660 Astronomy laboratory, PHYS4652 Planetary science, PHYS4653 Cosmology, PHYS4654 General relativity, PHYS4655 Interstellar medium, and PHYS4656 Advanced astrophysics, out of which at least one must be a 4000+ level course, as well as passing either PHYS3999 Directed studies in physics or PHYS4999 Physics project with topics of study in astrophysics.
- 8. Those who want to specialize in the computational physics theme should pass any three of the following courses: PHYS3150 Theoretical physics, PHYS3151 Machine learning in physics, PHYS4150 Computational physics, and PHYS4151 Data analysis and modeling in physics out of which at least one must be a 4000+ level course, as well as passing either PHYS3999 Directed studies in physics or PHYS4999 Physics project with topics of study in computational physics.
- 9. Those who want to specialize in the experimental physics theme should pass PHYS3760 Physics laboratory, plus any two of the following courses: PHYS3660 Astronomy laboratory, PHYS3750 Laser and spectroscopy, PHYS3850 Physical optics, PHYS3851 Atomic and nuclear physics, PHYS4151 Data analysis and modeling in physics, PHYS4551 Solid state physics, and PHYS4850 Particle physics out of which at least one must be a 4000+ level course, as well as passing either PHYS3999 Directed studies in physics or PHYS4999 Physics project with topics of study in experimental physics.
- 10. Those who want to specialize in the theoretical physics theme should pass any four of the following courses: PHYS3150 Theoretical physics, PHYS3350 Classical mechanics, PHYS3351 Quantum mechanics, PHYS3450 Electromagnetism, PHYS3550 Statistical mechanics & thermodynamics, PHYS4351 Advanced quantum mechanics, PHYS450 Advanced electromagnetism, PHYS4551 Solid state physics, PHYS4654 General relativity, PHYS4850 Particle physics, PHYS7351 Graduate quantum mechanics, PHYS7450 Graduate electromagnetism, PHYS7550 Graduate statistical mechanics out of which at least two must be 4000+ level courses, as well as passing either PHYS3999 Directed studies in physics or PHYS4999 Physics project with topics of study in theoretical physics.
- 11. Upon prior approval, one may use PHYS4966 Physics internship to replace PHYS3999 Directed studies or PHYS4999 Physics project to fulfill the specialization in a theme.
- 12. No double counting is allowed if one wants to specialize in more than one theme. In this case, one is allowed to replace the PHYS3999 Directed studies in physics or PHYS4999 Physics project requirement in one of the theme specializations by a regular course in the same theme of specialization.

# Remarks:

Major Title Major in Physics

Offered to students 2018

admitted to Year 1 in

#### **Objectives:**

The Major in Physics aims to provide students with a solid foundation on the subject. Core courses form the blocks of fundamental knowledge to pursue learning in specializations, e.g. quantum mechanics, statistical mechanics, classical mechanics and electrodynamics. A large selection of elective courses is provided for students to pursue a wide range of topics from the very small scale (i.e. subatomic particles) to the large scale (i.e. cosmology). Students will attain professional knowledge in physics, research experience and the training of analytical thinking and quantitative reasoning during their studies. Graduates are expected to have acquired the broad training which can equip them well for further studies in multiple science and technology disciplines and to work in their specialized area.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with their professional knowledge (by means of coursework and tutorial classes in the curriculum)
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# Impermissible Combinations:

Major in Physics (Intensive)

Minor in Physics

#### Required courses (96 credits)

#### 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (24 credits)** 

PHYS2250 Introductory mechanics (6)

PHYS2255 Introductory electricity and magnetism (6)
PHYS2261 Introductory heat and thermodynamics (6)

PHYS2265 Introductory quantum physics (6) [previous title: Modern physics (6)]

**Disciplinary Electives (12 credits)** 

At least 12 credits selected from the following courses: PHYS1150 Problem solving in physics (6)

PHYS2055 Introductory relativity (6) [previous title: Introduction to relativity (6) [6]

PHYS2150 Methods in physics I (6) PHYS2155 Methods in physics II (6)

PHYS2160 Introductory computational physics (6)

# 2. Advanced level courses (42 credits)

# Disciplinary Electives (42credits)

At least 24 credits selected from courses in List A:

List A

PHYS3150 Theoretical physics (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)
PHYS3450 Electromagnetism (6)

PHYS3550 Statistical mechanics & thermodynamics (6)

PHYS3760 Physics laboratory (6)

Plus at least 18 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current list includes courses in Lists A and B and those courses not selected to fulfill the capstone requirements.

List B

PHYS3151 Machine learning in physics (6)
PHYS3650 Observational astronomy (6)
PHYS3653 Astrophysics (6)

PHYS3653 Astrophysics (6)
PHYS3660 Astronomy laboratory (6)
PHYS3750 Laser and spectroscopy (6)
PHYS3850 Physical Optics (6)

PHYS3851 Atomic and nuclear physics (6)

PHYS4150 Computational physics (6)
PHYS4151 Data analysis and modeling in physics (6)
PHYS4351 Advanced quantum mechanics (6)
PHYS4450 Advanced electromagnetism (6)
PHYS4550 Advanced statistical mechanics (6)

[previous title: Waves and optics (6)]

PHYS4551	Solid state physics (6)
PHYS4650	Stellar physics (6)
PHYS4652	Planetary science (6)
PHYS4653	Cosmology (6)
PHYS4654	General relativity (6)
PHYS4655	Interstellar medium (6)
PHYS4656	Advanced astrophysics (6)
PHYS4850	Particle physics (6)
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PHYS7350 Graduate classical mechanics (6)
PHYS7351 Graduate quantum mechanics (6)
PHYS7450 Graduate electromagnetism (6)
PHYS7550 Graduate statistical mechanics (6)

PHYS7750 Nanophysics (6)

#### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:
PHYS3999 Directed studies in physics (6)
PHYS4966 Physics internship (6)

PHYS4999 Physics project (12)

#### Notes:

Notes:

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# Remarks:

Major Title Major in Physics

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

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# Impermissible Combinations:

Major in Mathematics/Physics

Major in Physics (Intensive)

Minor in Physics

# Required courses (96 credits)

# 1. Introductory level courses (48 credits)

# Disciplinary Core Courses: Science Foundation Courses (12 credits)

Scientific method and reasoning (6) SCNC1111 Fundamentals of modern science (6) **SCNC1112** 

**Disciplinary Core Courses (30 credits)** 

PHYS1250 Fundamental physics (6) **PHYS2250** Introductory mechanics (6)

Introductory electricity and magnetism (6) **PHYS2255** 

Heat and waves (6) PHYS2260

**PHYS2265** Introductory quantum physics (6) [previous title: Modern physics (6)]

Disciplinary Electives (6 credits)

At least 6 credits selected from the following courses: Problem solving in physics (6) PHYS1150

Introductory relativity (6) [previous title: Introduction to relativity **PHYS2055** (6)1

Methods in physics I (6) PHYS2150

PHYS2155 Methods in physics II (6)

PHYS2160 Introductory computational physics (6)

#### 2. Advanced level courses (42 credits) Disciplinary Core Courses (24 credits)

Classical mechanics (6) PHYS3350 PHYS3351 Quantum mechanics (6) Electromagnetism (6) **PHYS3450** 

Statistical mechanics & thermodynamics (6) PHYS3550

# **Disciplinary Electives (18 credits)**

At least 18 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current list includes courses in List A and those courses not selected to fulfill the capstone requirements.

List A

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PHYS3850 Physical Optics (6) [previous title: Waves and optics (6)] Atomic and nuclear physics (6) PHYS3851

PHYS4150	Computational physics (6)	
PHYS4151	Data analysis and modeling in physics (6)	
PHYS4350	Advanced classical mechanics (6)	
PHYS4351	Advanced quantum mechanics (6)	
PHYS4450	Advanced electromagnetism (6)	
PHYS4550	Advanced statistical mechanics (6)	
PHYS4551	Solid state physics (6)	
PHYS4650	Stellar physics (6)	
PHYS4651	Selected topics in astrophysics (6)	
PHYS4652	Planetary science (6)	
PHYS4653	Cosmology (6)	
PHYS4654	General relativity (6)	
PHYS4655	Interstellar medium (6)	
PHYS4656	Advanced astrophysics (6)	
PHYS4750	Experimental physics (6)	
PHYS4850	Particle physics (6)	
PHYS7350	Graduate classical mechanics (6)	
PHYS7351	Graduate quantum mechanics (6)	
PHYS7450	Graduate electromagnetism (6)	
PHYS7550	Graduate statistical mechanics (6)	
PHYS7551	Graduate solid state physics (6)	
PHYS7650	Stellar atmospheres (6)	
PHYS7750	Nanophysics (6)	
3. Capstone requirement (6 credits)		
At least 6 credits selected from		
PHYS3999	Directed studies in physics (6)	
PHYS4966	Physics internship (6)	
PHYS4999	Physics project (12)	

#### Notes:

- 1. Students are strongly advised to consult departmental course selection advisors for course and career planning before selecting the courses.
- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
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- 6. Students must have level 3 or above in HKDSE Physics or equivalent to take this major. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

# Remarks:

Major Title Major in Physics

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

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# Impermissible Combinations:

Major in Mathematics/Physics

Major in Physics (Intensive)

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# Required courses (96 credits)

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# Disciplinary Core Courses: Science Foundation Courses (12 credits)

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PHYS2255 Introductory electricity and magnetism (6)

PHYS2260 Heat and waves (6)

PHYS2265 Introductory quantum physics (6) [previous title: Modern physics (6)]

**Disciplinary Electives (6 credits)** 

At least 6 credits selected from the following courses:
PHYS1150 Problem solving in physics (6)

PHYS2055 Introductory relativity (6) [previous title: Introduction to relativity (6) [6] 1

YS2150 Methods in physics I (6)

PHYS2150 Methods in physics I (6) PHYS2155 Methods in physics II (6)

### 2. Advanced level courses (42 credits) Disciplinary Core Courses (24 credits)

PHYS3350 Classical mechanics (6) PHYS3351 Quantum mechanics (6) PHYS3450 Electromagnetism (6)

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#### **Disciplinary Electives (18 credits)**

At least 18 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current list includes courses in List A and those courses not selected to fulfill the capstone requirements.

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PHYS3850 Physical Optics (6) [previous title: Waves and optics (6) ]

PHYS3851 Atomic and nuclear physics (6) PHYS4150 Computational physics (6)

PHYS4151	Data analysis and modeling in physics (6)	
PHYS4350	Advanced classical mechanics (6)	
PHYS4351	Advanced quantum mechanics (6)	
PHYS4450	Advanced electromagnetism (6)	
PHYS4550	Advanced statistical mechanics (6)	
PHYS4551	Solid state physics (6)	
PHYS4650	Stellar physics (6)	
PHYS4651	Selected topics in astrophysics (6)	
PHYS4652	Planetary science (6)	
PHYS4653	Cosmology (6)	
PHYS4654	General relativity (6)	
PHYS4655	Interstellar medium (6)	
PHYS4656	Advanced astrophysics (6)	
PHYS4750	Experimental physics (6)	
PHYS4850	Particle physics (6)	
PHYS7350	Graduate classical mechanics (6)	
PHYS7351	Graduate quantum mechanics (6)	
PHYS7450	Graduate electromagnetism (6)	
PHYS7550	Graduate statistical mechanics (6)	
PHYS7551	Graduate solid state physics (6)	
PHYS7650	Stellar atmospheres (6)	
PHYS7750	Nanophysics (6)	
3. Capstone requirement (6 credits)		
At least 6 credits selected from the following courses:		
PHYS3999	Directed studies in physics (6)	

Physics internship (6)

Physics project (12)

# Notes:

PHYS4966 PHYS4999

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- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details
- 6. Students must have level 3 or above in HKDSE Physics or equivalent to take this major. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

#### Remarks

Major Title Major in Physics

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

The Major in Physics aims to provide students with a solid foundation on the subject. Core courses form the blocks of fundamental knowledge to pursue learning in specializations, e.g. quantum mechanics, statistical mechanics, classical mechanics and electrodynamics. A large selection of elective courses is provided for students to pursue a wide range of topics from the very small scale (i.e. subatomic particles) to the large scale (i.e. cosmology). Students will attain professional knowledge in physics, research experience and the training of analytical thinking and quantitative reasoning during their studies. Graduates are expected to have acquired the broad training which can equip them well for further studies in multiple science and technology disciplines and to work in their specialized area.

# Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with their professional knowledge (by means of coursework and tutorial classes in the curriculum)
- PLO 2: have developed their scientific intuition, abilities and techniques to tackle problems either theoretical or experimental in nature (by means of coursework, tutorial classes and laboratory works in the curriculum)
- PLO 3: analyze problems qualitatively and quantitatively, and appraise the related ethical issues (by means of coursework, tutorial classes and research-based projects in the curriculum)
- PLO 4: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)
- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-world setting (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

# Impermissible Combinations:

Major in Mathematics/Physics

Minor in Physics

#### Required courses (96 credits)

#### 1. Introductory level courses (48 credits)

# Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

PHYS1250 Fundamental physics (6) PHYS2250 Introductory mechanics (6)

PHYS2255 Introductory electricity and magnetism (6)

PHYS2260 Heat and waves (6)

PHYS2265 Introductory quantum physics (6) [previous title: Modern physics (6) ]

**Disciplinary Electives (6 credits)** 

At least 6 credits selected from the following courses:
PHYS1150 Problem solving in physics (6)

PHYS2055 Introductory relativity (6) [previous title: Introduction to relativity (6) [6] ]

S2150 Methods in physics I (6)

PHYS2150 Methods in physics I (6) PHYS2155 Methods in physics II (6)

#### 2. Advanced level courses (42 credits) Disciplinary Core Courses (24 credits)

PHYS3350 Classical mechanics (6) PHYS3351 Quantum mechanics (6) PHYS3450 Electromagnetism (6)

PHYS3550 Statistical mechanics & thermodynamics (6)

# **Disciplinary Electives (18 credits)**

At least 18 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current list includes courses in List A and those courses not selected to fulfill the capstone requirements.

List A

PHYS3150 Theoretical physics (6)
PHYS3151 Machine learning in physics (6)
PHYS3551 Introductory solid state physics (6)
PHYS3650 Observational astronomy (6)
PHYS3651 The physical universe (6)
PHYS3652 Principles of astronomy (6)
PHYS3653 Astronomy laboratory (6)
PHYS3750 Laser and spectroscopy (6)

PHYS3660 Astronomy laboratory (6)
PHYS3750 Laser and spectroscopy (6)
PHYS3751 Physics of nanomaterials (6)
PHYS3760 Physics laboratory (6)
PHYS3850 Physical Optics (6)

PHYS3851 Atomic and nuclear physics (6) PHYS4150 Computational physics (6)

PHYS4151 Data analysis and modeling in physics (6)

[previous title: Waves and optics (6) ]

	PHYS4350	Advanced classical mechanics (6)
	PHYS4351	Advanced quantum mechanics (6)
	PHYS4450	Advanced electromagnetism (6)
	PHYS4550	Advanced statistical mechanics (6)
	PHYS4551	Solid state physics (6)
	PHYS4650	Stellar physics (6)
	PHYS4651	Selected topics in astrophysics (6)
	PHYS4652	Planetary science (6)
	PHYS4653	Cosmology (6)
	PHYS4654	General relativity (6)
	PHYS4655	Interstellar medium (6)
	PHYS4656	Advanced astrophysics (6)
	PHYS4750	Experimental physics (6)
	PHYS4850	Particle physics (6)
	PHYS7350	Graduate classical mechanics (6)
	PHYS7351	Graduate quantum mechanics (6)
	PHYS7450	Graduate electromagnetism (6)
	PHYS7550	Graduate statistical mechanics (6)
	PHYS7551	Graduate solid state physics (6)
	PHYS7650	Stellar atmospheres (6)
	PHYS7750	Nanophysics (6)
3. Capstone requirement (6 credits)		
At least 6 credits selected from the following courses:		
	DLIV(00000	Dina -41 -41! !! (0)

At least 6 credits selected from the following courses:
PHYS3999
Directed studies in physics (6)
PHYS4966
PHYS4999
Physics project (12)

#### Notes:

- 1. Students are strongly advised to consult departmental course selection advisors for course and career planning before selecting the courses.
- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details
- 6. Students must have level 3 or above in HKDSE Physics or equivalent to take this major. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

#### Remarks

Major Title Major in Physics

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

The Major in Physics aims to provide students with a solid foundation on the subject. Core courses form the blocks of fundamental knowledge to pursue learning in specializations, e.g. quantum mechanics, statistical mechanics, classical mechanics and electrodynamics. A large selection of elective courses is provided for students to pursue a wide range of topics from the very small scale (i.e. subatomic particles) to the large scale (i.e. cosmology). Students will attain professional knowledge in physics, research experience and the training of analytical thinking and quantitative reasoning during their studies. Graduates are expected to have acquired the broad training which can equip them well for further studies in multiple science and technology disciplines and to work in their specialized area.

# Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with their professional knowledge (by means of coursework and tutorial classes in the curriculum)
- PLO 2: have developed their scientific intuition, abilities and techniques to tackle problems either theoretical or experimental in nature (by means of coursework, tutorial classes and laboratory works in the curriculum)
- PLO 3: analyze problems qualitatively and quantitatively, and appraise the related ethical issues (by means of coursework, tutorial classes and research-based projects in the curriculum)
- PLO 4: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)
- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-world setting (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

### Impermissible Combinations:

Major in Mathematics/Physics

Minor in Physics

#### Required courses (96 credits)

#### 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) Fundamentals of modern science (6) **SCNC1112** 

**Disciplinary Core Courses (36 credits)** 

PHYS1150 Problem solving in physics (6) PHYS1250 Fundamental physics (6) **PHYS2250** Introductory mechanics (6)

Introductory electricity and magnetism (6) **PHYS2255** 

Heat and waves (6) PHYS2260

**PHYS2265** Introductory quantum physics (6) [previous title: Modern physics (6)]

# 2. Advanced level courses (42 credits)

**Disciplinary Core Courses (24 credits)** 

Classical mechanics (6) PHYS3350 Quantum mechanics (6) PHYS3351 **PHYS3450** Electromagnetism (6)

Statistical mechanics & thermodynamics (6) PHYS3550

Theoretical physics (6)

# **Disciplinary Electives (18 credits)**

At least 18 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current list includes courses in List A and those courses not selected to fulfill the capstone requirements.

List A

PHYS3150 PHYS3551 Introductory solid state physics (6) PHYS3650 Observational astronomy (6) The physical universe (6) PHYS3651 Principles of astronomy (6) PHYS3652 Laser and spectroscopy (6) PHYS3750 PHYS3751 Physics of nanomaterials (6)

**PHYS3850** Physical Optics (6) [previous title: Waves and optics

(6)]

PHYS3851 Atomic and nuclear physics (6) PHYS4150 Computational physics (6)

Data analysis and modeling in physics (6) PHYS4151 Advanced classical mechanics (6) PHYS4350 PHYS4351 Advanced quantum mechanics (6) **PHYS4450** Advanced electromagnetism (6) PHYS4550 Advanced statistical mechanics (6)

PHYS4551 Solid state physics (6) Stellar physics (6) PHYS4650

PHYS4651 Selected topics in astrophysics (6)

PHYS4652 Planetary science (6) **PHYS4653** Cosmology (6)

PHYS4654	General relativity (6)
PHYS4655	Interstellar medium (6)
PHYS4750	Experimental physics (6)
PHYS4850	Particle physics (6)

PHYS7350 Graduate classical mechanics (6)
PHYS7351 Graduate quantum mechanics (6)
PHYS7450 Graduate electromagnetism (6)
PHYS7550 Graduate statistical mechanics (6)
PHYS7551 Graduate solid state physics (6)
PHYS7650 Stellar atmospheres (6)
PHYS7750 Nanophysics (6)

#### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:
PHYS3999 Directed studies in physics (6)
PHYS4966 Physics internship (6)
PHYS4999 Physics project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 5. Students must have level 3 or above in HKDSE Physics or equivalent to take this major. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

#### Remarks:

Major Title Major in Physics

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

The Major in Physics aims to provide students with a solid foundation on the subject. Core courses form the blocks of fundamental knowledge to pursue learning in specializations, e.g. quantum mechanics, statistical mechanics, classical mechanics and electrodynamics. A large selection of elective courses is provided for students to pursue a wide range of topics from the very small scale (i.e. subatomic particles) to the large scale (i.e. cosmology). Students will attain professional knowledge in physics, research experience and the training of analytical thinking and quantitative reasoning during their studies. Graduates are expected to have acquired the broad training which can equip them well for further studies in multiple science and technology disciplines and to work in their specialized area.

# Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with their professional knowledge (by means of coursework and tutorial classes in the curriculum)
- PLO 2: have developed their scientific intuition, abilities and techniques to tackle problems either theoretical or experimental in nature (by means of coursework, tutorial classes and laboratory works in the curriculum)
- PLO 3: analyze problems qualitatively and quantitatively, and appraise the related ethical issues (by means of coursework, tutorial classes and research-based projects in the curriculum)
- PLO 4: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)
- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-world setting (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

# Impermissible Combinations:

Major in Mathematics/Physics

Minor in Physics

#### Required courses (96 credits)

# 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (36 credits)** 

PHYS1150 Problem solving in physics (6)
PHYS1250 Fundamental physics (6)
PHYS2250 Introductory mechanics (6)

PHYS2255 Introductory electricity and magnetism (6)

PHYS2260 Heat and waves (6)

PHYS2265 Introductory quantum physics (6) [previous title: Modern physics (6)]

# 2. Advanced level courses (42 credits)

**Disciplinary Core Courses (24 credits)** 

PHYS3350 Classical mechanics (6) PHYS3351 Quantum mechanics (6) PHYS3450 Electromagnetism (6)

PHYS3550 Statistical mechanics & thermodynamics (6)

Theoretical physics (6)

# **Disciplinary Electives (18 credits)**

At least 18 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current list includes courses in List A and those courses not selected to fulfill the capstone requirements.

List A PHYS3150

PHYS3551 Introductory solid state physics (6)
PHYS3650 Observational astronomy (6)
PHYS3651 The physical universe (6)
PHYS3652 Principles of astronomy (6)
PHYS3750 Laser and spectroscopy (6)
PHYS3751 Physics of nanomaterials (6)

PHYS3850 Physical Optics (6) [previous title: Waves and optics

(6)]

PHYS3851 Atomic and nuclear physics (6)
PHYS4150 Computational physics (6)

PHYS4151 Data analysis and modeling in physics (6)
PHYS4350 Advanced classical mechanics (6)
PHYS4351 Advanced quantum mechanics (6)
PHYS4450 Advanced electromagnetism (6)
PHYS4550 Advanced statistical mechanics (6)

PHYS4551 Solid state physics (6) PHYS4650 Stellar physics (6)

PHYS4651 Selected topics in astrophysics (6)

PHYS4652 Planetary science (6) PHYS4653 Cosmology (6)

PHYS4654	General relativity (6)
PHYS4655	Interstellar medium (6)
PHYS4750	Experimental physics (6)
PHYS4850	Particle physics (6)

PHYS7350 Graduate classical mechanics (6)
PHYS7351 Graduate quantum mechanics (6)
PHYS7450 Graduate electromagnetism (6)
PHYS7550 Graduate statistical mechanics (6)
PHYS7551 Graduate solid state physics (6)
PHYS7650 Stellar atmospheres (6)
PHYS7750 Nanophysics (6)

#### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:
PHYS3999 Directed studies in physics (6)
PHYS4966 Physics internship (6)
PHYS4999 Physics project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 5. Students must have level 3 or above in HKDSE Physics or equivalent to take this major. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

#### Remarks

Major Title Major in Physics

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

The Major in Physics aims to provide students with a solid foundation on the subject. Core courses form the blocks of fundamental knowledge to pursue learning in specializations, e.g. quantum mechanics, statistical mechanics, classical mechanics and electrodynamics. A large selection of elective courses is provided for students to pursue a wide range of topics from the very small scale (i.e. subatomic particles) to the large scale (i.e. cosmology). Students will attain professional knowledge in physics, research experience and the training of analytical thinking and quantitative reasoning during their studies. Graduates are expected to have acquired the broad training which can equip them well for further studies in multiple science and technology disciplines and to work in their specialized area.

# Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with their professional knowledge (by means of coursework and tutorial classes in the curriculum)
- PLO 2: have developed their scientific intuition, abilities and techniques to tackle problems either theoretical or experimental in nature (by means of coursework, tutorial classes and laboratory works in the curriculum)
- PLO 3: analyze problems qualitatively and quantitatively, and appraise the related ethical issues (by means of coursework, tutorial classes and research-based projects in the curriculum)
- PLO 4: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)
- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-world setting (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

# Impermissible Combinations:

Major in Mathematics/Physics

Minor in Physics

#### Required courses (96 credits)

# 1. Introductory level courses (48 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) Fundamentals of modern science (6)

**SCNC1112** 

**Disciplinary Core Courses (36 credits)** 

PHYS1150 Problem solving in physics (6) PHYS1250 Fundamental physics (6) PHYS2250 Introductory mechanics (6)

Introductory electricity and magnetism (6) **PHYS2255** 

Heat and waves (6) PHYS2260

**PHYS2265** Introductory quantum physics (6) [previous title: Modern physics (6)]

# 2. Advanced level courses (42 credits)

**Disciplinary Core Courses (24 credits)** 

Classical mechanics (6) PHYS3350 Quantum mechanics (6) PHYS3351 **PHYS3450** Electromagnetism (6)

Statistical mechanics & thermodynamics (6) PHYS3550

# **Disciplinary Electives (18 credits)**

At least 18 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current list includes courses in List A and those courses not selected to fulfill the capstone requirements.

List	Α
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PHYS3150 Theoretical physics (6) PHYS3551 Introductory solid state physics (6) **PHYS3650** Observational astronomy (6) The physical universe (6) PHYS3651 Principles of astronomy (6) PHYS3652 Laser and spectroscopy (6) PHYS3750 PHYS3751 Physics of nanomaterials (6)

**PHYS3850** Physical Optics (6) [previous title: Waves and optics (6)]

PHYS3851 Atomic and nuclear physics (6) PHYS4150 Computational physics (6)

Data analysis and modeling in physics (6) PHYS4151 Advanced classical mechanics (6) PHYS4350 PHYS4351 Advanced quantum mechanics (6) **PHYS4450** Advanced electromagnetism (6) PHYS4550 Advanced statistical mechanics (6)

PHYS4551 Solid state physics (6) Stellar physics (6) PHYS4650

PHYS4651 Selected topics in astrophysics (6)

PHYS4652 Planetary science (6) Cosmology (6) **PHYS4653** 

PHYS4654	General relativity (6)
PHYS4655	Interstellar medium (6)
PHYS4750	Experimental physics (6)
PHYS4850	Particle physics (6)

PHYS7350 Graduate classical mechanics (6)
PHYS7351 Graduate quantum mechanics (6)
PHYS7450 Graduate electromagnetism (6)
PHYS7550 Graduate statistical mechanics (6)
PHYS7551 Graduate solid state physics (6)
PHYS7650 Stellar atmospheres (6)
PHYS7750 Nanophysics (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:
PHYS3999 Directed studies in physics (6)
PHYS4966 Physics internship (6)
PHYS4999 Physics project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Capstone requirement for BEd&BSc degree students is different. Students are required to take an additional 6-credit advanced level course (disciplinary electives) in the major to replace the capstone requirement of this Major. Students should consult the Faculty of Education for details.
- 5. Students must have level 3 or above in HKDSE Physics or equivalent to take this major. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

#### Remarks

Major Title Major in Physics (Intensive)

Offered to students 2021

admitted to Year 1 in

#### **Objectives:**

The Major in Physics (Intensive) aims to provide students with a solid foundation on the subject in breadth and depth. It covers a wide range of core areas which provides the intensive preparation to pursue learning in specializations, e.g. quantum mechanics, statistical mechanics, classical mechanics and electrodynamics. A large selection of elective courses is provided for students to pursue a wide range of topics from the very small scale (i.e. subatomic particles) to the large scale (i.e. cosmology). Students will attain professional knowledge and competencies in physics and research experience plus the training of analytical thinking, quantitative reasoning, and problem solving methods during their studies. Graduates are expected to be well-prepared for further studies in physics and related disciplines and to pursue careers in scientific or technical fields.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with their professional knowledge (by means of coursework and tutorial classes in the curriculum)
- PLO 2: have developed their scientific intuition, abilities and techniques to tackle problems either theoretical or experimental in nature (by means of coursework, tutorial classes and laboratory works in the curriculum)
- PLO 3: analyze problems qualitatively and quantitatively based on a broad foundation of theoretical and experimental knowledge in physics, and appraise the related ethical issues (by means of coursework, tutorial classes and research-based projects in the curriculum)
- PLO 4: communicate and collaborate with people of different background, culture, gender and nationality effectively in scientific issues (by means of group project, tutorial session, presentation, exchange, internship and capstone opportunities in the curriculum)
- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-world setting in an advanced level which can position them to pursue postgraduate studies in scientific and technical fields (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

#### Impermissible Combinations:

Major in Physics Minor in Physics

Required	courses	(144 cre	edits)
1. Introdu	ictory leve	el course	s (72 credit

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) (Note 1)
SCNC1112 Fundamentals of modern science (6) (Note 1)

**Disciplinary Core Courses (48 credits)** 

PHYS1150 Problem solving in physics (6)
PHYS2055 Introductory relativity (6)
PHYS2150 Methods in physics I (6)
PHYS2155 Methods in physics II (6)
PHYS2250 Introductory mechanics (6)

PHYS2250 Introductory mechanics (6) (Note 1)
PHYS2255 Introductory electricity and magnetism (6) (Note 1)
PHYS2261 Introductory heat and thermodynamics (6) (Note 1)
PHYS2265 Introductory quantum physics (6) (Note 1)

**Disciplinary Electives (12 credits)** 

At least 12 credits selected from the following courses:

COMP1117 Computer programming (6)
MATH1013 University mathematics II (6)
PHYS1650 Nature of the universe (6)

PHYS2160 Introductory computational physics (6)

PHYS2650 Modern astronomy (6) STAT1603 Introductory statistics (6)

2. Advanced level courses (60 credits)

Disciplinary Core Courses (36 credits)

PHYS3150 Theoretical physics (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)
PHYS3450 Electromagnetism (6)

PHYS3550 Statistical mechanics & thermodynamics (6)

PHYS3760 Physics laboratory (6)

**Disciplinary Electives (24 credits)** 

All 24 credits should be advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current list includes courses in List A and those courses not selected to fulfill the capstone requirements.

List A

PHYS3151 Machine learning in physics (6)
PHYS3650 Observational astronomy (6)
PHYS3653 Astrophysics (6)
PHYS3660 Astronomy laboratory (6)

PHYS3660 Astronomy laboratory (6)
PHYS3750 Laser and spectroscopy (6)

PHYS3850	Physical Optics (6)
PHYS3851	Atomic and nuclear physics (6)
PHYS4150	Computational physics (6)
PHYS4151	Data analysis and modeling in physics (6)
PHYS4351	Advanced quantum mechanics (6)
PHYS4450	Advanced electromagnetism (6)
PHYS4550	Advanced statistical mechanics (6)
PHYS4551	Solid state physics (6)
PHYS4650	Stellar physics (6)
PHYS4652	Planetary science (6)
PHYS4653	Cosmology (6)
PHYS4654	General relativity (6)
PHYS4655	Interstellar medium (6)
PHYS4656	Advanced astrophysics (6)
PHYS4850	Particle physics (6)
PHYS7350	Graduate classical mechanics (6)
PHYS7351	Graduate quantum mechanics (6)
PHYS7450	Graduate electromagnetism (6)
PHYS7550	Graduate statistical mechanics (6)
PHYS7750	Nanophysics (6)
3. Capstone requirement (12 credits)	
At least 12 credits selected from the	following courses:
PHYS3999	Directed studies in physics (6)
PHYS4966	Physics internship (6)

# Notes:

PHYS4999

- 1. These are core courses in the regular Physics-Major (96 credits) curriculum.
- 2. Students are strongly advised to consult departmental course selection advisors for course and career planning before selecting the courses.

Physics project (12)

- 3. Students must have level 3 or above in HKDSE Physics or equivalent to take this major. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.
- 4. Those who want to specialize in the astrophysics theme should pass any three of the following courses: PHYS3650 Observational astronomy, PHYS3653 Astrophysics, PHYS3660 Astronomy laboratory, PHYS4652 Planetary science, PHYS4653 Cosmology, PHYS4654 General relativity, PHYS4655 Interstellar medium, and PHYS4656 Advanced astrophysics, out of which at least one must be a 4000+ level course, as well as passing either PHYS3999 Directed studies in physics or PHYS4999 Physics project with topics of study in astrophysics.
- 5. Those who want to specialize in the computational physics theme should pass any three of the following courses: PHYS3150 Theoretical physics, PHYS3151 Machine learning in physics, PHYS4150 Computational physics, and PHYS4151 Data analysis and modeling in physics out of which at least one must be a 4000+ level course, as well as passing either PHYS3999 Directed studies in physics or PHYS4999 Physics project with topics of study in computational physics.
- 6. Those who want to specialize in the experimental physics theme should pass PHYS3760 Physics laboratory, plus any two of the following courses: PHYS3660 Astronomy laboratory, PHYS3750 Laser and spectroscopy, PHYS3850 Physical optics, PHYS3851 Atomic and nuclear physics, PHYS4151 Data analysis and modeling in physics, PHYS4551 Solid state physics, and PHYS4850 Particle physics out of which at least one must be a 4000+ level course, as well as passing either PHYS3999 Directed studies in physics or PHYS4999 Physics project with topics of study in experimental physics.
- 7. Those who want to specialize in the theoretical physics theme should pass any four of the following courses: PHYS3150 Theoretical physics, PHYS3350 Classical mechanics, PHYS3351 Quantum mechanics, PHYS3450 Electromagnetism, PHYS3550 Statistical mechanics & thermodynamics, PHYS4351 Advanced quantum mechanics, PHYS4450 Advanced electromagnetism, PHYS4551 Solid state physics, PHYS4654 General relativity, PHYS4850 Particle physics, PHYS7351 Graduate quantum mechanics, PHYS7450 Graduate electromagnetism, PHYS7550 Graduate statistical mechanics out of which at least two must be 4000+ level courses, as well as passing either PHYS3999 Directed studies in physics or PHYS4999 Physics project with topics of study in theoretical physics.
- 8. Upon prior approval, one may use PHYS4966 Physics internship to replace PHYS3999 Directed studies or PHYS4999 Physics project to fulfill the specialization in a theme.
- 9. No double counting is allowed if one wants to specialize in more than one theme. In this case, one is allowed to replace the PHYS3999 Directed studies in physics or PHYS4999 Physics project requirement in one of the theme specializations by a regular course in the same theme of specialization.
- 10. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis
- 11. Candidates who have been admitted to Year 1 in 2021-22 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1112. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Biology, Chemistry, and Physics in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Biology, Chemistry, and Physics Higher Level in International Baccalaureate (IB)
   Grade B or above in Biology, Chemistry, and Physics in General Certificate of Education Advanced Level (GCEAL)
- Biology, Chemistry, and Physics qualification in Gao Kao will be considered on a case-by-case basis

#### Remarks:

(Note 1)

(Note 1)

(Note 1)

(Note 1)

Major Title Major in Physics (Intensive)

Offered to students 2020

admitted to Year 1 in

#### **Objectives:**

The Major in Physics (Intensive) aims to provide students with a solid foundation on the subject in breadth and depth. It covers a wide range of core areas which provides the intensive preparation to pursue learning in specializations, e.g. quantum mechanics, statistical mechanics, classical mechanics and electrodynamics. A large selection of elective courses is provided for students to pursue a wide range of topics from the very small scale (i.e. subatomic particles) to the large scale (i.e. cosmology). Students will attain professional knowledge and competencies in physics and research experience plus the training of analytical thinking, quantitative reasoning, and problem solving methods during their studies. Graduates are expected to be well-prepared for further studies in physics and related disciplines and to pursue careers in scientific or technical fields.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with their professional knowledge (by means of coursework and tutorial classes in the curriculum)
- PLO 2: have developed their scientific intuition, abilities and techniques to tackle problems either theoretical or experimental in nature (by means of coursework, tutorial classes and laboratory works in the curriculum)
- PLO 3: analyze problems qualitatively and quantitatively based on a broad foundation of theoretical and experimental knowledge in physics, and appraise the related ethical issues (by means of coursework, tutorial classes and research-based projects in the curriculum)
- PLO 4: communicate and collaborate with people of different background, culture, gender and nationality effectively in scientific issues (by means of group project, tutorial session, presentation, exchange, internship and capstone opportunities in the curriculum)
- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-world setting in an advanced level which can position them to pursue postgraduate studies in scientific and technical fields (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

#### Impermissible Combinations:

Major in Physics Minor in Physics

Required	courses	(144	credits)	
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# 1. Introductory level courses (72 credits)

Disciplinary Core Courses: S	Science Foundation Courses (12 credits)	
SCNC1111	Scientific method and reasoning (6)	

SCNC1111 Scientific method and reasoning (6) (Note 1)
SCNC1112 Fundamentals of modern science (6) (Note 1)

Disciplinary Core Courses (48 credits)
PHYS1150 Problem solving in physics (6)

PHYS2055 Introductory relativity (6)
PHYS2150 Methods in physics I (6)
PHYS2155 Methods in physics II (6)
PHYS2250 Introductory mechanics (6)
PHYS2255 Introductory electricity and magnetism (6)
PHYS2261 Introductory heat and thermodynamics (6)
PHYS2265 Introductory quantum physics (6)

**Disciplinary Electives (12 credits)** 

At least 12 credits selected from the following courses: COMP1117 Computer programm

COMP1117 Computer programming (6)
MATH1013 University mathematics II (6)
PHYS1650 Nature of the universe (6)

PHYS2160 Introductory computational physics (6)

PHYS2650 Modern astronomy (6) STAT1603 Introductory statistics (6)

# 2. Advanced level courses (60 credits)

**Disciplinary Core Courses (36 credits)** 

PHYS3150 Theoretical physics (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)
PHYS3450 Electromagnetism (6)

PHYS3550 Statistical mechanics & thermodynamics (6)

PHYS3760 Physics laboratory (6)

# **Disciplinary Electives (24 credits)**

All 24 credits should be advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current list includes courses in List A and those courses not selected to fulfill the capstone requirements.

List A

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PHYS3650 Observational astronomy (6)
PHYS3653 Astrophysics (6)
PHYS3660 Astronomy laboratory (6)
PHYS3750 Laser and spectroscopy (6)

PHYS3850	Physical Optics (6)
PHYS3851	Atomic and nuclear physics (6)
PHYS4150	Computational physics (6)
PHYS4151	Data analysis and modeling in physics (6)
PHYS4351	Advanced quantum mechanics (6)
PHYS4450	Advanced electromagnetism (6)
PHYS4550	Advanced statistical mechanics (6)
PHYS4551	Solid state physics (6)
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PHYS7550	Graduate statistical mechanics (6)
PHYS7750	Nanophysics (6)
3. Capstone requirement (12 credits	)
At least 12 credits selected from the	following courses:
PHYS3999	Directed studies in physics (6)
PHYS4966	Physics internship (6)

Physics project (12)

# Notes:

**PHYS4999** 

- 1. These are core courses in the regular Physics-Major (96 credits) curriculum.
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- Mathematics qualification in Gao Kao will be considered on a case-by-case basis

#### Remarks:

Major Title Major in Physics (Intensive)

Offered to students 2019

admitted to Year 1 in

#### **Objectives:**

The Major in Physics (Intensive) aims to provide students with a solid foundation on the subject in breadth and depth. It covers a wide range of core areas which provides the intensive preparation to pursue learning in specializations, e.g. quantum mechanics, statistical mechanics, classical mechanics and electrodynamics. A large selection of elective courses is provided for students to pursue a wide range of topics from the very small scale (i.e. subatomic particles) to the large scale (i.e. cosmology). Students will attain professional knowledge and competencies in physics and research experience plus the training of analytical thinking, quantitative reasoning, and problem solving methods during their studies. Graduates are expected to be well-prepared for further studies in physics and related disciplines and to pursue careers in scientific or technical fields.

# Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with their professional knowledge (by means of coursework and tutorial classes in the curriculum)
- PLO 2: have developed their scientific intuition, abilities and techniques to tackle problems either theoretical or experimental in nature (by means of coursework, tutorial classes and laboratory works in the curriculum)
- PLO 3: analyze problems qualitatively and quantitatively based on a broad foundation of theoretical and experimental knowledge in physics, and appraise the related ethical issues (by means of coursework, tutorial classes and research-based projects in the curriculum)
- PLO 4: communicate and collaborate with people of different background, culture, gender and nationality effectively in scientific issues (by means of group project, tutorial session, presentation, exchange, internship and capstone opportunities in the curriculum)
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#### Impermissible Combinations:

Major in Physics Minor in Physics

Required	COLIFCAS	(144	credite)

#### 1. Introductory level courses (72 credits)

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SCNC1111 Scientific method and reasoning (6) (Note 1)
SCNC1112 Fundamentals of modern science (6) (Note 1)

**Disciplinary Core Courses (48 credits)** 

Problem solving in physics (6) PHYS1150 Introductory relativity (6) PHYS2055 Methods in physics I (6) PHYS2150 **PHYS2155** Methods in physics II (6) Introductory mechanics (6) (Note 1) PHYS2250 Introductory electricity and magnetism (6) (Note 1) **PHYS2255** Introductory heat and thermodynamics (6) (Note 1) PHYS2261 **PHYS2265** Introductory quantum physics (6) (Note 1)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

COMP1117 Computer programming (6)

MATH1013 University mathematics II (6)

PHYS1650 Nature of the universe (6)

PHYS2160 Introductory computational physics (6)

PHYS2650 Modern astronomy (6) STAT1603 Introductory statistics (6)

# 2. Advanced level courses (60 credits)

**Disciplinary Core Courses (36 credits)** 

PHYS3150 Theoretical physics (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)
PHYS3450 Electromagnetism (6)

PHYS3550 Statistical mechanics & thermodynamics (6)

PHYS3760 Physics laboratory (6)

# **Disciplinary Electives (24 credits)**

All 24 credits should be advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current list includes courses in List A and those courses not selected to fulfill the capstone requirements.

List A

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PHYS3650 Observational astronomy (6)
PHYS3653 Astrophysics (6)
PHYS3660 Astronomy laboratory (6)
PHYS3750 Laser and spectroscopy (6)

PHYS3850	Physical Optics (6)	[previous title: Waves and optics (6)]
PHYS3851	Atomic and nuclear physics (6)	(-/)
PHYS4150	Computational physics (6)	
PHYS4151	Data analysis and modeling in physics (6)	
PHYS4351	Advanced quantum mechanics (6)	
PHYS4450	Advanced electromagnetism (6)	
PHYS4550	Advanced statistical mechanics (6)	
PHYS4551	Solid state physics (6)	
PHYS4650	Stellar physics (6)	
PHYS4652	Planetary science (6)	
PHYS4653	Cosmology (6)	
PHYS4654	General relativity (6)	
PHYS4655	Interstellar medium (6)	
PHYS4656	Advanced astrophysics (6)	
PHYS4850	Particle physics (6)	
PHYS7350	Graduate classical mechanics (6)	
PHYS7351	Graduate quantum mechanics (6)	
PHYS7450	Graduate electromagnetism (6)	
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PHYS7750	Nanophysics (6)	
3. Capstone requirement	ent (12 credits)	
At least 12 credits se	elected from the following courses:	
PHYS3999	Directed studies in physics (6)	
PHYS4966	Physics internship (6)	
PHYS4999	Physics project (12)	

#### Notes:

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- 5. Those who want to specialize in the computational physics theme should pass any three of the following courses: PHYS3150 Theoretical physics, PHYS3151 Machine learning in physics, PHYS4150 Computational physics, and PHYS4151 Data analysis and modeling in physics out of which at least one must be a 4000+ level course, as well as passing either PHYS3999 Directed studies in physics or PHYS4999 Physics project with topics of study in computational physics.
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#### Remarks

Major Title Major in Physics (Intensive)

Offered to students 2018

admitted to Year 1 in

#### **Objectives:**

The Major in Physics (Intensive) aims to provide students with a solid foundation on the subject in breadth and depth. It covers a wide range of core areas which provides the intensive preparation to pursue learning in specializations, e.g. quantum mechanics, statistical mechanics, classical mechanics and electrodynamics. A large selection of elective courses is provided for students to pursue a wide range of topics from the very small scale (i.e. subatomic particles) to the large scale (i.e. cosmology). Students will attain professional knowledge and competencies in physics and research experience plus the training of analytical thinking, quantitative reasoning, and problem solving methods during their studies. Graduates are expected to be well-prepared for further studies in physics and related disciplines and to pursue careers in scientific or technical fields.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with their professional knowledge (by means of coursework and tutorial classes in the curriculum)
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#### Impermissible Combinations:

Major in Physics Minor in Physics

Required	courses	(144	credits)

#### 1. Introductory level courses (72 credits)

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**Disciplinary Core Courses (48 credits)** 

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At least 12 credits selected from the following courses:

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# 2. Advanced level courses (60 credits)

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PHYS3760 Physics laboratory (6)

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	PHYS4151	Data analysis and modeling in physics (6)	
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#### Remarks

Major Title Major in Physics (Intensive)

Offered to students 2017

admitted to Year 1 in

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By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with their professional knowledge (by means of coursework and tutorial classes in the curriculum)
- PLO 2: have developed their scientific intuition, abilities and techniques to tackle problems either theoretical or experimental in nature (by means of coursework, tutorial classes and laboratory works in the curriculum)
- PLO 3: analyze problems qualitatively and quantitatively based on a broad foundation of theoretical and experimental knowledge in physics, and appraise the related ethical issues (by means of coursework, tutorial classes and research-based projects in the curriculum)
- PLO 4: communicate and collaborate with people of different background, culture, gender and nationality effectively in scientific issues (by means of group project, tutorial session, presentation, exchange, internship and capstone opportunities in the curriculum)
- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-world setting in an advanced level which can position them to pursue postgraduate studies in scientific and technical fields (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

(Note 1)

(Note 1)

# Impermissible Combinations:

Major in Physics Minor in Physics

Required courses (14	14 credits)		
1. Introductory level courses (72 credits)			
Disciplinary Core Cou	rses: Science Foundation Courses (12 credits)		
SCNC1111	Scientific method and reasoning (6)	(Note 1)	

SCNC1112 Fundamentals of modern science (6)

Disciplinary Core Courses (48 credits)
PHYS1150
PHYS2055
PHYS2055
PHYS2055
Problem solving in physics (6)

PHYS2150 Methods in physics I (6)
PHYS2155 Methods in physics II (6)
PHYS2250 Introductory mechanics (6)

PHYS2255 Introductory electricity and magnetism (6) (Note 1)
PHYS2261 Introductory heat and thermodynamics (6)
PHYS2265 Introductory quantum physics (6) (Note 1)

**Disciplinary Electives (12 credits)** 

At least 12 credits selected from the following courses:

COMP1117 Computer programming (6)

MATH1013 University mathematics II (6)

PHYS1650 Nature of the universe (6)

PHYS2160 Introductory computational physics (6)

PHYS2650 Modern astronomy (6) STAT1603 Introductory statistics (6)

2. Advanced level courses (60 credits)

**Disciplinary Core Courses (36 credits)** 

 PHYS3150
 Theoretical physics (6)

 PHYS3350
 Classical mechanics (6)
 (Note 1)

 PHYS3351
 Quantum mechanics (6)
 (Note 1)

 PHYS3450
 Electromagnetism (6)
 (Note 1)

 PHYS3550
 Statistical mechanics & thermodynamics (6)
 (Note 1)

PHYS3760 Physics laboratory (6)

# **Disciplinary Electives (24 credits)**

All 24 credits should be advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current list includes courses in List A and those courses not selected to fulfill the capstone requirements.

List A

PHYS3151 Machine learning in physics (6)
PHYS3650 Observational astronomy (6)
PHYS3653 Astrophysics (6)
PHYS3660 Astronomy laboratory (6)
PHYS3750 Laser and spectroscopy (6)

	PHYS3850	Physical Optics (6)	[previous title: Waves and optics (6)]	
	PHYS3851	Atomic and nuclear physics (6)	(6)1	
	PHYS4150	Computational physics (6)		
	PHYS4151	Data analysis and modeling in physics (6)		
	PHYS4351	Advanced quantum mechanics (6)		
	PHYS4450	Advanced electromagnetism (6)		
	PHYS4550	Advanced statistical mechanics (6)		
	PHYS4551	Solid state physics (6)		
	PHYS4650	Stellar physics (6)		
	PHYS4652	Planetary science (6)		
	PHYS4653	Cosmology (6)		
	PHYS4654	General relativity (6)		
	PHYS4655	Interstellar medium (6)		
	PHYS4656	Advanced astrophysics (6)		
	PHYS4850	Particle physics (6)		
	PHYS7350	Graduate classical mechanics (6)		
	PHYS7351	Graduate quantum mechanics (6)		
	PHYS7450	Graduate electromagnetism (6)		
	PHYS7550	Graduate statistical mechanics (6)		
	PHYS7750	Nanophysics (6)		
3. Capstone requirement (12 credits)				
	At least 12 credits sel	ected from the following courses:		
	PHYS3999	Directed studies in physics (6)		
	PHYS4966	Physics internship (6)		
	PHYS4999	Physics project (12)		
П				

#### Notes:

- 1. These are core courses in the regular Physics-Major (96 credits) curriculum.
- 2. Students are strongly advised to consult departmental course selection advisors for course and career planning before selecting the courses.
- 3. Students must have level 3 or above in HKDSE Physics or equivalent to take this major. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.
- 4. Those who want to specialize in the astrophysics theme should pass any three of the following courses: PHYS3650 Observational astronomy, PHYS3653 Astrophysics, PHYS3660 Astronomy laboratory, PHYS4652 Planetary science, PHYS4653 Cosmology, PHYS4654 General relativity, PHYS4655 Interstellar medium, and PHYS4656 Advanced astrophysics, out of which at least one must be a 4000+ level course, as well as passing either PHYS3999 Directed studies in physics or PHYS4999 Physics project with topics of study in astrophysics.
- 5. Those who want to specialize in the computational physics theme should pass any three of the following courses: PHYS3150 Theoretical physics, PHYS3151 Machine learning in physics, PHYS4150 Computational physics, and PHYS4151 Data analysis and modeling in physics out of which at least one must be a 4000+ level course, as well as passing either PHYS3999 Directed studies in physics or PHYS4999 Physics project with topics of study in computational physics.
- 6. Those who want to specialize in the experimental physics theme should pass PHYS3760 Physics laboratory, plus any two of the following courses: PHYS3660 Astronomy laboratory, PHYS3750 Laser and spectroscopy, PHYS3850 Physical optics, PHYS3851 Atomic and nuclear physics, PHYS4151 Data analysis and modeling in physics, PHYS4551 Solid state physics, and PHYS4850 Particle physics out of which at least one must be a 4000+ level course, as well as passing either PHYS3999 Directed studies in physics or PHYS4999 Physics project with topics of study in experimental physics.
- 7. Those who want to specialize in the theoretical physics theme should pass any four of the following courses: PHYS3150 Theoretical physics, PHYS3350 Classical mechanics, PHYS3351 Quantum mechanics, PHYS3450 Electromagnetism, PHYS4550 Statistical mechanics & thermodynamics, PHYS4351 Advanced quantum mechanics, PHYS4450 Advanced electromagnetism, PHYS4551 Solid state physics, PHYS4654 General relativity, PHYS4850 Particle physics, PHYS7351 Graduate quantum mechanics, PHYS7450 Graduate electromagnetism, PHYS7550 Graduate statistical mechanics out of which at least two must be 4000+ level courses, as well as passing either PHYS3999 Directed studies in physics or PHYS4999 Physics project with topics of study in theoretical physics.
- 8. Upon prior approval, one may use PHYS4966 Physics internship to replace PHYS3999 Directed studies or PHYS4999 Physics project to fulfill the specialization in a theme.
- 9. No double counting is allowed if one wants to specialize in more than one theme. In this case, one is allowed to replace the PHYS3999 Directed studies in physics or PHYS4999 Physics project requirement in one of the theme specializations by a regular course in the same theme of specialization.

#### Remarks

Major Title Major in Physics (Intensive)

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

The Major in Physics (Intensive) aims to provide students with a solid foundation on the subject in breadth and depth. It covers a wide range of core areas which provides the intensive preparation to pursue learning in specializations, e.g. quantum mechanics, statistical mechanics, classical mechanics and electrodynamics. A large selection of elective courses is provided for students to pursue a wide range of topics from the very small scale (i.e. subatomic particles) to the large scale (i.e. cosmology). Students will attain professional knowledge and competencies in physics and research experience plus the training of analytical thinking, quantitative reasoning, and problem solving methods during their studies. Graduates are expected to be well-prepared for further studies in physics and related disciplines and to pursue careers in scientific or technical fields.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with their professional knowledge (by means of coursework and tutorial classes in the curriculum)
- PLO 2: have developed their scientific intuition, abilities and techniques to tackle problems either theoretical or experimental in nature (by means of coursework, tutorial classes and laboratory works in the curriculum)
- PLO 3: analyze problems qualitatively and quantitatively based on a broad foundation of theoretical and experimental knowledge in physics, and appraise the related ethical issues (by means of coursework, tutorial classes and research-based projects in the curriculum)
- PLO 4: communicate and collaborate with people of different background, culture, gender and nationality effectively in scientific issues (by means of group project, tutorial session, presentation, exchange, internship and capstone opportunities in the curriculum)
- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-world setting in an advanced level which can position them to pursue postgraduate studies in scientific and technical fields (by means of projects, directed studies, local and foreign internships attached to universities, research centers, government bodies, NGOs and influential companies)

#### Impermissible Combinations:

Major in Physics Minor in Physics

Required	courses	(144	credits)

Disciplinary Core Course	es: Science Foundation Courses (12 credits)	
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SCNC1111 Scientific method and reasoning (6) (Note 1)
SCNC1112 Fundamentals of modern science (6) (Note 1)

**Disciplinary Core Courses (48 credits)** 

Problem solving in physics (6) PHYS1150 Introductory relativity (6) PHYS2055 Methods in physics I (6) PHYS2150 **PHYS2155** Methods in physics II (6) Introductory mechanics (6) (Note 1) PHYS2250 Introductory electricity and magnetism (6) (Note 1) **PHYS2255** Introductory heat and thermodynamics (6) PHYS2261 **PHYS2265** Introductory quantum physics (6) (Note 1)

**Disciplinary Electives (12 credits)** 

At least 12 credits selected from the following courses:

COMP1117 Computer programming (6)

MATH1013 University mathematics II (6)

PHYS1650 University mathematics II (6)
Nature of the universe (6)

PHYS2160 Introductory computational physics (6)

Modern astronomy (6)

PHYS2650 Modern astronomy (6) STAT1603 Introductory statistics (6)

# 2. Advanced level courses (60 credits)

**Disciplinary Core Courses (36 credits)** 

 PHYS3150
 Theoretical physics (6)

 PHYS3350
 Classical mechanics (6)
 (Note 1)

 PHYS3351
 Quantum mechanics (6)
 (Note 1)

 PHYS3450
 Electromagnetism (6)
 (Note 1)

 PHYS3550
 Statistical mechanics & thermodynamics (6)
 (Note 1)

PHYS3760 Physics laboratory (6)

# **Disciplinary Electives (24 credits)**

All 24 credits should be advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current list includes courses in List A and those courses not selected to fulfill the capstone requirements.

List A

PHYS3151 Machine learning in physics (6)
PHYS3650 Observational astronomy (6)
PHYS3653 Astrophysics (6)
PHYS3660 Astronomy laboratory (6)
PHYS3750 Laser and spectroscopy (6)

	PHYS3850	Physical Optics (6)	[previous title: Waves and optics (6)]		
	PHYS3851	Atomic and nuclear physics (6)	(6)1		
	PHYS4150	Computational physics (6)			
	PHYS4151	Data analysis and modeling in physics (6)			
	PHYS4351	Advanced quantum mechanics (6)			
	PHYS4450	Advanced electromagnetism (6)			
	PHYS4550	Advanced statistical mechanics (6)			
	PHYS4551	Solid state physics (6)			
	PHYS4650	Stellar physics (6)			
	PHYS4652	Planetary science (6)			
	PHYS4653	Cosmology (6)			
	PHYS4654	General relativity (6)			
	PHYS4655	Interstellar medium (6)			
	PHYS4656	Advanced astrophysics (6)			
	PHYS4850	Particle physics (6)			
	PHYS7350	Graduate classical mechanics (6)			
	PHYS7351	Graduate quantum mechanics (6)			
	PHYS7450	Graduate electromagnetism (6)			
	PHYS7550	Graduate statistical mechanics (6)			
	PHYS7750	Nanophysics (6)			
3. Capstone requirement (12 credits)					
At least 12 credits selected from the following courses:					
	PHYS3999	Directed studies in physics (6)			
	PHYS4966	Physics internship (6)			
	PHYS4999	Physics project (12)			
П					

- 1. These are core courses in the regular Physics-Major (96 credits) curriculum.
- 2. Students are strongly advised to consult departmental course selection advisors for course and career planning before selecting the courses.
- 3. Students must have level 3 or above in HKDSE Physics or equivalent to take this major. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.
- 4. Those who want to specialize in the astrophysics theme should pass any three of the following courses: PHYS3650 Observational astronomy, PHYS3653 Astrophysics, PHYS3660 Astronomy laboratory, PHYS4652 Planetary science, PHYS4653 Cosmology, PHYS4654 General relativity, PHYS4655 Interstellar medium, and PHYS4656 Advanced astrophysics, out of which at least one must be a 4000+ level course, as well as passing either PHYS3999 Directed studies in physics or PHYS4999 Physics project with topics of study in astrophysics.
- 5. Those who want to specialize in the computational physics theme should pass any three of the following courses: PHYS3150 Theoretical physics, PHYS3151 Machine learning in physics, PHYS4150 Computational physics, and PHYS4151 Data analysis and modeling in physics out of which at least one must be a 4000+ level course, as well as passing either PHYS3999 Directed studies in physics or PHYS4999 Physics project with topics of study in computational physics.
- 6. Those who want to specialize in the experimental physics theme should pass PHYS3760 Physics laboratory, plus any two of the following courses: PHYS3660 Astronomy laboratory, PHYS3750 Laser and spectroscopy, PHYS3850 Physical optics, PHYS3851 Atomic and nuclear physics, PHYS4151 Data analysis and modeling in physics, PHYS4551 Solid state physics, and PHYS4850 Particle physics out of which at least one must be a 4000+ level course, as well as passing either PHYS3999 Directed studies in physics or PHYS4999 Physics project with topics of study in experimental physics.
- 7. Those who want to specialize in the theoretical physics theme should pass any four of the following courses: PHYS3150 Theoretical physics, PHYS3350 Classical mechanics, PHYS3351 Quantum mechanics, PHYS3450 Electromagnetism, PHYS4550 Statistical mechanics & thermodynamics, PHYS4351 Advanced quantum mechanics, PHYS4450 Advanced electromagnetism, PHYS4551 Solid state physics, PHYS4654 General relativity, PHYS4850 Particle physics, PHYS7351 Graduate quantum mechanics, PHYS7450 Graduate electromagnetism, PHYS7550 Graduate statistical mechanics out of which at least two must be 4000+ level courses, as well as passing either PHYS3999 Directed studies in physics or PHYS4999 Physics project with topics of study in theoretical physics.
- 8. Upon prior approval, one may use PHYS4966 Physics internship to replace PHYS3999 Directed studies or PHYS4999 Physics project to fulfill the specialization in a theme.
- 9. No double counting is allowed if one wants to specialize in more than one theme. In this case, one is allowed to replace the PHYS3999 Directed studies in physics or PHYS4999 Physics project requirement in one of the theme specializations by a regular course in the same theme of specialization.

### Remarks

Offered to students 2021

admitted to Year 1 in

### **Objectives:**

The Major in Risk Management aims to provide students with the skills and expertise in the theory and methodology behind the scientific process of risk management, with application to actuarial science, finance and other related areas of interest. It is designed to provide solid training in the concepts of the risk management process, statistical models and methods of risk management, and good risk management practice. Core courses in the curriculum emphasize fundamental concepts and nature of risk assessment, risk management and governance from different standpoints while elective courses provide either training in specific Risk Management disciplines or an extension of knowledge aiming to give students more modeling, technical and analytical skills in risk management, including data mining, stochastic calculus, and financial time series modeling.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and categorize the various risks faced by an organization and be able to demonstrate a critical understanding of generic risk management issues and techniques (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: analyze and assess risk management situations, and be able to deal with qualitative as well as quantitative aspects appropriate to the situation (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: critically evaluate and make effective use of models and techniques for risk assessment and management, and appraise the related ethical issues (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: make informed risk management decisions, employ any techniques necessary to acquire and interpret relevant data and information from different sources and the factors that influence their perceptions of risk identification, risk reduction, risk mitigation and risk transfer (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: communicate and collaborate with people effectively on risk management issues (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: gain insights into current advances in risk management through either project or industrial training (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Statistics

Minor in Risk Management

Minor in Statistics

# Required courses (96 credits)

## 1. Introductory level courses (42 credits)

**Disciplinary Core Courses: Science Foundation Courses (12 credits)** 

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

Disciplinary Core Courses (30 credits)

MATH1013 University mathematics II (6) STAT1600 Statistics: ideas and concepts (6)

MATH2014 Multivariable calculus and linear algebra (6)

STAT2601 Probability and statistics I (6) STAT2602 Probability and statistics II (6)

# 2. Advanced level courses (48 credits)

# **Disciplinary Core Courses (18 credits)**

STAT3600 Linear statistical analysis (6)
STAT3609 The statistics of investment risk (6)
STAT3615 Practical mathematics for investment (6)

# **Disciplinary Electives (30 credits)**

At least 30 credits selected from the following courses:

STAT3603 Stochastic processes (6)
STAT3610 Risk management and insurance (6)
STAT3612 Statistical machine learning (6)

STAT3618 Derivatives and risk management (6)
STAT3655 Survival analysis (6)
STAT3911 Financial economics II (6)
STAT4601 Time-series analysis (6)

STAT4603 Current topics in risk management (6)

STAT4606 Risk management and Basel Accords in banking and finance

(6)

STAT4607 Credit risk analysis (6)
STAT4608 Market risk analysis (6)

# 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses: STAT3799 Directed studies in statistics (6)

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6)

[previous title: Probability modelling (6)]

STAT4799 Statistics project (12)

#### Notes

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required (disciplinary core) by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses (disciplinary core) in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary elective) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary elective) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 5. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.
- 6. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis
- 7. Candidates who have been admitted to Year 1 in 2021-22 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1112. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Biology, Chemistry, and Physics in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Biology, Chemistry, and Physics Higher Level in International Baccalaureate (IB)
- Grade B or above in Biology, Chemistry, and Physics in General Certificate of Education Advanced Level (GCEAL)
- Biology, Chemistry, and Physics qualification in Gao Kao will be considered on a case-by-case basis

### Remarks:

Offered to students 2020

admitted to Year 1 in

### **Objectives:**

The Major in Risk Management aims to provide students with the skills and expertise in the theory and methodology behind the scientific process of risk management, with application to actuarial science, finance and other related areas of interest. It is designed to provide solid training in the concepts of the risk management process, statistical models and methods of risk management, and good risk management practice. Core courses in the curriculum emphasize fundamental concepts and nature of risk assessment, risk management and governance from different standpoints while elective courses provide either training in specific Risk Management disciplines or an extension of knowledge aiming to give students more modeling, technical and analytical skills in risk management, including data mining, stochastic calculus, and financial time series modeling.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and categorize the various risks faced by an organization and be able to demonstrate a critical understanding of generic risk management issues and techniques (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: analyze and assess risk management situations, and be able to deal with qualitative as well as quantitative aspects appropriate to the situation (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: critically evaluate and make effective use of models and techniques for risk assessment and management, and appraise the related ethical issues (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: make informed risk management decisions, employ any techniques necessary to acquire and interpret relevant data and information from different sources and the factors that influence their perceptions of risk identification, risk reduction, risk mitigation and risk transfer (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: communicate and collaborate with people effectively on risk management issues (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: gain insights into current advances in risk management through either project or industrial training (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Statistics

Minor in Risk Management

Minor in Statistics

# Required courses (96 credits)

## 1. Introductory level courses (42 credits)

**Disciplinary Core Courses: Science Foundation Courses (12 credits)** 

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

MATH1013 University mathematics II (6) STAT1600 Statistics: ideas and concepts (6)

MATH2014 Multivariable calculus and linear algebra (6)

STAT2601 Probability and statistics I (6) STAT2602 Probability and statistics II (6)

# 2. Advanced level courses (48 credits)

# **Disciplinary Core Courses (18 credits)**

STAT3600 Linear statistical analysis (6)
STAT3609 The statistics of investment risk (6)
STAT3615 Practical mathematics for investment (6)

# **Disciplinary Electives (30 credits)**

At least 30 credits selected from the following courses:

STAT3603 Stochastic processes (6)
STAT3610 Risk management and insurance (6)
STAT3612 Statistical machine learning (6)
STAT3618 Derivatives and risk management (6)

STAT3618 Derivatives and risk mana STAT3655 Survival analysis (6) STAT3911 Financial economics II (6) STAT4601 Time-series analysis (6)

STAT4603 Current topics in risk management (6)

STAT4606 Risk management and Basel Accords in banking and finance

(6)

STAT4607 Credit risk analysis (6)
STAT4608 Market risk analysis (6)

# 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses: STAT3799 Directed studies in statistics (6)

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6)

[previous title: Probability modelling (6)]

STAT4799 Statistics project (12)

#### Notes

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required (disciplinary core) by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses (disciplinary core) in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary elective) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary elective) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 5. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.
- 6. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis

#### Remarks:

Offered to students 2019

admitted to Year 1 in

### **Objectives:**

The Major in Risk Management aims to provide students with the skills and expertise in the theory and methodology behind the scientific process of risk management, with application to actuarial science, finance and other related areas of interest. It is designed to provide solid training in the concepts of the risk management process, statistical models and methods of risk management, and good risk management practice. Core courses in the curriculum emphasize fundamental concepts and nature of risk assessment, risk management and governance from different standpoints while elective courses provide either training in specific Risk Management disciplines or an extension of knowledge aiming to give students more modeling, technical and analytical skills in risk management, including data mining, stochastic calculus, and financial time series modeling.

# Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: identify and categorize the various risks faced by an organization and be able to demonstrate a critical understanding of generic risk management issues and techniques (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: analyze and assess risk management situations, and be able to deal with qualitative as well as quantitative aspects appropriate to the situation (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: critically evaluate and make effective use of models and techniques for risk assessment and management, and appraise the related ethical issues (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: make informed risk management decisions, employ any techniques necessary to acquire and interpret relevant data and information from different sources and the factors that influence their perceptions of risk identification, risk reduction, risk mitigation and risk transfer (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: communicate and collaborate with people effectively on risk management issues (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: gain insights into current advances in risk management through either project or industrial training (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Statistics

Minor in Risk Management

Minor in Statistics

# Required courses (96 credits)

## 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

MATH1013 University mathematics II (6) STAT1600 Statistics: ideas and concepts (6)

MATH2014 Multivariable calculus and linear algebra (6)

STAT2601 Probability and statistics I (6) STAT2602 Probability and statistics II (6)

# 2. Advanced level courses (48 credits)

# **Disciplinary Core Courses (18 credits)**

STAT3600 Linear statistical analysis (6)
STAT3609 The statistics of investment risk (6)
STAT3615 Practical mathematics for investment (6)

# **Disciplinary Electives (30 credits)**

At least 30 credits selected from the following courses:

STAT3603 Stochastic processes (6)
STAT3610 Risk management and insurance (6)
STAT3612 Statistical machine learning (6)

STAT3618 Derivatives and risk management (6)
STAT3655 Survival analysis (6)
STAT3911 Financial economics II (6)
STAT4601 Time-series analysis (6)

STAT4603 Current topics in risk management (6)

STAT4606 Risk management and Basel Accords in banking and finance

(6)

STAT4607 Credit risk analysis (6)
STAT4608 Market risk analysis (6)

# 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses: STAT3799 Directed studies in statistics (6)

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6)

[previous title: Probability modelling (6)]

STAT4799 Statistics project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required (disciplinary core) by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses (disciplinary core) in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary elective) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary elective) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 5. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

#### Remarks

Offered to students 2018

admitted to Year 1 in

### **Objectives:**

The Major in Risk Management aims to provide students with the skills and expertise in the theory and methodology behind the scientific process of risk management, with application to actuarial science, finance and other related areas of interest. It is designed to provide solid training in the concepts of the risk management process, statistical models and methods of risk management, and good risk management practice. Core courses in the curriculum emphasize fundamental concepts and nature of risk assessment, risk management and governance from different standpoints while elective courses provide either training in specific Risk Management disciplines or an extension of knowledge aiming to give students more modeling, technical and analytical skills in risk management, including data mining, stochastic calculus, and financial time series modeling.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and categorize the various risks faced by an organization and be able to demonstrate a critical understanding of generic risk management issues and techniques (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: analyze and assess risk management situations, and be able to deal with qualitative as well as quantitative aspects appropriate to the situation (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: critically evaluate and make effective use of models and techniques for risk assessment and management, and appraise the related ethical issues (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: make informed risk management decisions, employ any techniques necessary to acquire and interpret relevant data and information from different sources and the factors that influence their perceptions of risk identification, risk reduction, risk mitigation and risk transfer (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: communicate and collaborate with people effectively on risk management issues (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: gain insights into current advances in risk management through either project or industrial training (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Statistics

Minor in Risk Management

Minor in Statistics

# Required courses (96 credits)

## 1. Introductory level courses (42 credits)

**Disciplinary Core Courses: Science Foundation Courses (12 credits)** 

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

MATH1013 University mathematics II (6) STAT1600 Statistics: ideas and concepts (6)

MATH2014 Multivariable calculus and linear algebra (6)

STAT2601 Probability and statistics I (6) STAT2602 Probability and statistics II (6)

# 2. Advanced level courses (48 credits)

# **Disciplinary Core Courses (18 credits)**

STAT3600 Linear statistical analysis (6)
STAT3609 The statistics of investment risk (6)
STAT3615 Practical mathematics for investment (6)

# Disciplinary Electives (30 credits)

At least 30 credits selected from the following courses:

STAT3603 Stochastic processes (6) [previous title: Probability modelling (6)]
STAT3610 Risk management and insurance (6)

STAT3612 Statistical machine learning (6) [previous title: Data mining (6)]
STAT3618 Derivatives and risk management (6)

STAT3618 Derivatives and risk mana-STAT3655 Survival analysis (6) STAT3911 Financial economics II (6) STAT4601 Time-series analysis (6)

STAT4603 Current topics in risk management (6)

STAT4606 Risk management and Basel Accords in banking and finance

(6)

STAT4607 Credit risk analysis (6)
STAT4608 Market risk analysis (6)

# 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses: STAT3799 Directed studies in statistics (6)

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6)

STAT4799 Statistics project (12)

#### Notes

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required (disciplinary core) by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses (disciplinary core) in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary elective) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary elective) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 5. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

#### Remarks

Offered to students 2017

admitted to Year 1 in

### **Objectives:**

The Major in Risk Management aims to provide students with the skills and expertise in the theory and methodology behind the scientific process of risk management, with application to actuarial science, finance and other related areas of interest. It is designed to provide solid training in the concepts of the risk management process, statistical models and methods of risk management, and good risk management practice. Core courses in the curriculum emphasize fundamental concepts and nature of risk assessment, risk management and governance from different standpoints while elective courses provide either training in specific Risk Management disciplines or an extension of knowledge aiming to give students more modeling, technical and analytical skills in risk management, including data mining, stochastic calculus, and financial time series modeling.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and categorize the various risks faced by an organization and be able to demonstrate a critical understanding of generic risk management issues and techniques (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: analyze and assess risk management situations, and be able to deal with qualitative as well as quantitative aspects appropriate to the situation (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: critically evaluate and make effective use of models and techniques for risk assessment and management, and appraise the related ethical issues (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: make informed risk management decisions, employ any techniques necessary to acquire and interpret relevant data and information from different sources and the factors that influence their perceptions of risk identification, risk reduction, risk mitigation and risk transfer (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: communicate and collaborate with people effectively on risk management issues (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: gain insights into current advances in risk management through either project or industrial training (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Statistics

Minor in Risk Management

Minor in Statistics

# Required courses (96 credits)

## 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

Disciplinary Core Courses (30 credits)

MATH1013 University mathematics II (6) STAT1600 Statistics: ideas and concepts (6)

MATH2014 Multivariable calculus and linear algebra (6)

STAT2601 Probability and statistics I (6) STAT2602 Probability and statistics II (6)

# 2. Advanced level courses (48 credits)

# **Disciplinary Core Courses (18 credits)**

STAT3600 Linear statistical analysis (6)
STAT3609 The statistics of investment risk (6)
STAT3615 Practical mathematics for investment (6)

# **Disciplinary Electives (30 credits)**

At least 30 credits selected from the following courses:

STAT3603 Stochastic processes (6) [previous title: Probability modelling (6)]

STAT3610 Risk management and insurance (6)
STAT3612 Statistical machine learning (6) [previous title: Data mining (6)]

STAT3618 Derivatives and risk management (6)
STAT3655 Survival analysis (6)
STAT3911 Financial economics II (6)

STAT4601 Time-series analysis (6) STAT4603 Current topics in risk management (6)

STAT4606 Risk management and Basel Accords in banking and finance

(6)

STAT4607 Credit risk analysis (6)
STAT4608 Market risk analysis (6)

# 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses: STAT3799 Directed studies in statistics (6)

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6)

STAT4799 Statistics project (12)

#### Notes

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required (disciplinary core) by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
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- 4. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
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#### Remarks

Offered to students 2016

admitted to Year 1 in

### **Objectives:**

The Major in Risk Management aims to provide students with the skills and expertise in the theory and methodology behind the scientific process of risk management, with application to actuarial science, finance and other related areas of interest. It is designed to provide solid training in the concepts of the risk management process, statistical models and methods of risk management, and good risk management practice. Core courses in the curriculum emphasize fundamental concepts and nature of risk assessment, risk management and governance from different standpoints while elective courses provide either training in specific Risk Management disciplines or an extension of knowledge aiming to give students more modeling, technical and analytical skills in risk management, including data mining, stochastic calculus, and financial time series modeling.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and categorize the various risks faced by an organization and be able to demonstrate a critical understanding of generic risk management issues and techniques (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: analyze and assess risk management situations, and be able to deal with qualitative as well as quantitative aspects appropriate to the situation (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
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- PLO 6: gain insights into current advances in risk management through either project or industrial training (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Statistics

Minor in Risk Management

Minor in Statistics

# Required courses (96 credits)

## 1. Introductory level courses (42 credits)

**Disciplinary Core Courses: Science Foundation Courses (12 credits)** 

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

MATH1013 University mathematics II (6) STAT1600 Statistics: ideas and concepts (6)

MATH2014 Multivariable calculus and linear algebra (6)

STAT2601 Probability and statistics I (6) STAT2602 Probability and statistics II (6)

# 2. Advanced level courses (48 credits)

# **Disciplinary Core Courses (18 credits)**

STAT3600 Linear statistical analysis (6)
STAT3609 The statistics of investment risk (6)
STAT3615 Practical mathematics for investment (6)

# **Disciplinary Electives (30 credits)**

At least 30 credits selected from the following courses:

STAT3603 Stochastic processes (6) [previous title: Probability modelling (6)]

STAT3610 Risk management and insurance (6)
STAT3612 Statistical machine learning (6) [previous title: Data mining (6)]

STAT3618 Derivatives and risk management (6)

STAT3655 Survival analysis (6) STAT3911 Financial economics II (6) STAT4601 Time-series analysis (6)

STAT4603 Current topics in risk management (6)

STAT4606 Risk management and Basel Accords in banking and finance

(6)

STAT4607 Credit risk analysis (6)
STAT4608 Market risk analysis (6)

# 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses: STAT3799 Directed studies in statistics (6)

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6)

STAT4799 Statistics project (12)

#### Notes:

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required (disciplinary core) by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
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- 4. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 5. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

#### Remarks

Offered to students 2015

admitted to Year 1 in

### **Objectives:**

The Major in Risk Management aims to provide students with the skills and expertise in the theory and methodology behind the scientific process of risk management, with application to actuarial science, finance and other related areas of interest. It is designed to provide solid training in the concepts of the risk management process, statistical models and methods of risk management, and good risk management practice. Core courses in the curriculum emphasize fundamental concepts and nature of risk assessment, risk management and governance from different standpoints while elective courses provide either training in specific Risk Management disciplines or an extension of knowledge aiming to give students more modeling, technical and analytical skills in risk management, including data mining, stochastic calculus, and financial time series modeling.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and categorize the various risks faced by an organization and be able to demonstrate a critical understanding of generic risk management issues and techniques (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
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- PLO 6: gain insights into current advances in risk management through either project or industrial training (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Statistics

Minor in Risk Management

Minor in Statistics

# Required courses (96 credits)

## 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

MATH1013 University mathematics II (6) STAT1600 Statistics: ideas and concepts (6)

MATH2014 Multivariable calculus and linear algebra (6)

STAT2601 Probability and statistics I (6) STAT2602 Probability and statistics II (6)

# 2. Advanced level courses (48 credits)

# **Disciplinary Core Courses (24 credits)**

STAT3600 Linear statistical analysis (6)
STAT3609 The statistics of investment risk (6)
STAT3615 Practical mathematics for investment (6)

STAT4601 Time-series analysis (6)

# **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

STAT3603 Stochastic processes (6) [previous title: Probability modelling (6)]

[previous title: Data mining (6)]

STAT3610 Risk management and insurance (6)
STAT3612 Statistical machine learning (6)
STAT3618 Derivatives and risk management (6)

STAT3911 Financial economics II (6) STAT4603 Current topics in risk management (6)

STAT4606 Risk management and Basel Accords in banking and finance

(6

STAT4607 Credit risk analysis (6) STAT4608 Market risk analysis (6)

# 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

STAT3799 Directed studies in statistics (6)

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6) STAT4799 Statistics project (12)

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
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# Remarks:

Offered to students 2014

admitted to Year 1 in

### **Objectives:**

The Major in Risk Management aims to provide students with the skills and expertise in the theory and methodology behind the scientific process of risk management, with application to actuarial science, finance and other related areas of interest. It is designed to provide solid training in the concepts of the risk management process, statistical models and methods of risk management, and good risk management practice. Core courses in the curriculum emphasize fundamental concepts and nature of risk assessment, risk management and governance from different standpoints while elective courses provide either training in specific Risk Management disciplines or an extension of knowledge aiming to give students more modeling, technical and analytical skills in risk management, including data mining, stochastic calculus, and financial time series modeling.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and categorize the various risks faced by an organization and be able to demonstrate a critical understanding of generic risk management issues and techniques (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: analyze and assess risk management situations, and be able to deal with qualitative as well as quantitative aspects appropriate to the situation (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
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### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Statistics

Minor in Risk Management

Minor in Statistics

# Required courses (96 credits)

## 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

MATH1013 University mathematics II (6) STAT1600 Statistics: ideas and concepts (6)

MATH2014 Multivariable calculus and linear algebra (6)

STAT2601 Probability and statistics I (6) STAT2602 Probability and statistics II (6)

# 2. Advanced level courses (48 credits)

# **Disciplinary Core Courses (24 credits)**

STAT3600 Linear statistical analysis (6)
STAT3609 The statistics of investment risk (6)
STAT3615 Practical mathematics for investment (6)

STAT4601 Time-series analysis (6)

# **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

STAT3603 Stochastic processes (6) [previous title: Probability modelling (6)]
STAT3610 Risk management and insurance (6)

[previous title: Data mining (6)]

STAT3612 Statistical machine learning (6)
STAT3618 Derivatives and risk management (6)

STAT3911 Financial economics II (6) STAT4603 Current topics in risk management (6)

STAT4606 Risk management and Basel Accords in banking and finance

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STAT4607 Credit risk analysis (6) STAT4608 Market risk analysis (6)

# 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

STAT3799 Directed studies in statistics (6)

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6) STAT4799 Statistics project (12)

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
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# Remarks:

Offered to students 2013

admitted to Year 1 in

### **Objectives:**

The Major in Risk Management aims to provide students with the skills and expertise in the theory and methodology behind the scientific process of risk management, with application to actuarial science, finance and other related areas of interest. It is designed to provide solid training in the concepts of the risk management process, statistical models and methods of risk management, and good risk management practice. Core courses in the curriculum emphasize fundamental concepts and nature of risk assessment, risk management and governance from different standpoints while elective courses provide either training in specific Risk Management disciplines or an extension of knowledge aiming to give students more modeling, technical and analytical skills in risk management, including data mining, stochastic calculus, and financial time series modeling.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and categorize the various risks faced by an organization and be able to demonstrate a critical understanding of generic risk management issues and techniques (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: analyze and assess risk management situations, and be able to deal with qualitative as well as quantitative aspects appropriate to the situation (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: critically evaluate and make effective use of models and techniques for risk assessment and management, and appraise the related ethical issues (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: make informed risk management decisions, employ any techniques necessary to acquire and interpret relevant data and information from different sources and the factors that influence their perceptions of risk identification, risk reduction, risk mitigation and risk transfer (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: communicate and collaborate with people effectively on risk management issues (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: gain insights into current advances in risk management through either project or industrial training (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

### Impermissible Combinations:

Major in Decision Analytics

Major in Statistics

Minor in Risk Management

Minor in Statistics

# Required courses (96 credits)

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

MATH1013 University mathematics II (6)
STAT1600 Statistics: ideas and concepts (6)
STAT2601 Probability and statistics II (6)
STAT2602 Probability and statistics II (6)
STAT2603 Data management with SAS (6)

### 2. Advanced level courses (48 credits)

# **Disciplinary Core Courses (24 credits)**

STAT3600 Linear statistical analysis (6)
STAT3609 The statistics of investment risk (6)
STAT3615 Practical mathematics for investment (6)

STAT4601 Time-series analysis (6)

# Disciplinary Electives (24 credits)

At least 24 credits selected from the following courses:

STAT3603 Stochastic processes (6) [previous title: Probability modelling (6)]

STAT3610 Risk management and insurance (6)
STAT3612 Statistical machine learning (6) [previous title: Data mining (6)]

STAT3618 Derivatives and risk management (6) STAT3911 Financial economics II (6)

STAT4603 Current topics in risk management (6)

STAT4606 Risk management and Basel Accords in banking and finance

(6

STAT4607 Credit risk analysis (6)
STAT4608 Market risk analysis (6)

# 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

STAT3799 Directed studies in statistics (6)

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6) STAT4799 Statistics project (12)

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 5. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

#### Remarks:

Offered to students 2012

admitted to Year 1 in

### **Objectives:**

The Major in Risk Management aims to provide students with the skills and expertise in the theory and methodology behind the scientific process of risk management, with application to actuarial science, finance and other related areas of interest. It is designed to provide solid training in the concepts of the risk management process, statistical models and methods of risk management, and good risk management practice. Core courses in the curriculum emphasize fundamental concepts and nature of risk assessment, risk management and governance from different standpoints while elective courses provide either training in specific Risk Management disciplines or an extension of knowledge aiming to give students more modeling, technical and analytical skills in risk management, including data mining, stochastic calculus, and financial time series modeling.

# Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: identify and categorize the various risks faced by an organization and be able to demonstrate a critical understanding of generic risk management issues and techniques (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: analyze and assess risk management situations, and be able to deal with qualitative as well as quantitative aspects appropriate to the situation (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: critically evaluate and make effective use of models and techniques for risk assessment and management, and appraise the related ethical issues (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: make informed risk management decisions, employ any techniques necessary to acquire and interpret relevant data and information from different sources and the factors that influence their perceptions of risk identification, risk reduction, risk mitigation and risk transfer (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: communicate and collaborate with people effectively on risk management issues (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: gain insights into current advances in risk management through either project or industrial training (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

### Impermissible Combinations:

Major in Decision Analytics

Major in Statistics

Minor in Risk Management

Minor in Statistics

# Required courses (96 credits)

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

MATH1013 University mathematics II (6)
STAT1600 Statistics: ideas and concepts (6)
STAT2601 Probability and statistics II (6)
STAT2602 Probability and statistics II (6)
STAT2603 Data management with SAS (6)

### 2. Advanced level courses (48 credits)

# **Disciplinary Core Courses (24 credits)**

STAT3600 Linear statistical analysis (6)
STAT3609 The statistics of investment risk (6)
STAT3615 Practical mathematics for investment (6)

STAT4601 Time-series analysis (6)

# **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

STAT3603 Stochastic processes (6) [previous title: Probability modelling (6)]

STAT3610 Risk management and insurance (6)
STAT3612 Statistical machine learning (6) [previous title: Data mining (6)]

STAT3618 Derivatives and risk management (6) STAT3911 Financial economics II (6)

STAT4603 Current topics in risk management (6)

STAT4606 Risk management and Basel Accords in banking and finance

(6

STAT4607 Credit risk analysis (6) STAT4608 Market risk analysis (6)

# 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

STAT3799 Directed studies in statistics (6)

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6) STAT4799 Statistics project (12)

- 1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 3. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 4. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 5. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

### Remarks:

Major Title Major in Statistics

Offered to students 2021

admitted to Year 1 in

### **Objectives:**

The Major in Statistics focuses on the study of statistics, a scientific discipline characterized by the development and applications of analytical and quantitative tools which involve logical thinking, problem formulation, probability reasoning and intensive data analyses. The programme aims to equip students with powerful mathematical, analytical and computational skills, which are in great demand in practical areas where data are obtained for the purpose of extracting information in support of decision making. It gives students a strong background in statistical concepts, and provides broad and solid training in applied statistical methodologies. The curriculum is constantly revised to meet a steadily rising demand for specialist statisticians or quantitative analysts in government, business, finance, industry, as well as in research and teaching in local and overseas institutions.

# Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: receive solid training in probability and statistics, gain insight into their underlying theory and be acquainted with their state-of-the-art applications in the modern world (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: conduct meticulous data analyses, supported by rigorous statistical reasoning, to make informed decisions in the face of uncertainty that arises in all sorts of institutions and companies, and appraise the related ethical issues (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: equip with hands-on experience in data analysis using statistical software, and be competent for data-analytic jobs which require advanced computational skills (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: be highly motivated to explore cross-disciplinary applications of statistics in a broad variety of academic or professional areas including, in particular, mathematics, natural sciences, economics, finance, business, risk management, actuarial work, social sciences and engineering (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: communicate and collaborate with people effectively on probability and statistical issues (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: through the understanding and application of statistical concepts and techniques, gain confidence to meet challenges posed by increasingly complicated real-life problems encountered in the modern era in a creative and rational manner (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Risk Management

Minor in Risk Management

Minor in Statistics

# Required courses (96 credits)

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) Fundamentals of modern science (6) SCNC1112

**Disciplinary Core Courses (30 credits)** 

University mathematics II (6) MATH1013 Statistics: ideas and concepts (6) STAT1600

MATH2014 Multivariable calculus and linear algebra (6)

Probability and statistics I (6) STAT2601 Probability and statistics II (6) STAT2602

# 2. Advanced level courses (48 credits)

# **Disciplinary Core Courses (12 credits)**

STAT3600 Linear statistical analysis (6) STAT4602 Multivariate data analysis (6)

### **Disciplinary Electives (36 credits)**

At least 36 credits from Lists A and B, among which at least 12 credits from List A:

List A

STAT3602 Statistical inference (6) STAT3603 Stochastic processes (6)

Modern nonparametric statistics (6)

STAT3620 Statistical data analysis (6) STAT3621 Survival analysis (6) STAT3655 STAT4601 Time-series analysis (6)

List B

STAT3604 Design and analysis of experiments (6) STAT3605 Quality control and management (6)

Business logistics (6) STAT3606

Statistics in clinical medicine and bio-medical research (6) STAT3607

STAT3608 Statistical genetics (6) Statistical machine learning (6) STAT3612 STAT3613 Marketing analytics (6)

[previous title: Probability modelling (6)]

STAT3617 Sample survey methods (6) STAT4610 Bayesian learning (6)

# 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

STAT3799 Directed studies in statistics (6)

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6) STAT4799 Statistics project (12)

#### Notes:

1. Students who wish to specialize in the theme of data science are recommended to choose the combination of courses STAT3612, STAT3613 and STAT3621. Note that students who wish to take STAT3621 are strongly recommended to take STAT2603 or STAT2604 first.

- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required (disciplinary core) by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses (disciplinary core) in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary elective) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary elective) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 6. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.
- 7. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis
- 8. Candidates who have been admitted to Year 1 in 2021-22 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1112. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Biology, Chemistry, and Physics in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Biology, Chemistry, and Physics Higher Level in International Baccalaureate (IB)
- Grade B or above in Biology, Chemistry, and Physics in General Certificate of Education Advanced Level (GCEAL)
- Biology, Chemistry, and Physics qualification in Gao Kao will be considered on a case-by-case basis

### Remarks:

Major Title Major in Statistics

Offered to students 2020

admitted to Year 1 in

### **Objectives:**

The Major in Statistics focuses on the study of statistics, a scientific discipline characterized by the development and applications of analytical and quantitative tools which involve logical thinking, problem formulation, probability reasoning and intensive data analyses. The programme aims to equip students with powerful mathematical, analytical and computational skills, which are in great demand in practical areas where data are obtained for the purpose of extracting information in support of decision making. It gives students a strong background in statistical concepts, and provides broad and solid training in applied statistical methodologies. The curriculum is constantly revised to meet a steadily rising demand for specialist statisticians or quantitative analysts in government, business, finance, industry, as well as in research and teaching in local and overseas institutions.

### Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: receive solid training in probability and statistics, gain insight into their underlying theory and be acquainted with their state-of-the-art applications in the modern world (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: conduct meticulous data analyses, supported by rigorous statistical reasoning, to make informed decisions in the face of uncertainty that arises in all sorts of institutions and companies, and appraise the related ethical issues (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: equip with hands-on experience in data analysis using statistical software, and be competent for data-analytic jobs which require advanced computational skills (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: be highly motivated to explore cross-disciplinary applications of statistics in a broad variety of academic or professional areas including, in particular, mathematics, natural sciences, economics, finance, business, risk management, actuarial work, social sciences and engineering (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: communicate and collaborate with people effectively on probability and statistical issues (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: through the understanding and application of statistical concepts and techniques, gain confidence to meet challenges posed by increasingly complicated real-life problems encountered in the modern era in a creative and rational manner (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

# Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Risk Management

Minor in Risk Management

Minor in Statistics

# Required courses (96 credits)

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

MATH1013 University mathematics II (6) STAT1600 Statistics: ideas and concepts (6)

MATH2014 Multivariable calculus and linear algebra (6) STAT2601 Probability and statistics L(6)

STAT2601 Probability and statistics I (6) STAT2602 Probability and statistics II (6)

# 2. Advanced level courses (48 credits)

# **Disciplinary Core Courses (12 credits)**

STAT3600 Linear statistical analysis (6) STAT4602 Multivariate data analysis (6)

### **Disciplinary Electives (36 credits)**

At least 36 credits from Lists A and B, among which at least 12 credits from List A:

List A

STAT3602 Statistical inference (6)
STAT3603 Stochastic processes (6) [previous title: Probability modelling (6)]

STAT3620 Modern nonparametric statistics (6)
STAT3621 Statistical data analysis (6)
STAT3655 Survival analysis (6)
STAT4601 Time-series analysis (6)

List B

STAT3604 Design and analysis of experiments (6) STAT3605 Quality control and management (6)

STAT3606 Business logistics (6)

STAT3607 Statistics in clinical medicine and bio-medical research (6)

STAT3608 Statistical genetics (6)
STAT3612 Statistical machine learning (6)
STAT3613 Marketing analytics (6)

STAT3617 Sample survey methods (6) STAT4610 Bayesian learning (6)

# 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

STAT3799 Directed studies in statistics (6)

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6) STAT4799 Statistics project (12)

### Notes:

1. Students who wish to specialize in the theme of data science are recommended to choose the combination of courses STAT3612, STAT3613 and STAT3621. Note that students who wish to take STAT3621 are strongly recommended to take STAT2603 or STAT2604 first.

- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required (disciplinary core) by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses (disciplinary core) in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary elective) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary elective) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 6. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.
- 7. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.
- Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)
- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis

### Remarks

Major Title Major in Statistics

Offered to students 2019

admitted to Year 1 in

### **Objectives:**

The Major in Statistics focuses on the study of statistics, a scientific discipline characterized by the development and applications of analytical and quantitative tools which involve logical thinking, problem formulation, probability reasoning and intensive data analyses. The programme aims to equip students with powerful mathematical, analytical and computational skills, which are in great demand in practical areas where data are obtained for the purpose of extracting information in support of decision making. It gives students a strong background in statistical concepts, and provides broad and solid training in applied statistical methodologies. The curriculum is constantly revised to meet a steadily rising demand for specialist statisticians or quantitative analysts in government, business, finance, industry, as well as in research and teaching in local and overseas institutions.

### Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: receive solid training in probability and statistics, gain insight into their underlying theory and be acquainted with their state-of-the-art applications in the modern world (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: conduct meticulous data analyses, supported by rigorous statistical reasoning, to make informed decisions in the face of uncertainty that arises in all sorts of institutions and companies, and appraise the related ethical issues (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: equip with hands-on experience in data analysis using statistical software, and be competent for data-analytic jobs which require advanced computational skills (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: be highly motivated to explore cross-disciplinary applications of statistics in a broad variety of academic or professional areas including, in particular, mathematics, natural sciences, economics, finance, business, risk management, actuarial work, social sciences and engineering (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: communicate and collaborate with people effectively on probability and statistical issues (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: through the understanding and application of statistical concepts and techniques, gain confidence to meet challenges posed by increasingly complicated real-life problems encountered in the modern era in a creative and rational manner (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

# Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Risk Management

Minor in Risk Management

Minor in Statistics

# Required courses (96 credits)

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) Fundamentals of modern science (6) SCNC1112

**Disciplinary Core Courses (30 credits)** 

University mathematics II (6) MATH1013 Statistics: ideas and concepts (6) STAT1600

MATH2014 Multivariable calculus and linear algebra (6)

Probability and statistics I (6) STAT2601 Probability and statistics II (6) STAT2602

# 2. Advanced level courses (48 credits)

# **Disciplinary Core Courses (12 credits)**

STAT3600 Linear statistical analysis (6) STAT4602 Multivariate data analysis (6)

### **Disciplinary Electives (36 credits)**

At least 36 credits from Lists A and B, among which at least 12 credits from List A:

List A

STAT3655

STAT3602 Statistical inference (6) STAT3603 Stochastic processes (6) Modern nonparametric statistics (6) STAT3620 Statistical data analysis (6) STAT3621

Survival analysis (6)

STAT3955 Survival analysis (6)

STAT4601 Time-series analysis (6)

List B

STAT3604 Design and analysis of experiments (6) STAT3605 Quality control and management (6)

Business logistics (6) STAT3606

[previous title: Probability modelling (6)]

STAT3955 are mutually exclusive. Take either STAT3655 or STAT3955 to fulfill

STAT3955 are mutually exclusive.

Take either STAT3655 or STAT3955 to fulfill

the requirement; but not both. STAT3655 and

the requirement: but not both, STAT3655 and

STAT3607	Statistics in clinical medicine and bio-medical research (6)			
STAT3608	Statistical genetics (6)			
STAT3612	Statistical machine learning (6)			
STAT3613	Marketing analytics (6)			
STAT3617	Sample survey methods (6)			
STAT4610	Bayesian learning (6)			
3. Capstone requirement (6 credits)				
At least 6 credits selected from the following courses:				
STAT3799	Directed studies in statistics (6)			
STAT4710	Capstone experience for statistics undergraduates (6)			
STAT4766	Statistics internship (6)			
STAT4799	Statistics project (12)			

- 1. Students who wish to specialize in the theme of data science are recommended to choose the combination of courses STAT3612, STAT3613 and STAT3621. Note that students who wish to take STAT3621 are strongly recommended to take STAT2603 or STAT2604 first.
- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required (disciplinary core) by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses (disciplinary core) in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary elective) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary elective) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 6. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

## Remarks:

Major Title Major in Statistics

Offered to students 2018

admitted to Year 1 in

### **Objectives:**

The Major in Statistics focuses on the study of statistics, a scientific discipline characterized by the development and applications of analytical and quantitative tools which involve logical thinking, problem formulation, probability reasoning and intensive data analyses. The programme aims to equip students with powerful mathematical, analytical and computational skills, which are in great demand in practical areas where data are obtained for the purpose of extracting information in support of decision making. It gives students a strong background in statistical concepts, and provides broad and solid training in applied statistical methodologies. The curriculum is constantly revised to meet a steadily rising demand for specialist statisticians or quantitative analysts in government, business, finance, industry, as well as in research and teaching in local and overseas institutions.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: receive solid training in probability and statistics, gain insight into their underlying theory and be acquainted with their state-of-the-art applications in the modern world (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: conduct meticulous data analyses, supported by rigorous statistical reasoning, to make informed decisions in the face of uncertainty that arises in all sorts of institutions and companies, and appraise the related ethical issues (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: equip with hands-on experience in data analysis using statistical software, and be competent for data-analytic jobs which require advanced computational skills (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: be highly motivated to explore cross-disciplinary applications of statistics in a broad variety of academic or professional areas including, in particular, mathematics, natural sciences, economics, finance, business, risk management, actuarial work, social sciences and engineering (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: communicate and collaborate with people effectively on probability and statistical issues (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: through the understanding and application of statistical concepts and techniques, gain confidence to meet challenges posed by increasingly complicated real-life problems encountered in the modern era in a creative and rational manner (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Risk Management

Minor in Risk Management

Minor in Statistics

# Required courses (96 credits)

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

MATH1013 University mathematics II (6) STAT1600 Statistics: ideas and concepts (6)

MATH2014 Multivariable calculus and linear algebra (6)

STAT2601 Probability and statistics I (6) STAT2602 Probability and statistics II (6)

# 2. Advanced level courses (48 credits)

# **Disciplinary Core Courses (12 credits)**

STAT3600 Linear statistical analysis (6) STAT4602 Multivariate data analysis (6)

### **Disciplinary Electives (36 credits)**

At least 36 credits from Lists A and B, among which at least 12 credits from List A:

List A

STAT3602

STAT3955

STAT3603 Stochastic processes (6)
STAT3620 Modern nonparametric statistics (6)
STAT3621 Statistical data analysis (6)
STAT3655 Survival analysis (6)

Statistical inference (6)

Survival analysis (6)

STAT4601 Time-series analysis (6)

List B

STAT3604 Design and analysis of experiments (6)
STAT3605 Quality control and management (6)

STAT3606 Business logistics (6)

[previous title: Probability modelling (6)]

STAT3955 are mutually exclusive.
Take either STAT3655 or STAT3955 to fulfill

STAT3955 are mutually exclusive.

Take either STAT3655 or STAT3955 to fulfill

the requirement; but not both. STAT3655 and

the requirement: but not both, STAT3655 and

	STAT3607 STAT3608 STAT3612	Statistics in clinical medicine and bio-medical research (6) Statistical genetics (6) Statistical machine learning (6)	[previous title: Data mining (6) ]		
Ш	STAT3613	Marketing analytics (6)	[previous title: Marketing engineering (6)]		
Ш	STAT3617	Sample survey methods (6)			
Ш	STAT4610	Bayesian learning (6)			
Ш	3. Capstone requirement (6 credits)				
Ш	At least 6 credits selected from the following courses:				
Ш	STAT3799	Directed studies in statistics (6)			
Ш	STAT4710	Capstone experience for statistics undergraduates (6)			
Ш	STAT4766	Statistics internship (6)			
	STAT4799	Statistics project (12)			

- 1. Students who wish to specialize in the theme of data science are recommended to choose the combination of courses STAT3612, STAT3613 and STAT3621. Note that students who wish to take STAT3621 are strongly recommended to take STAT2603 or STAT2604 first.
- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required (disciplinary core) by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses (disciplinary core) in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary elective) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary elective) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 6. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

## Remarks:

Major Title Major in Statistics

Offered to students 2017

admitted to Year 1 in

### **Objectives:**

The Major in Statistics focuses on the study of statistics, a scientific discipline characterized by the development and applications of analytical and quantitative tools which involve logical thinking, problem formulation, probability reasoning and intensive data analyses. The programme aims to equip students with powerful mathematical, analytical and computational skills, which are in great demand in practical areas where data are obtained for the purpose of extracting information in support of decision making. It gives students a strong background in statistical concepts, and provides broad and solid training in applied statistical methodologies. The curriculum is constantly revised to meet a steadily rising demand for specialist statisticians or quantitative analysts in government, business, finance, industry, as well as in research and teaching in local and overseas institutions.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: receive solid training in probability and statistics, gain insight into their underlying theory and be acquainted with their state-of-the-art applications in the modern world (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: conduct meticulous data analyses, supported by rigorous statistical reasoning, to make informed decisions in the face of uncertainty that arises in all sorts of institutions and companies, and appraise the related ethical issues (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: equip with hands-on experience in data analysis using statistical software, and be competent for data-analytic jobs which require advanced computational skills (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: be highly motivated to explore cross-disciplinary applications of statistics in a broad variety of academic or professional areas including, in particular, mathematics, natural sciences, economics, finance, business, risk management, actuarial work, social sciences and engineering (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: communicate and collaborate with people effectively on probability and statistical issues (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: through the understanding and application of statistical concepts and techniques, gain confidence to meet challenges posed by increasingly complicated real-life problems encountered in the modern era in a creative and rational manner (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Risk Management

Minor in Risk Management

Minor in Statistics

# Required courses (96 credits)

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

MATH1013 University mathematics II (6) STAT1600 Statistics: ideas and concepts (6)

MATH2014 Multivariable calculus and linear algebra (6) STAT2601 Probability and statistics I (6)

STAT2601 Probability and statistics I (6) STAT2602 Probability and statistics II (6)

# 2. Advanced level courses (48 credits)

# **Disciplinary Core Courses (12 credits)**

STAT3600 Linear statistical analysis (6) STAT4602 Multivariate data analysis (6)

### **Disciplinary Electives (36 credits)**

At least 36 credits from Lists A and B, among which at least 12 credits from List A:

List A

STAT3602

STAT3603 Stochastic processes (6)
STAT3620 Modern nonparametric statistics (6)
STAT3621 Statistical data analysis (6)
STAT3655 Survival analysis (6)

Statistical inference (6)

STAT3955 Survival analysis (6)

STAT4601 Time-series analysis (6)

List B

STAT3604 Design and analysis of experiments (6)
STAT3605 Quality control and management (6)

STAT3606 Business logistics (6)

[previous title: Probability modelling (6)]

STAT3955 are mutually exclusive.
Take either STAT3655 or STAT3955 to fulfill

STAT3955 are mutually exclusive.

Take either STAT3655 or STAT3955 to fulfill

the requirement; but not both. STAT3655 and

the requirement: but not both, STAT3655 and

STAT3607	Statistics in clinical medicine and bio-medical research (6)			
STAT3608	Statistical genetics (6)			
STAT3612	Statistical machine learning (6)	[previous title: Data mining (6) ]		
STAT3613	Marketing analytics (6)	[previous title: Marketing engineering (6)]		
STAT3616	Advanced SAS programming (6)			
STAT3617	Sample survey methods (6)			
STAT4610	Bayesian learning (6)			
3. Capstone requirement (6 credits)				
At least 6 credits selected from the following courses:				
STAT3799	Directed studies in statistics (6)			
STAT4710	Capstone experience for statistics undergraduates (6)			
STAT4766	Statistics internship (6)			

STAT4799

1. Students who wish to specialize in the theme of data science are recommended to choose the combination of courses STAT3612, STAT3613, STAT3616 and STAT3621. Note that students who wish to take STAT3616 and STAT3621 are strongly recommended to take STAT2603 or STAT2604 first.

Statistics project (12)

- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required (disciplinary core) by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses (disciplinary core) in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary elective) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary elective) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 6. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

## Remarks:

Major Title Major in Statistics

Offered to students 2016

admitted to Year 1 in

### **Objectives:**

The Major in Statistics focuses on the study of statistics, a scientific discipline characterized by the development and applications of analytical and quantitative tools which involve logical thinking, problem formulation, probability reasoning and intensive data analyses. The programme aims to equip students with powerful mathematical, analytical and computational skills, which are in great demand in practical areas where data are obtained for the purpose of extracting information in support of decision making. It gives students a strong background in statistical concepts, and provides broad and solid training in applied statistical methodologies. The curriculum is constantly revised to meet a steadily rising demand for specialist statisticians or quantitative analysts in government, business, finance, industry, as well as in research and teaching in local and overseas institutions.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: receive solid training in probability and statistics, gain insight into their underlying theory and be acquainted with their state-of-the-art applications in the modern world (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: conduct meticulous data analyses, supported by rigorous statistical reasoning, to make informed decisions in the face of uncertainty that arises in all sorts of institutions and companies, and appraise the related ethical issues (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: equip with hands-on experience in data analysis using statistical software, and be competent for data-analytic jobs which require advanced computational skills (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 4: be highly motivated to explore cross-disciplinary applications of statistics in a broad variety of academic or professional areas including, in particular, mathematics, natural sciences, economics, finance, business, risk management, actuarial work, social sciences and engineering (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: communicate and collaborate with people effectively on probability and statistical issues (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: through the understanding and application of statistical concepts and techniques, gain confidence to meet challenges posed by increasingly complicated real-life problems encountered in the modern era in a creative and rational manner (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

# Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Risk Management

Minor in Risk Management

Minor in Statistics

# Required courses (96 credits)

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

MATH1013 University mathematics II (6) STAT1600 Statistics: ideas and concepts (6)

MATH2014 Multivariable calculus and linear algebra (6) STAT2601 Probability and statistics L(6)

STAT2601 Probability and statistics I (6) STAT2602 Probability and statistics II (6)

# 2. Advanced level courses (48 credits)

# **Disciplinary Core Courses (12 credits)**

STAT3600 Linear statistical analysis (6) STAT4602 Multivariate data analysis (6)

### **Disciplinary Electives (36 credits)**

At least 36 credits from Lists A and B, among which at least 12 credits from List A:

List A

STAT3655

STAT3602 Statistical inference (6)
STAT3603 Stochastic processes (6)
STAT3620 Modern nonparametric statistics (6)
STAT3621 Statistical data analysis (6)

Survival analysis (6)

STAT3955 Survival analysis (6)

STAT4601 Time-series analysis (6)

List B

STAT3604 Design and analysis of experiments (6) STAT3605 Quality control and management (6) STAT3606 Business logistics (6) the requirement; but not both. STAT3655 and STAT3955 are mutually exclusive.

STAT3955 are mutually exclusive.
Take either STAT3655 or STAT3955 to fulfill

[previous title: Probability modelling (6)]

Take either STAT3655 or STAT3955 to fulfill

the requirement; but not both. STAT3655 and

STAT3607 Statistics in clinical medicine and bio-medical research (6) Statistical genetics (6) STAT3608 Statistical machine learning (6) [previous title: Data mining (6)] STAT3612 STAT3613 Marketing analytics (6) [previous title: Marketing engineering (6)] Advanced SAS programming (6) STAT3616 Sample survey methods (6) STAT3617 Bayesian learning (6) STAT4610 3. Capstone requirement (6 credits) At least 6 credits selected from the following courses:

STAT3799 Directed studies in statistics (6)

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6) STAT4799 Statistics project (12)

### Notes:

- 1. Students who wish to specialize in the theme of data science are recommended to choose the combination of courses STAT3612, STAT3613, STAT3616 and STAT3621. Note that students who wish to take STAT3616 and STAT3621 are strongly recommended to take STAT2603 or STAT2604 first.
- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required (disciplinary core) by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses (disciplinary core) in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary elective) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary elective) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 6. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

## Remarks:

Major Title Major in Statistics

Offered to students 2015

admitted to Year 1 in

### **Objectives:**

The Major in Statistics focuses on the study of statistics, a scientific discipline characterized by the development and applications of analytical and quantitative tools which involve logical thinking, problem formulation, probability reasoning and intensive data analyses. The programme aims to equip students with powerful mathematical, analytical and computational skills, which are in great demand in practical areas where data are obtained for the purpose of extracting information in support of decision making. It gives students a strong background in statistical concepts, and provides broad and solid training in applied statistical methodologies. The curriculum is constantly revised to meet a steadily rising demand for specialist statisticians or quantitative analysts in government, business, finance, industry, as well as in research and teaching in local and overseas institutions.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: receive solid training in probability and statistics, gain insight into their underlying theory and be acquainted with their state-of-the-art applications in the modern world (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: conduct meticulous data analyses, supported by rigorous statistical reasoning, to make informed decisions in the face of uncertainty that arises in all sorts of institutions and companies, and appraise the related ethical issues (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: equip with hands-on experience in data analysis using commercial statistical software, and be competent for dataanalytic jobs which require advanced computational skills (by means of coursework, tutorial classes and/or projectbased learning in the curriculum)
- PLO 4: be highly motivated to explore cross-disciplinary applications of statistics in a broad variety of academic or professional areas including, in particular, mathematics, natural sciences, economics, finance, business, risk management, actuarial work, social sciences and engineering (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: communicate and collaborate with people effectively on probability and statistical issues (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: through the understanding and application of statistical concepts and techniques, gain confidence to meet challenges posed by increasingly complicated real-life problems encountered in the modern era in a creative and rational manner (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

# Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Risk Management

Minor in Risk Management

Minor in Statistics

# Required courses (96 credits)

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

MATH1013 University mathematics II (6) STAT1600 Statistics: ideas and concepts (6)

MATH2014 Multivariable calculus and linear algebra (6)

STAT2601 Probability and statistics I (6) STAT2602 Probability and statistics II (6)

# 2. Advanced level courses (48 credits)

# **Disciplinary Core Courses (24 credits)**

STAT3600 Linear statistical analysis (6)
STAT3603 Stochastic processes (6) [previous title: Probability modelling (6)]

STAT4601 Time-series analysis (6)
STAT4602 Multivariate data analysis (6)

# **Disciplinary Electives (24 credits)**

At least 24 credits from Lists A and B, among which at least 6 credits from List A:

List A
STAT3602 Statistical inference (6)
STAT3604 Design and analysis of experiments (6)
STAT3620 Modern nonparametric statistics (6)
STAT3621 Statistical data analysis (6)

List B

STAT3605 Quality control and management (6)

STAT3606 Business logistics (6)

STAT3607 Statistics in clinical medicine and bio-medical research (6)

STAT3608 Statistical genetics (6)

STAT3612 Statistical machine learning (6) [previous title: Data mining (6) ]
STAT3613 Marketing analytics (6) [previous title: Marketing engineering (6) ]
STAT3616 Advanced SAS programming (6)

STAT3617 Sample survey methods (6)

STAT3655 Survival analysis (6)

STAT3955 Survival analysis (6)

Take either STAT3655 or STAT3955 to fulfill the requirement; but not both. STAT3655 and STAT3955 are mutually exclusive.

Take either STAT3655 or STAT3955 to fulfill the requirement; but not both. STAT3655 and STAT3955 are mutually exclusive.

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

STAT3799 Directed studies in statistics (6)

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6) STAT4799 Statistics project (12)

#### Notes:

1. Students who wish to specialize in the theme of data science are recommended to choose the combination of courses STAT3612, STAT3613, STAT3616 and STAT3621. Note that students who wish to take STAT3616 and STAT3621 are strongly recommended to take STAT2603 first.

- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 6. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

### Remarks

Major Title Major in Statistics

Offered to students 2014

admitted to Year 1 in

### **Objectives:**

The Major in Statistics focuses on the study of statistics, a scientific discipline characterized by the development and applications of analytical and quantitative tools which involve logical thinking, problem formulation, probability reasoning and intensive data analyses. The programme aims to equip students with powerful mathematical, analytical and computational skills, which are in great demand in practical areas where data are obtained for the purpose of extracting information in support of decision making. It gives students a strong background in statistical concepts, and provides broad and solid training in applied statistical methodologies. The curriculum is constantly revised to meet a steadily rising demand for specialist statisticians or quantitative analysts in government, business, finance, industry, as well as in research and teaching in local and overseas institutions.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: receive solid training in probability and statistics, gain insight into their underlying theory and be acquainted with their state-of-the-art applications in the modern world (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: conduct meticulous data analyses, supported by rigorous statistical reasoning, to make informed decisions in the face of uncertainty that arises in all sorts of institutions and companies, and appraise the related ethical issues (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: equip with hands-on experience in data analysis using commercial statistical software, and be competent for dataanalytic jobs which require advanced computational skills (by means of coursework, tutorial classes and/or projectbased learning in the curriculum)
- PLO 4: be highly motivated to explore cross-disciplinary applications of statistics in a broad variety of academic or professional areas including, in particular, mathematics, natural sciences, economics, finance, business, risk management, actuarial work, social sciences and engineering (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: communicate and collaborate with people effectively on probability and statistical issues (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: through the understanding and application of statistical concepts and techniques, gain confidence to meet challenges posed by increasingly complicated real-life problems encountered in the modern era in a creative and rational manner (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Risk Management

Minor in Risk Management

Minor in Statistics

# Required courses (96 credits)

# 1. Introductory level courses (42 credits)

Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Courses (30 credits)** 

MATH1013 University mathematics II (6)
STAT1600 Statistics: ideas and concepts (6)

MATH2014 Multivariable calculus and linear algebra (6)

STAT2601 Probability and statistics I (6) STAT2602 Probability and statistics II (6)

# 2. Advanced level courses (48 credits)

# **Disciplinary Core Courses (24 credits)**

STAT3600 Linear statistical analysis (6)
STAT3603 Stochastic processes (6) [previous title: Probability modelling (6)]

STAT4601 Time-series analysis (6) STAT4602 Multivariate data analysis (6)

# **Disciplinary Electives (24 credit)**

At least 24 credits from Lists A and B, among which at least 6 credits from List A:

List A
STAT3602 Statistical inference (6)
STAT3604 Design and analysis of experiments (6)
STAT3620 Modern nonparametric statistics (6)
STAT3621 Statistical data analysis (6)

List B

STAT3605 Quality control and management (6)

STAT3606 Business logistics (6)

STAT3607 Statistics in clinical medicine and bio-medical research (6)

STAT3608 Statistical genetics (6)
STAT3612 Statistical machine learning (6) [previous title: Data mining (6) ]
STAT3613 Marketing analytics (6) [previous title: Marketing engineering (6) ]

STAT3613 Marketing analytics (6) STAT3616 Advanced SAS programming (6) STAT3617 Sample survey methods (6)

STAT3655 Survival analysis (6) Take either STAT3655 or STAT3955 to fulfill the requirement; but not both. STAT3655 and

STAT3955 are mutually exclusive.

Take either STAT3655 or STAT3955 to fulfill the requirement; but not both. STAT3655 and

STAT3955 are mutually exclusive.

3. Capstone requirement (6 credits)

STAT3955

At least 6 credits selected from the following courses:

Survival analysis (6)

STAT3799 Directed studies in statistics (6)

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6) STAT4799 Statistics project (12)

#### Notes:

1. Students who wish to specialize in the theme of data science are recommended to choose the combination of courses STAT3612, STAT3613, STAT3616 and STAT3621. Note that students who wish to take STAT3616 and STAT3621 are strongly recommended to take STAT2603 first.

- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 6. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

#### Remarks:

Major Title Major in Statistics

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

The Major in Statistics focuses on the study of statistics, a scientific discipline characterized by the development and applications of analytical and quantitative tools which involve logical thinking, problem formulation, probability reasoning and intensive data analyses. The programme aims to equip students with powerful mathematical, analytical and computational skills, which are in great demand in practical areas where data are obtained for the purpose of extracting information in support of decision making. It gives students a strong background in statistical concepts, and provides broad and solid training in applied statistical methodologies. The curriculum is constantly revised to meet a steadily rising demand for specialist statisticians or quantitative analysts in government, business, finance, industry, as well as in research and teaching in local and overseas institutions.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: receive solid training in probability and statistics, gain insight into their underlying theory and be acquainted with their state-of-the-art applications in the modern world (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: conduct meticulous data analyses, supported by rigorous statistical reasoning, to make informed decisions in the face of uncertainty that arises in all sorts of institutions and companies, and appraise the related ethical issues (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: equip with hands-on experience in data analysis using commercial statistical software, and be competent for dataanalytic jobs which require advanced computational skills (by means of coursework, tutorial classes and/or projectbased learning in the curriculum)
- PLO 4: be highly motivated to explore cross-disciplinary applications of statistics in a broad variety of academic or professional areas including, in particular, mathematics, natural sciences, economics, finance, business, risk management, actuarial work, social sciences and engineering (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: communicate and collaborate with people effectively on probability and statistical issues (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: through the understanding and application of statistical concepts and techniques, gain confidence to meet challenges posed by increasingly complicated real-life problems encountered in the modern era in a creative and rational manner (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

#### Impermissible Combinations:

Major in Decision Analytics

Major in Risk Management

Minor in Risk Management

Minor in Statistics

# Required courses (96 credits)

#### 1. Introductory level courses (42 credits)

## Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) **SCNC1112** Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

MATH1013 University mathematics II (6) Statistics: ideas and concepts (6) STAT1600 STAT2601 Probability and statistics I (6) STAT2602 Probability and statistics II (6) STAT2603 Data management with SAS (6)

# 2. Advanced level courses (48 credits)

# **Disciplinary Core Courses (24 credits)**

Linear statistical analysis (6) STAT3600 STAT3603 Stochastic processes (6) [previous title: Probability modelling (6)] STAT4601 Time-series analysis (6)

Multivariate data analysis (6) STAT4602

#### **Disciplinary Electives (24 credits)**

At least 24 credits from Lists A and B, among which at least 6 credits from List A:

List A STAT3602 Statistical inference (6) Design and analysis of experiments (6) STAT3604 Modern nonparametric statistics (6) STAT3620 Statistical data analysis (6) STAT3621

List B

STAT3608

STAT3605 Quality control and management (6)

STAT3606 Business logistics (6)

STAT3607 Statistics in clinical medicine and bio-medical research (6) Statistical genetics (6)

STAT3612 Statistical machine learning (6) [previous title: Data mining (6)] [previous title: Marketing engineering (6)] STAT3613 Marketing analytics (6)

Advanced SAS programming (6) STAT3616 STAT3617 Sample survey methods (6)

STAT3655 Survival analysis (6)

Take either STAT3655 or STAT3955 to fulfill the requirement; but not both. STAT3655 and

STAT3955 are mutually exclusive.

STAT3955 Survival analysis (6)

Take either STAT3655 or STAT3955 to fulfill the requirement; but not both. STAT3655 and STAT3955 are mutually exclusive.

#### 3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

STAT3799 Directed studies in statistics (6)

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6) STAT4799 Statistics project (12)

#### Notes:

1. Students who wish to specialize in the theme of data science are recommended to choose the combination of courses STAT3612, STAT3613, STAT3616 and STAT3621. Note that students who wish to take STAT3616 and STAT3621 are strongly recommended to take STAT2603 first.

- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 6. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

#### Remarks:

Major Title Major in Statistics

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

The Major in Statistics focuses on the study of statistics, a scientific discipline characterized by the development and applications of analytical and quantitative tools which involve logical thinking, problem formulation, probability reasoning and intensive data analyses. The programme aims to equip students with powerful mathematical, analytical and computational skills, which are in great demand in practical areas where data are obtained for the purpose of extracting information in support of decision making. It gives students a strong background in statistical concepts, and provides broad and solid training in applied statistical methodologies. The curriculum is constantly revised to meet a steadily rising demand for specialist statisticians or quantitative analysts in government, business, finance, industry, as well as in research and teaching in local and overseas institutions.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: receive solid training in probability and statistics, gain insight into their underlying theory and be acquainted with their state-of-the-art applications in the modern world (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 2: conduct meticulous data analyses, supported by rigorous statistical reasoning, to make informed decisions in the face of uncertainty that arises in all sorts of institutions and companies, and appraise the related ethical issues (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 3: equip with hands-on experience in data analysis using commercial statistical software, and be competent for dataanalytic jobs which require advanced computational skills (by means of coursework, tutorial classes and/or projectbased learning in the curriculum)
- PLO 4: be highly motivated to explore cross-disciplinary applications of statistics in a broad variety of academic or professional areas including, in particular, mathematics, natural sciences, economics, finance, business, risk management, actuarial work, social sciences and engineering (by means of coursework, tutorial classes and/or project-based learning in the curriculum)
- PLO 5: communicate and collaborate with people effectively on probability and statistical issues (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)
- PLO 6: through the understanding and application of statistical concepts and techniques, gain confidence to meet challenges posed by increasingly complicated real-life problems encountered in the modern era in a creative and rational manner (by means of coursework, tutorial classes, project-based and/or capstone learning in the curriculum)

#### Impermissible Combinations:

Major in Decision Analytics

Major in Risk Management

Minor in Risk Management

Minor in Statistics

# Required courses (96 credits)

#### 1. Introductory level courses (42 credits)

## Disciplinary Core Courses: Science Foundation Courses (12 credits)

SCNC1111 Scientific method and reasoning (6) SCNC1112 Fundamentals of modern science (6)

**Disciplinary Core Courses (30 credits)** 

MATH1013 University mathematics II (6)
STAT1600 Statistics: ideas and concepts (6)
STAT2601 Probability and statistics II (6)
STAT2602 Probability and statistics II (6)
STAT2603 Data management with SAS (6)

# 2. Advanced level courses (48 credits)

# **Disciplinary Core Courses (24 credits)**

STAT3600 Linear statistical analysis (6)
STAT3603 Stochastic processes (6) [previous title: Probability modelling (6)]
STAT4601 Time-series analysis (6)

STAT4602 Multivariate data analysis (6)

#### **Disciplinary Electives (24 credits)**

At least 24 credits from Lists A and B, among which at least 6 credits from List A:

STAT3602 Statistical inference (6)
STAT3604 Design and analysis of experiments (6)
STAT3620 Modern nonparametric statistics (6)
STAT3621 Statistical data analysis (6)

List B

List A

STAT3605 Quality control and management (6)

STAT3606 Business logistics (6)

STAT3607 Statistics in clinical medicine and bio-medical research (6) STAT3608 Statistical genetics (6)

STAT3608 Statistical genetics (6)
STAT3612 Statistical machine learning (6)
STAT3613 Marketing analytics (6)
STAT3616 Advanced SAS programming (6)

STAT3616 Advanced SAS programming (6) STAT3617 Sample survey methods (6) [previous title: Data mining (6) ]
[previous title: Marketing engineering (6) ]

STAT3655 Survival analysis (6)

Take either STAT3655 or STAT3955 to fulfill the requirement; but not both. STAT3655 and

STAT3955 are mutually exclusive.

Take either STAT3655 or STAT3955 to fulfill the requirement; but not both. STAT3655 and

STAT3955 are mutually exclusive.

3. Capstone requirement (6 credits)

STAT3955

At least 6 credits selected from the following courses:

Survival analysis (6)

STAT3799 Directed studies in statistics (6)

STAT4710 Capstone experience for statistics undergraduates (6)

STAT4766 Statistics internship (6) STAT4799 Statistics project (12)

#### Notes:

1. Students who wish to specialize in the theme of data science are recommended to choose the combination of courses STAT3612, STAT3613, STAT3616 and STAT3621. Note that students who wish to take STAT3616 and STAT3621 are strongly recommended to take STAT2603 first.

- 2. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 3. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("disciplinary core") in both the first and second majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) (disciplinary electives) in the second major. Double counting of credits is not permissible for major-minor or double-minors combinations. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 4. Students are not required to take Capstone if this Science major is taken as a second major on the condition that the capstone experience in the first major requires the integration or application of knowledge from both major disciplines. If this is approved, a 6-credit advanced level course (disciplinary electives) in the second major must be taken to fulfill the credit requirement of the capstone experience.
- 5. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 6. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

#### Remarks:

Science Minors 2021-2022

# SCIENCE

# SECTION VII Science Minors on offer in 2021/2022

# Minors offered by Science Faculty

#### **Minors**

Actuarial Studies (not for BSc(ActuarSc) students)

Astronomy

Biochemistry

Chemistry

Computational & Financial Mathematics

Earth Sciences

Ecology & Biodiversity

**Environmental Science** 

Food & Nutritional Science

Marine Biology

Mathematics

Molecular Biology & Biotechnology

Operations Research & Mathematical Programming

**Physics** 

Plant Science

Risk Management

Science Entrepreneurship (for 2016 cohort and thereafter)

Statistics

Offered to students 2021

admitted to Year 1 in

#### **Objectives:**

The Minor in Actuarial Studies aims to provide interested students with an introduction to the basic concepts and methodologies in Actuarial Science. The minor curriculum is designed particularly for students from different majors to enhance their interests in Actuarial Science and to strengthen their confidence and potential in solving mathematical, financial, economical and investment-related problems.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and apply the methods used by actuaries to solve problems of insurance, investment, pension, financial risk management and demography (by means of coursework and tutorial classes and/or research-based project in the curriculum)
- PLO 2: develop and apply problem-solving skills appropriate to the level of the preliminary education component specified by international actuarial bodies such as the Society of Actuaries (by means of coursework and tutorial classes and/or research-based project in the curriculum)

#### Impermissible Combinations:

Bachelor of Science in Actuarial Science

#### Required courses (42 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

FINA1310 Corporate finance (6)
MATH1013 University mathematics II (6)
STAT2601 Probability and statistics I (6)
STAT2602 Probability and statistics II (6)

STAT2605 Demographic and socio-economic statistics (6)

#### 2. Advanced level courses (30 credits)

#### **Disciplinary Electives (30 credits)**

At least 30 credits selected from the following courses:

STAT3615 Practical mathematics for investment (6)

STAT3901 Life contingencies I (6)

STAT3904 Corporate finance for actuarial science (6)

STAT3906 Risk theory I (6)

STAT3908 Credibility theory and loss distributions (6)

STAT3910 Financial economics I (6) STAT3911 Financial economics II (6)

STAT3953 Fundamentals of actuarial practice (6) STAT4903 Actuarial techniques for general insurance (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Offered to students 2020

admitted to Year 1 in

#### **Objectives:**

The Minor in Actuarial Studies aims to provide interested students with an introduction to the basic concepts and methodologies in Actuarial Science. The minor curriculum is designed particularly for students from different majors to enhance their interests in Actuarial Science and to strengthen their confidence and potential in solving mathematical, financial, economical and investment-related problems.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and apply the methods used by actuaries to solve problems of insurance, investment, pension, financial risk management and demography (by means of coursework and tutorial classes and/or research-based project in the curriculum)
- PLO 2: develop and apply problem-solving skills appropriate to the level of the preliminary education component specified by international actuarial bodies such as the Society of Actuaries (by means of coursework and tutorial classes and/or research-based project in the curriculum)

#### Impermissible Combinations:

Bachelor of Science in Actuarial Science

#### Required courses (42 credits)

#### 1. Introductory level courses (12 credits)

#### Disciplinary Electives (12 credits)

At least 12 credits selected from the following courses:

FINA1310 Corporate finance (6)
MATH1013 University mathematics II (6)
STAT2601 Probability and statistics I (6)
STAT2602 Probability and statistics II (6)

STAT2605 Demographic and socio-economic statistics (6)

STAT2901 Probability and statistics: foundations of actuarial science (6)

## 2. Advanced level courses (30 credits)

#### **Disciplinary Electives (30 credits)**

At least 30 credits selected from the following courses:

STAT3615 Practical mathematics for investment (6)

STAT3901 Life contingencies I (6)

STAT3904 Corporate finance for actuarial science (6)

STAT3906 Risk theory I (6)

STAT3908 Credibility theory and loss distributions (6)

STAT3910 Financial economics I (6) STAT3911 Financial economics II (6)

STAT3953 Fundamentals of actuarial practice (6)
STAT4903 Actuarial techniques for general insurance (6)

#### Notes:

#### Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Offered to students 2019

admitted to Year 1 in

#### **Objectives:**

The Minor in Actuarial Studies aims to provide interested students with an introduction to the basic concepts and methodologies in Actuarial Science. The minor curriculum is designed particularly for students from different majors to enhance their interests in Actuarial Science and to strengthen their confidence and potential in solving mathematical, financial, economical and investment-related problems.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and apply the methods used by actuaries to solve problems of insurance, investment, pension, financial risk management and demography (by means of coursework and tutorial classes and/or research-based project in the curriculum)
- PLO 2: develop and apply problem-solving skills appropriate to the level of the preliminary education component specified by international actuarial bodies such as the Society of Actuaries (by means of coursework and tutorial classes and/or research-based project in the curriculum)

#### Impermissible Combinations:

Bachelor of Science in Actuarial Science

#### Required courses (42 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

FINA1310 Corporate finance (6)
MATH1013 University mathematics II (6)
STAT2601 Probability and statistics I (6)
STAT2602 Probability and statistics II (6)

STAT2605 Demographic and socio-economic statistics (6)

STAT2901 Probability and statistics: foundations of actuarial science (6)

## 2. Advanced level courses (30 credits)

#### **Disciplinary Electives (30 credits)**

At least 30 credits selected from the following courses:

STAT3615 Practical mathematics for investment (6)

STAT3901 Life contingencies I (6)

STAT3904 Corporate finance for actuarial science (6)

STAT3906 Risk theory I (6)

STAT3908 Credibility theory and loss distributions (6)

STAT3910 Financial economics I (6) STAT3911 Financial economics II (6)

STAT3953 Fundamentals of actuarial practice (6) STAT4903 Actuarial techniques for general insurance (6)

#### Notes:

#### Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

2018

Offered to students

admitted to Year 1 in

#### **Objectives:**

The Minor in Actuarial Studies aims to provide interested students with an introduction to the basic concepts and methodologies in Actuarial Science. The minor curriculum is designed particularly for students from different majors to enhance their interests in Actuarial Science and to strengthen their confidence and potential in solving mathematical, financial, economical and investment-related problems.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and apply the methods used by actuaries to solve problems of insurance, investment, pension, financial risk management and demography (by means of coursework and tutorial classes and/or research-based project in the curriculum)
- PLO 2: develop and apply problem-solving skills appropriate to the level of the preliminary education component specified by international actuarial bodies such as the Society of Actuaries (by means of coursework and tutorial classes and/or research-based project in the curriculum)

#### Impermissible Combinations:

Bachelor of Science in Actuarial Science

#### Required courses (42 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

FINA1310 Corporate finance (6)
MATH1013 University mathematics II (6)
STAT2601 Probability and statistics I (6)
STAT2602 Probability and statistics II (6)

STAT2605 Demographic and socio-economic statistics (6)

STAT2901 Probability and statistics: foundations of actuarial science (6)

# 2. Advanced level courses (30 credits)

#### **Disciplinary Electives (30 credits)**

At least 30 credits selected from the following courses:

STAT3615 Practical mathematics for investment (6)

STAT3901 Life contingencies I (6)

STAT3904 Corporate finance for actuarial science (6)

STAT3906 Risk theory I (6)

STAT3908 Credibility theory and loss distributions (6)

STAT3910 Financial economics I (6) STAT3911 Financial economics II (6)

STAT3953 Fundamentals of actuarial practice (6) STAT4903 Actuarial techniques for general insurance (6)

#### Notes:

#### Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

The Minor in Actuarial Studies aims to provide interested students with an introduction to the basic concepts and methodologies in Actuarial Science. The minor curriculum is designed particularly for students from different majors to enhance their interests in Actuarial Science and to strengthen their confidence and potential in solving mathematical, financial, economical and investment-related problems.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and apply the methods used by actuaries to solve problems of insurance, investment, pension, financial risk management and demography (by means of coursework and tutorial classes and/or research-based project in the curriculum)
- PLO 2: develop and apply problem-solving skills appropriate to the level of the preliminary education component specified by international actuarial bodies such as the Society of Actuaries (by means of coursework and tutorial classes and/or research-based project in the curriculum)

#### Impermissible Combinations:

Bachelor of Science in Actuarial Science

#### Required courses (42 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

FINA1310 Corporate finance (6)
MATH1013 University mathematics II (6)
STAT2601 Probability and statistics I (6)
STAT2602 Probability and statistics II (6)

STAT2605 Demographic and socio-economic statistics (6)

STAT2901 Probability and statistics: foundations of actuarial science (6)

# 2. Advanced level courses (30 credits)

#### **Disciplinary Electives (30 credits)**

At least 30 credits selected from the following courses:

STAT3615 Practical mathematics for investment (6)

STAT3901 Life contingencies I (6)

STAT3904 Corporate finance for actuarial science (6)

STAT3906 Risk theory I (6)

STAT3908 Credibility theory and loss distributions (6)

STAT3910 Financial economics I (6) STAT3911 Financial economics II (6)

STAT3953 Fundamentals of actuarial practice (6) STAT4903 Actuarial techniques for general insurance (6)

#### Notes:

#### Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

2016

Offered to students

admitted to Year 1 in

#### **Objectives:**

The Minor in Actuarial Studies aims to provide interested students with an introduction to the basic concepts and methodologies in Actuarial Science. The minor curriculum is designed particularly for students from different majors to enhance their interests in Actuarial Science and to strengthen their confidence and potential in solving mathematical, financial, economical and investment-related problems.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and apply the methods used by actuaries to solve problems of insurance, investment, pension, financial risk management and demography (by means of coursework and tutorial classes and/or research-based project in the curriculum)
- PLO 2: develop and apply problem-solving skills appropriate to the level of the preliminary education component specified by international actuarial bodies such as the Society of Actuaries (by means of coursework and tutorial classes and/or research-based project in the curriculum)

#### Impermissible Combinations:

Bachelor of Science in Actuarial Science

#### Required courses (42 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

FINA1310 Corporate finance (6)
MATH1013 University mathematics II (6)
STAT2601 Probability and statistics I (6)
STAT2602 Probability and statistics II (6)

STAT2605 Demographic and socio-economic statistics (6)

STAT2901 Probability and statistics: foundations of actuarial science (6)

## 2. Advanced level courses (30 credits)

#### **Disciplinary Electives (30 credits)**

At least 30 credits selected from the following courses:

STAT3615 Practical mathematics for investment (6)

STAT3901 Life contingencies I (6)

STAT3904 Corporate finance for actuarial science (6)

STAT3906 Risk theory I (6)

STAT3908 Credibility theory and loss distributions (6)

STAT3910 Financial economics I (6) STAT3911 Financial economics II (6)

STAT3953 Fundamentals of actuarial practice (6) STAT4903 Actuarial techniques for general insurance (6)

#### Notes:

#### Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

The Minor in Actuarial Studies aims to provide interested students with an introduction to the basic concepts and methodologies in Actuarial Science. The minor curriculum is designed particularly for students from different majors to enhance their interests in Actuarial Science and to strengthen their confidence and potential in solving mathematical, financial, economical and investment-related problems.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and apply the methods used by actuaries to solve problems of insurance, investment, pension, financial risk management and demography (by means of coursework and tutorial classes and/or research-based project in the curriculum)
- PLO 2: develop and apply problem-solving skills appropriate to the level of the preliminary education component specified by international actuarial bodies such as the Society of Actuaries (by means of coursework and tutorial classes and/or research-based project in the curriculum)

#### Impermissible Combinations:

Bachelor of Science in Actuarial Science

#### Required courses (42 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

FINA1310 Corporate finance (6)
MATH1013 University mathematics II (6)
STAT2601 Probability and statistics I (6)
STAT2602 Probability and statistics II (6)

STAT2605 Demographic and socio-economic statistics (6)

STAT2901 Probability and statistics: foundations of actuarial science (6)

## 2. Advanced level courses (30 credits)

# Disciplinary Electives (30 credits)

At least 30 credits selected from the following courses:

STAT3615 Practical mathematics for investment (6)

STAT3901 Life contingencies I (6)

STAT3904 Corporate finance for actuarial science (6)

STAT3906 Risk theory I (6)

STAT3908 Credibility theory and loss distributions (6)

STAT3910 Financial economics I (6) STAT3911 Financial economics II (6)

STAT3953 Fundamentals of actuarial practice (6)
STAT4903 Actuarial techniques for general insurance (6)

#### Notes:

#### Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

The Minor in Actuarial Studies aims to provide interested students with an introduction to the basic concepts and methodologies in Actuarial Science. The minor curriculum is designed particularly for students from different majors to enhance their interests in Actuarial Science and to strengthen their confidence and potential in solving mathematical, financial, economical and investment-related problems.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and apply the methods used by actuaries to solve problems of insurance, investment, pension, financial risk management and demography (by means of coursework and tutorial classes and/or research-based project in the curriculum)
- PLO 2: develop and apply problem-solving skills appropriate to the level of the preliminary education component specified by international actuarial bodies such as the Society of Actuaries (by means of coursework and tutorial classes and/or research-based project in the curriculum)

#### Impermissible Combinations:

Bachelor of Science in Actuarial Science

#### Required courses (42 credits)

#### 1. Introductory level courses (12 credits)

#### Disciplinary Electives (12 credits)

At least 12 credits selected from the following courses:

FINA1310 Corporate finance (6)
MATH1013 University mathematics II (6)
STAT2601 Probability and statistics I (6)
STAT2602 Probability and statistics II (6)

STAT2605 Demographic and socio-economic statistics (6)

STAT2901 Probability and statistics: foundations of actuarial science (6)

## 2. Advanced level courses (30 credits)

#### **Disciplinary Electives (30 credits)**

At least 30 credits selected from the following courses:

STAT3615 Practical mathematics for investment (6)

STAT3901 Life contingencies I (6)

STAT3904 Corporate finance for actuarial science (6)

STAT3906 Risk theory I (6)

STAT3908 Credibility theory and loss distributions (6)

STAT3910 Financial economics I (6) STAT3911 Financial economics II (6)

STAT3953 Fundamentals of actuarial practice (6)
STAT4903 Actuarial techniques for general insurance (6)

#### Notes:

#### Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

The Minor in Actuarial Studies aims to provide interested students with an introduction to the basic concepts and methodologies in Actuarial Science. The minor curriculum is designed particularly for students from different majors to enhance their interests in Actuarial Science and to strengthen their confidence and potential in solving mathematical, financial, economical and investment-related problems.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and apply the methods used by actuaries to solve problems of insurance, investment, pension, financial risk management and demography (by means of coursework and tutorial classes and/or research-based project in the curriculum)
- PLO 2: develop and apply problem-solving skills appropriate to the level of the preliminary education component specified by international actuarial bodies such as the Society of Actuaries (by means of coursework and tutorial classes and/or research-based project in the curriculum)

#### Impermissible Combinations:

Bachelor of Science in Actuarial Science

#### Required courses (42 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

FINA1310 Corporate finance (6)
MATH1013 University mathematics II (6)
STAT2601 Probability and statistics I (6)
STAT2602 Probability and statistics II (6)

STAT2605 Demographic and socio-economic statistics (6)

STAT2901 Probability and statistics: foundations of actuarial science (6)

## 2. Advanced level courses (30 credits)

#### **Disciplinary Electives (30 credits)**

At least 30 credits selected from the following courses:

STAT3615 Practical mathematics for investment (6)

STAT3901 Life contingencies I (6)

STAT3904 Corporate finance for actuarial science (6)

STAT3906 Risk theory I (6)

STAT3908 Credibility theory and loss distributions (6)

STAT3910 Financial economics I (6) STAT3911 Financial economics II (6)

STAT3953 Fundamentals of actuarial practice (6) STAT4903 Actuarial techniques for general insurance (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

The Minor in Actuarial Studies aims to provide interested students with an introduction to the basic concepts and methodologies in Actuarial Science. The minor curriculum is designed particularly for students from different majors to enhance their interests in Actuarial Science and to strengthen their confidence and potential in solving mathematical, financial, economical and investment-related problems.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and apply the methods used by actuaries to solve problems of insurance, investment, pension, financial risk management and demography (by means of coursework and tutorial classes and/or research-based project in the curriculum)
- PLO 2: develop and apply problem-solving skills appropriate to the level of the preliminary education component specified by international actuarial bodies such as the Society of Actuaries (by means of coursework and tutorial classes and/or research-based project in the curriculum)

#### Impermissible Combinations:

Bachelor of Science in Actuarial Science

#### Required courses (42 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

FINA1310 Corporate finance (6)
MATH1013 University mathematics II (6)
STAT2601 Probability and statistics I (6)
STAT2602 Probability and statistics II (6)

STAT2605 Demographic and socio-economic statistics (6)

STAT2901 Probability and statistics: foundations of actuarial science (6)

#### 2. Advanced level courses (30 credits)

#### **Disciplinary Electives (30 credits)**

At least 30 credits selected from the following courses:

STAT3615 Practical mathematics for investment (6)

STAT3901 Life contingencies I (6)

STAT3904 Corporate finance for actuarial science (6)

STAT3906 Risk theory I (6)

STAT3908 Credibility theory and loss distributions (6)

STAT3910 Financial economics I (6) STAT3911 Financial economics II (6)

STAT3953 Fundamentals of actuarial practice (6) STAT4903 Actuarial techniques for general insurance (6)

#### Notes:

#### Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Minor Title Minor in Astronomy

Offered to students 2021

admitted to Year 1 in

#### **Objectives:**

The Minor in Astronomy is intended to provide interested students with a fundamental outlook on the subject. Students would acquire a taste of the subject through a large selection of elective courses to allow them to pursue their interests in the subject and to establish connections between the field of astronomy and other science disciplines.

#### Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: identify and describe astrophysical phenomena with fundamental knowledge in physics (by means of coursework and tutorial classes in the curriculum)
- PLO 2: develop their scientific intuition, abilities and techniques to tackle astrophysical problems either theoretical or observational in nature (by means of coursework, tutorial classes, and opportunities of field activities in the curriculum)
- PLO 3: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)

#### Impermissible Combinations:

#### Required courses (36 credits)

#### 1. Introductory level courses (18 credits)

#### **Disciplinary Core Courses (12 credits)**

Nature of the universe (6) PHYS1650 Modern astronomy (6) PHYS2650

#### **Disciplinary Electives (6 credits)**

At least 6 credits selected from the following courses:

PHYS1250 Fundamental physics (6) PHYS2055 Introductory relativity (6)

Introductory computational physics (6) PHYS2160

EASC2408 Planetary geology (6) 2. Advanced level courses (18 credits)

# **Disciplinary Core Courses (6 credits)**

Observational astronomy (6) PHYS3650

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

PHYS3653 Astrophysics (6) Astronomy laboratory (6) PHYS3660 PHYS4650 Stellar physics (6) Planetary science (6) PHYS4652 PHYS4653 Cosmology (6) General relativity (6) **PHYS4654** 

Interstellar medium (6) PHYS4655 PHYS4656 Advanced astrophysics (6)

#### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc
- 2. Students must have level 3 or above in HKDSE Physics or equivalent to take this minor. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

#### Remarks:

Minor Title Minor in Astronomy

Offered to students 2020

admitted to Year 1 in

#### **Objectives:**

The Minor in Astronomy is intended to provide interested students with a fundamental outlook on the subject. Students would acquire a taste of the subject through a large selection of elective courses to allow them to pursue their interests in the subject and to establish connections between the field of astronomy and other science disciplines.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe astrophysical phenomena with fundamental knowledge in physics (by means of coursework and tutorial classes in the curriculum)
- PLO 2: develop their scientific intuition, abilities and techniques to tackle astrophysical problems either theoretical or observational in nature (by means of coursework, tutorial classes, and opportunities of field activities in the curriculum)
- PLO 3: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)

#### Impermissible Combinations:

NII

#### Required courses (36 credits)

#### 1. Introductory level courses (18 credits)

#### **Disciplinary Core Courses (12 credits)**

PHYS1650 Nature of the universe (6) PHYS2650 Modern astronomy (6)

#### **Disciplinary Electives (6 credits)**

At least 6 credits selected from the following courses:

PHYS1250 Fundamental physics (6) PHYS2055 Introductory relativity (6)

PHYS2160 Introductory computational physics (6)

EASC2408 Planetary geology (6)

# 2. Advanced level courses (18 credits)

#### **Disciplinary Core Courses (6 credits)**

PHYS3650 Observational astronomy (6)

# Disciplinary Electives (12 credits)

At least 12 credits selected from the following courses:

PHYS3653 Astrophysics (6)
PHYS3660 Astronomy laboratory (6)
PHYS4650 Stellar physics (6)
PHYS4652 Planetary science (6)
PHYS4653 Cosmology (6)
PHYS4654 General relativity (6)

PHYS4655 Interstellar medium (6)
PHYS4656 Advanced astrophysics (6)

#### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses
- 2. Students must have level 3 or above in HKDSE Physics or equivalent to take this minor. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

# Remarks:

Minor Title Minor in Astronomy

Offered to students 2019

admitted to Year 1 in

#### **Objectives:**

The Minor in Astronomy is intended to provide interested students with a fundamental outlook on the subject. Students would acquire a taste of the subject through a large selection of elective courses to allow them to pursue their interests in the subject and to establish connections between the field of astronomy and other science disciplines.

#### Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: identify and describe astrophysical phenomena with fundamental knowledge in physics (by means of coursework and tutorial classes in the curriculum)
- PLO 2: develop their scientific intuition, abilities and techniques to tackle astrophysical problems either theoretical or observational in nature (by means of coursework, tutorial classes, and opportunities of field activities in the curriculum)
- PLO 3: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)

#### Impermissible Combinations:

#### Required courses (36 credits)

#### 1. Introductory level courses (18 credits)

#### **Disciplinary Core Courses (12 credits)**

Nature of the universe (6) PHYS1650 Modern astronomy (6) PHYS2650

#### **Disciplinary Electives (6 credits)**

At least 6 credits selected from the following courses:

PHYS1250 Fundamental physics (6) PHYS2055 Introductory relativity (6)

Introductory computational physics (6) PHYS2160

EASC2408 Planetary geology (6) 2. Advanced level courses (18 credits)

# **Disciplinary Core Courses (6 credits)**

Observational astronomy (6) PHYS3650

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

PHYS3653 Astrophysics (6) Astronomy laboratory (6) PHYS3660 PHYS4650 Stellar physics (6) Planetary science (6) PHYS4652 PHYS4653 Cosmology (6) General relativity (6) **PHYS4654** 

Interstellar medium (6) PHYS4655 PHYS4656 Advanced astrophysics (6)

#### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc
- 2. Students must have level 3 or above in HKDSE Physics or equivalent to take this minor. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

# Remarks:

Minor Title Minor in Astronomy

Offered to students 2018

admitted to Year 1 in

#### Objectives:

The Minor in Astronomy is intended to provide interested students with a fundamental outlook on the subject. Students would acquire a taste of the subject through a large selection of elective courses to allow them to pursue their interests in the subject and to establish connections between the field of astronomy and other science disciplines.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe astrophysical phenomena with fundamental knowledge in physics (by means of coursework and tutorial classes in the curriculum)
- PLO 2: develop their scientific intuition, abilities and techniques to tackle astrophysical problems either theoretical or observational in nature (by means of coursework, tutorial classes, and opportunities of field activities in the curriculum)
- PLO 3: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)

#### Impermissible Combinations:

NII

## Required courses (36 credits)

#### 1. Introductory level courses (18 credits)

#### **Disciplinary Core Courses (12 credits)**

PHYS1650 Nature of the universe (6) PHYS2650 Modern astronomy (6)

#### **Disciplinary Electives (6 credits)**

At least 6 credits selected from the following courses:

PHYS1250 Fundamental physics (6) PHYS2055 Introductory relativity (6)

PHYS2055 Introductory relativity (6) [previous title: Introduction to relativity (6)]
EASC2408 Planetary geology (6)

# 2. Advanced level courses (18 credits) Disciplinary Core Courses (6 credits)

PHYS3650 Observational astronomy (6)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

PHYS3653 Astrophysics (6) **PHYS3660** Astronomy laboratory (6) Stellar physics (6) **PHYS4650** PHYS4652 Planetary science (6) Cosmology (6) PHYS4653 **PHYS4654** General relativity (6) **PHYS4655** Interstellar medium (6) **PHYS4656** Advanced astrophysics (6)

#### **Notes**

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 3 or above in HKDSE Physics or equivalent to take this minor. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

#### Remarks:

Minor Title Minor in Astronomy

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

The Minor in Astronomy is intended to provide interested students with a fundamental outlook on the subject. Students would acquire a taste of the subject through a large selection of elective courses to allow them to pursue their interests in the subject and to establish connections between the field of astronomy and other science disciplines.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe astrophysical phenomena with fundamental knowledge in physics (by means of coursework and tutorial classes in the curriculum)
- PLO 2: develop their scientific intuition, abilities and techniques to tackle astrophysical problems either theoretical or observational in nature (by means of coursework, tutorial classes, and opportunities of field activities in the curriculum)
- PLO 3: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Major in Astronomy

#### Required courses (42 credits)

#### 1. Introductory level courses (18 credits)

#### **Disciplinary Core Courses (18 credits)**

PHYS1250 Fundamental physics (6)
PHYS1650 Nature of the universe (6)
PHYS2265 Introductory quantum physics (6)

2. Advanced level courses (24 credits)

# Disciplinary Electives (24 credits)

At least 24 credits selected from the following courses:

PHYS3650 Observational astronomy (6)
PHYS3651 The physical universe (6)
PHYS3652 Principles of astronomy (6)
PHYS3653 Astrophysics (6)
PHYS3660 Astronomy laboratory (6)

PHYS4650 Stellar physics (6)

PHYS4651 Selected topics in astrophysics (6)

PHYS4652 Planetary science (6)
PHYS4653 Cosmology (6)
PHYS4654 General relativity (6)
PHYS4655 Interstellar medium (6)
PHYS4656 Advanced astrophysics (6)
PHYS7650 Stellar atmospheres (6)

#### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 3 or above in HKDSE Physics or equivalent to take this minor. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

#### Remarks:

Minor Title Minor in Astronomy

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

The Minor in Astronomy is intended to provide interested students with a fundamental outlook on the subject. Students would acquire a taste of the subject through a large selection of elective courses to allow them to pursue their interests in the subject and to establish connections between the field of astronomy and other science disciplines.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe astrophysical phenomena with fundamental knowledge in physics (by means of coursework and tutorial classes in the curriculum)
- PLO 2: develop their scientific intuition, abilities and techniques to tackle astrophysical problems either theoretical or observational in nature (by means of coursework, tutorial classes, and opportunities of field activities in the curriculum)
- PLO 3: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Major in Astronomy

#### Required courses (42 credits)

#### 1. Introductory level courses (18 credits)

#### **Disciplinary Core Courses (18 credits)**

PHYS1250 Fundamental physics (6)
PHYS1650 Nature of the universe (6)
PHYS2265 Introductory quantum physics (6)

[previous title: Modern physics (6) ]

#### 2. Advanced level courses (24 credits) Disciplinary Electives (24 credits)

At least 24 credits selected from the following courses:

PHYS3650 Observational astronomy (6)
PHYS3651 The physical universe (6)
PHYS3652 Principles of astronomy (6)
PHYS3653 Astrophysics (6)
PHYS3660 Astronomy laboratory (6)

PHYS4650 Stellar physics (6)

PHYS4651 Selected topics in astrophysics (6)

PHYS4652 Planetary science (6)
PHYS4653 Cosmology (6)
PHYS4654 General relativity (6)
PHYS4655 Interstellar medium (6)
PHYS4656 Advanced astrophysics (6)
PHYS7650 Stellar atmospheres (6)

#### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 3 or above in HKDSE Physics or equivalent to take this minor. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

#### Remarks

Minor Title Minor in Astronomy

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

The Minor in Astronomy is intended to provide interested students with a fundamental outlook on the subject. Students would acquire a taste of the subject through a large selection of elective courses to allow them to pursue their interests in the subject and to establish connections between the field of astronomy and other science disciplines.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe astrophysical phenomena with fundamental knowledge in physics (by means of coursework and tutorial classes in the curriculum)
- PLO 2: develop their scientific intuition, abilities and techniques to tackle astrophysical problems either theoretical or observational in nature (by means of coursework, tutorial classes, and opportunities of field activities in the curriculum)
- PLO 3: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Major in Astronomy

#### Required courses (42 credits)

#### 1. Introductory level courses (18 credits)

#### **Disciplinary Core Courses (18 credits)**

Fundamental physics (6) PHYS1250 Nature of the universe (6) PHYS1650 **PHYS2265** Introductory quantum physics (6)

[previous title: Modern physics (6)]

#### 2. Advanced level courses (24 credits) **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

Observational astronomy (6) PHYS3650 PHYS3651 The physical universe (6) **PHYS3652** Principles of astronomy (6) PHYS3653 Astrophysics (6) Astronomy laboratory (6) **PHYS3660** 

Stellar physics (6) PHYS4650

PHYS4651 Selected topics in astrophysics (6)

PHYS4652 Planetary science (6) Cosmology (6) PHYS4653 **PHYS4654** General relativity (6) Interstellar medium (6) PHYS4655 **PHYS4656** Advanced astrophysics (6) PHYS7650 Stellar atmospheres (6)

#### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc
- 2. Students must have level 3 or above in HKDSE Physics or equivalent to take this minor. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

Minor Title Minor in Astronomy

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

The Minor in Astronomy is intended to provide interested students with a fundamental outlook on the subject. Students would acquire a taste of the subject through a large selection of elective courses to allow them to pursue their interests in the subject and to establish connections between the field of astronomy and other science disciplines.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe astrophysical phenomena with fundamental knowledge in physics (by means of coursework and tutorial classes in the curriculum)
- PLO 2: develop their scientific intuition, abilities and techniques to tackle astrophysical problems either theoretical or observational in nature (by means of coursework, tutorial classes, and opportunities of field activities in the curriculum)
- PLO 3: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Major in Astronomy

## Required courses (42 credits)

#### 1. Introductory level courses (18 credits)

#### **Disciplinary Core Courses (18 credits)**

PHYS1250 Fundamental physics (6)
PHYS1650 Nature of the universe (6)
PHYS2265 Introductory quantum physics (6)

2. Advanced level courses (24 credits) Disciplinary Electives (24 credits)

At least 24 credits selected from the following courses:

PHYS3650 Observational astronomy (6)
PHYS3651 The physical universe (6)
PHYS3652 Principles of astronomy (6)

PHYS4650 Stellar physics (6)

PHYS4651 Selected topics in astrophysics (6)

PHYS4652 Planetary science (6)
PHYS4653 Cosmology (6)
PHYS4654 General relativity (6)
PHYS4655 Interstellar medium (6)
PHYS7650 Stellar atmospheres (6)

#### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 3 or above in HKDSE Physics or equivalent to take this minor. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

#### Remarks:

Minor Title Minor in Astronomy

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

The Minor in Astronomy is intended to provide interested students with a fundamental outlook on the subject. Students would acquire a taste of the subject through a large selection of elective courses to allow them to pursue their interests in the subject and to establish connections between the field of astronomy and other science disciplines.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe astrophysical phenomena with fundamental knowledge in physics (by means of coursework and tutorial classes in the curriculum)
- PLO 2: develop their scientific intuition, abilities and techniques to tackle astrophysical problems either theoretical or observational in nature (by means of coursework, tutorial classes, and opportunities of field activities in the curriculum)
- PLO 3: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Major in Astronomy

#### Required courses (42 credits)

#### 1. Introductory level courses (18 credits)

# Disciplinary Core Courses (18 credits)

PHYS1250 Fundamental physics (6)
PHYS1650 Nature of the universe (6)
PHYS2265 Introductory quantum physics (6)

2. Advanced level courses (24 credits)

# Disciplinary Electives (24 credits)

At least 24 credits selected from the following courses:

PHYS3650 Observational astronomy (6)
PHYS3651 The physical universe (6)
PHYS3652 Principles of astronomy (6)

PHYS4650 Stellar physics (6)

PHYS4651 Selected topics in astrophysics (6)

PHYS4652 Planetary science (6)
PHYS4653 Cosmology (6)
PHYS4654 General relativity (6)
PHYS4655 Interstellar medium (6)
PHYS7650 Stellar atmospheres (6)

#### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 3 or above in HKDSE Physics or equivalent to take this minor. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

#### Remarks:

Minor Title Minor in Astronomy

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

The Minor in Astronomy is intended to provide interested students with a fundamental outlook on the subject. Students would acquire a taste of the subject through a large selection of elective courses to allow them to pursue their interests in the subject and to establish connections between the field of astronomy and other science disciplines.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe astrophysical phenomena with fundamental knowledge in physics (by means of coursework and tutorial classes in the curriculum)
- PLO 2: develop their scientific intuition, abilities and techniques to tackle astrophysical problems either theoretical or observational in nature (by means of coursework, tutorial classes, and opportunities of field activities in the curriculum)
- PLO 3: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Major in Astronomy

## Required courses (42 credits)

# 1. Introductory level courses (18 credits)

#### **Disciplinary Core Courses (18 credits)**

PHYS1250 Fundamental physics (6)
PHYS1650 Nature of the universe (6)
PHYS2265 Introductory quantum physics (6)

2. Advanced level courses (24 credits) Disciplinary Electives (24 credits)

At least 24 credits selected from the following courses:

PHYS3650 Observational astronomy (6)
PHYS3651 The physical universe (6)
PHYS3652 Principles of astronomy (6)

PHYS4650 Stellar physics (6)

PHYS4651 Selected topics in astrophysics (6)

PHYS4652 Planetary science (6)
PHYS4653 Cosmology (6)
PHYS4654 General relativity (6)
PHYS4655 Interstellar medium (6)
PHYS7650 Stellar atmospheres (6)

#### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 3 or above in HKDSE Physics or equivalent to take this minor. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

#### Remarks:

Offered to students 2021

admitted to Year 1 in

#### **Objectives:**

The Minor in Biochemistry is designed to provide students from all backgrounds with a multidisciplinary perspective on contemporary biochemistry and molecular biology. This minor curriculum incorporates significant flexibility to allow students to select courses that will complement the individual student's Major.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the fundamentals of biochemistry and molecular biology, and apply biochemical knowledge appropriately and effectively (by means of coursework and laboratory-based learning in the curriculum)
- integrate knowledge regarding the structure and function of biological molecules and how they come together to form the systems that make up life (by means of coursework and laboratory-based learning in the curriculum)
- PLO 3: develop a general interest in biochemistry and recognize the inter-relationship of biochemistry with other disciplines (by means of coursework and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Biochemistry

#### Required courses (36 credits)

# 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses: BIOC1600 Perspectives in biochemistry (6) From molecules to cells (6) BIOL1110 **BIOC2600** Basic biochemistry (6)

Take either BIOC2600 or BIOL2220 to fulfill this 12 credits requirement, but not both. BIOC2600 and BIOL2220 are mutually

exclusive.

**BIOL2220** Principles of biochemistry (6) Take either BIOC2600 or BIOL2220 to fulfill this 12 credits requirement, but not both. BIOC2600 and BIOL2220 are mutually

exclusive.

# 2. Advanced level courses (24 credits)

**Disciplinary Electives (24 credits)** 

At least 24 credits selected from the following courses: BIOC3601 Basic metabolism (6)

BIOC3604 Essential techniques in biochemistry and molecular biology (6) **BIOC3605** Sequence bioinformatics (6)

Molecular medicine (6) **BIOC3606** BIOL3202 Nutritional biochemistry (6) BIOL3401 Molecular biology (6)

Cell biology and cell technology (6) BIOL3402

Immunology (6) BIOL3403

Protein structure and function (6) BIOL3404 BIOC4610 Advanced biochemistry (6) BIOC4612 Molecular biology of the gene (6)

Advanced techniques in biochemistry & molecular biology (6) **BIOC4613** 

**BIOL4417** 'Omics' and systems biology (6)

Chemical biology (6) CHEM4444

## Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Offered to students 2020

admitted to Year 1 in

#### **Objectives:**

The Minor in Biochemistry is designed to provide students from all backgrounds with a multidisciplinary perspective on contemporary biochemistry and molecular biology. This minor curriculum incorporates significant flexibility to allow students to select courses that will complement the individual student's Major.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the fundamentals of biochemistry and molecular biology, and apply biochemical knowledge appropriately and effectively (by means of coursework and laboratory-based learning in the curriculum)
- PLO 2: integrate knowledge regarding the structure and function of biological molecules and how they come together to form the systems that make up life (by means of coursework and laboratory-based learning in the curriculum)
- PLO 3: develop a general interest in biochemistry and recognize the inter-relationship of biochemistry with other disciplines (by means of coursework and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Biochemistry

#### Required courses (36 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:
BIOC1600 Perspectives in biochemistry (6)
BIOL1110 From molecules to cells (6)
BIOC2600 Basic biochemistry (6)

C2600 Basic biochemistry (6) Take either BIOC2600 or BIOL2220 to fulfill this 12 credits requirement, but not both.

BIOC2600 and BIOL2220 are mutually

exclusive.

BIOL2220 Principles of biochemistry (6)

Take either BIOC2600 or BIOL2220 to fulfill this 12 credits requirement, but not both. BIOC2600 and BIOL2220 are mutually exclusive.

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# 2. Advanced level courses (24 credits) Disciplinary Electives (24 credits)

At least 24 credits selected from the following courses:

BIOC3601 Basic metabolism (6)
BIOC3604 Basic metabolism (6)
Essential techniques in biochemistry and molecular biology (6)

BIOC3605 Sequence bioinformatics (6)
BIOC3606 Molecular medicine (6)
BIOL3202 Nutritional biochemistry (6)
BIOL3401 Molecular biology (6)

BIOL3402 Cell biology and cell technology (6)

BIOL3403 Immunology (6)

BIOL3404 Protein structure and function (6)
BIOC4610 Advanced biochemistry (6)
BIOC4612 Molecular biology of the gene (6)

BIOC4613 Advanced techniques in biochemistry & molecular biology (6)

BIOL4417 'Omics' and systems biology (6)

CHEM4444 Chemical biology (6)

## Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

2019

Offered to students

admitted to Year 1 in

#### **Objectives:**

The Minor in Biochemistry is designed to provide students from all backgrounds with a multidisciplinary perspective on contemporary biochemistry and molecular biology. This minor curriculum incorporates significant flexibility to allow students to select courses that will complement the individual student's Major.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the fundamentals of biochemistry and molecular biology, and apply biochemical knowledge appropriately and effectively (by means of coursework and laboratory-based learning in the curriculum)
- integrate knowledge regarding the structure and function of biological molecules and how they come together to form the systems that make up life (by means of coursework and laboratory-based learning in the curriculum)
- PLO 3: develop a general interest in biochemistry and recognize the inter-relationship of biochemistry with other disciplines (by means of coursework and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Biochemistry

#### Required courses (36 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses: BIOC1600 Perspectives in biochemistry (6) From molecules to cells (6) BIOL1110 **BIOC2600** Basic biochemistry (6)

Take either BIOC2600 or BIOL2220 to fulfill this 12 credits requirement, but not both. BIOC2600 and BIOL2220 are mutually

exclusive.

**BIOL2220** Principles of biochemistry (6)

Take either BIOC2600 or BIOL2220 to fulfill this 12 credits requirement, but not both. BIOC2600 and BIOL2220 are mutually

exclusive.

#### 2. Advanced level courses (24 credits) **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

BIOC3601 Basic metabolism (6)

BIOC3604 Essential techniques in biochemistry and molecular biology (6)

**BIOC3605** Sequence bioinformatics (6) Molecular medicine (6) **BIOC3606** BIOL3202 Nutritional biochemistry (6) BIOL3401 Molecular biology (6)

Cell biology and cell technology (6) BIOL3402

**BIOL3403** Immunology (6)

Protein structure and function (6) BIOL3404 BIOC4610 Advanced biochemistry (6) BIOC4612 Molecular biology of the gene (6)

Advanced techniques in biochemistry & molecular biology (6) **BIOC4613** 

**BIOL4417** 'Omics' and systems biology (6)

CHEM4444 Chemical biology (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Offered to students 2018

admitted to Year 1 in

#### **Objectives:**

The Minor in Biochemistry is designed to provide students from all backgrounds with a multidisciplinary perspective on contemporary biochemistry and molecular biology. This minor curriculum incorporates significant flexibility to allow students to select courses that will complement the individual student's Major.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the fundamentals of biochemistry and molecular biology, and apply biochemical knowledge appropriately and effectively (by means of coursework and laboratory-based learning in the curriculum)
- PLO 2: integrate knowledge regarding the structure and function of biological molecules and how they come together to form the systems that make up life (by means of coursework and laboratory-based learning in the curriculum)
- PLO 3: develop a general interest in biochemistry and recognize the inter-relationship of biochemistry with other disciplines (by means of coursework and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Biochemistry

#### Required courses (36 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:
BIOC1600 Perspectives in biochemistry (6)
BIOL1110 From molecules to cells (6)
BIOC2600 Basic biochemistry (6)

2600 Basic biochemistry (6) Take either BIOC2600 or BIOL2220 to fulfill this 12 credits requirement, but not both.

BIOC2600 and BIOL2220 are mutually

exclusive.

BIOL2220 Principles of biochemistry (6)

Take either BIOC2600 or BIOL2220 to fulfill this 12 credits requirement, but not both. BIOC2600 and BIOL2220 are mutually exclusive.

# 2. Advanced level courses (24 credits)

Disciplinary Electives (24 credits)

At least 24 credits selected from the following courses: BIOC3601 Basic metabolism (6)

BIOC3604 Essential techniques in biochemistry and molecular biology (6)

BIOC3605 Sequence bioinformatics (6)
BIOC3606 Molecular medicine (6)
BIOL3202 Nutritional biochemistry (6)
BIOL3401 Molecular biology (6)

BIOL3402 Cell biology and cell technology (6)

BIOL3403 Immunology (6)

BIOL3404 Protein structure and function (6)
BIOC4610 Advanced biochemistry (6)
BIOC4612 Molecular biology of the gene (6)

BIOC4613 Advanced techniques in biochemistry & molecular biology (6)

BIOL4417 'Omics' and systems biology (6)

CHEM4444 Chemical biology (6)

## Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

2017

Offered to students

admitted to Year 1 in

#### **Objectives:**

The Minor in Biochemistry is designed to provide students from all backgrounds with a multidisciplinary perspective on contemporary biochemistry and molecular biology. This minor curriculum incorporates significant flexibility to allow students to select courses that will complement the individual student's Major.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the fundamentals of biochemistry and molecular biology, and apply biochemical knowledge appropriately and effectively (by means of coursework and laboratory-based learning in the curriculum)
- PLO 2: integrate knowledge regarding the structure and function of biological molecules and how they come together to form the systems that make up life (by means of coursework and laboratory-based learning in the curriculum)
- PLO 3: develop a general interest in biochemistry and recognize the inter-relationship of biochemistry with other disciplines (by means of coursework and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Biochemistry

#### Required courses (36 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:
BIOC1600 Perspectives in biochemistry (6)
BIOL1110 From molecules to cells (6)
BIOC2600 Basic biochemistry (6)

Take either BIOC2600 or BIOL2220 to fulfill this 12 credits requirement, but not both. BIOC2600 and BIOL2220 are mutually

exclusive.

BIOL2220 Principles of biochemistry (6)

Take either BIOC2600 or BIOL2220 to fulfill this 12 credits requirement, but not both. BIOC2600 and BIOL2220 are mutually

exclusive.

#### 2. Advanced level courses (24 credits) Disciplinary Electives (24 credits)

At least 24 credits selected from the following courses:

BIOC3601 Basic metabolism (6)

BIOC3604 Essential techniques in biochemistry and molecular biology (6)

BIOC3605 Sequence bioinformatics (6)
BIOC3606 Molecular medicine (6)
BIOL3202 Nutritional biochemistry (6)
BIOL3401 Molecular biology (6)

BIOL3402 Cell biology and cell technology (6)

BIOL3403 Immunology (6)

BIOL3404 Protein structure and function (6)
BIOC4610 Advanced biochemistry (6)
BIOC4612 Molecular biology of the gene (6)

BIOC4613 Advanced techniques in biochemistry & molecular biology (6)

BIOL4417 'Omics' and systems biology (6)

CHEM4444 Chemical biology (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Offered to students

2016

admitted to Year 1 in

#### **Objectives:**

The Minor in Biochemistry is designed to provide students from all backgrounds with a multidisciplinary perspective on contemporary biochemistry and molecular biology. This minor curriculum incorporates significant flexibility to allow students to select courses that will complement the individual student's Major.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the fundamentals of biochemistry and molecular biology, and apply biochemical knowledge appropriately and effectively (by means of coursework and laboratory-based learning in the curriculum)
- PLO 2: integrate knowledge regarding the structure and function of biological molecules and how they come together to form the systems that make up life (by means of coursework and laboratory-based learning in the curriculum)
- PLO 3: develop a general interest in biochemistry and recognize the inter-relationship of biochemistry with other disciplines (by means of coursework and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Biochemistry

#### Required courses (36 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:
BIOC1600 Perspectives in biochemistry (6)
BIOL1110 From molecules to cells (6)

BIOC2600 Basic biochemistry (6)

this 12 credits requirement, but not both. BIOC2600 and BIOL2220 are mutually exclusive.

BIOL2220 Principles of biochemistry (6)

Take either BIOC2600 or BIOL2220 to fulfill this 12 credits requirement, but not both. BIOC2600 and BIOL2220 are mutually exclusive.

Take either BIOC2600 or BIOL2220 to fulfill

# 2. Advanced level courses (24 credits)

#### **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

BIOC3601 Basic metabolism (6)
BIOC3604 Essential techniques in biochemistry and molecular biology (6)

BIOC3605 Sequence bioinformatics (6)
BIOC3606 Molecular medicine (6)
BIOL3202 Nutritional biochemistry (6)
BIOL3401 Molecular biology (6)

BIOL3402 Cell biology and cell technology (6)

BIOL3403 Immunology (6)

BIOL3404 Protein structure and function (6)
BIOC4610 Advanced biochemistry (6)
BIOC4612 Molecular biology of the gene (6)

BIOC4613 Advanced techniques in biochemistry & molecular biology (6)

BIOL4417 'Omics' and systems biology (6)

CHEM4444 Chemical biology (6)

## Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Offered to students 2015

admitted to Year 1 in

# **Objectives:**

The Minor in Biochemistry is designed to provide students from all backgrounds with a multidisciplinary perspective on contemporary biochemistry and molecular biology. This minor curriculum incorporates significant flexibility to allow students to select courses that will complement the individual student's Major.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the fundamentals of biochemistry and molecular biology, and apply biochemical knowledge appropriately and effectively (by means of coursework and laboratory-based learning in the curriculum)
- integrate knowledge regarding the structure and function of biological molecules and how they come together to form the systems that make up life (by means of coursework and laboratory-based learning in the curriculum)
- PLO 3: develop a general interest in biochemistry and recognize the inter-relationship of biochemistry with other disciplines (by means of coursework and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Biochemistry

#### Required courses (36 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses: BIOC1600 Perspectives in biochemistry (6) From molecules to cells (6) BIOL1110 **BIOC2600** Basic biochemistry (6)

Take either BIOC2600 or BIOL2220 to fulfill this 12 credits requirement, but not both. BIOC2600 and BIOL2220 are mutually

exclusive.

**BIOL2220** Principles of biochemistry (6) Take either BIOC2600 or BIOL2220 to fulfill this 12 credits requirement, but not both. BIOC2600 and BIOL2220 are mutually

exclusive.

# 2. Advanced level courses (24 credits)

**Disciplinary Electives (24 credits)** 

At least 24 credits selected from the following courses: BIOC3601 Basic metabolism (6)

BIOC3604 Essential techniques in biochemistry and molecular biology (6)

**BIOC3605** Sequence bioinformatics (6) Molecular medicine (6) **BIOC3606** BIOL3202 Nutritional biochemistry (6) BIOL3401 Molecular biology (6)

Cell biology and cell technology (6) BIOL3402

**BIOL3403** Immunology (6)

Protein structure and function (6) BIOL3404 BIOC4610 Advanced biochemistry (6) BIOC4612 Molecular biology of the gene (6)

Advanced techniques in biochemistry & molecular biology (6) **BIOC4613** 

**BIOL4417** 'Omics' and systems biology (6)

CHEM4444 Chemical biology (6)

## Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

The Minor in Biochemistry is designed to provide students from all backgrounds with a multidisciplinary perspective on contemporary biochemistry and molecular biology. This minor curriculum incorporates significant flexibility to allow students to select courses that will complement the individual student's Major.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the fundamentals of biochemistry and molecular biology, and apply biochemical knowledge appropriately and effectively (by means of coursework and laboratory-based learning in the curriculum)
- PLO 2: integrate knowledge regarding the structure and function of biological molecules and how they come together to form the systems that make up life (by means of coursework and laboratory-based learning in the curriculum)
- PLO 3: develop a general interest in biochemistry and recognize the inter-relationship of biochemistry with other disciplines (by means of coursework and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Biochemistry

BIOC3601

#### Required courses (36 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses: Perspectives in biochemistry (6) BIOC1600 From molecules to cells (6) BIOL1110 BIOC2600 Basic biochemistry (6)

# 2. Advanced level courses (24 credits)

#### **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses: Basic metabolism (6)

BIOC3604 Essential techniques in biochemistry and molecular biology (6) BIOC3605 Sequence bioinformatics (6) Molecular medicine (6) **BIOC3606** BIOL3202 Nutritional biochemistry (6) Molecular biology (6) BIOL3401 BIOL3402 Cell biology and cell technology (6)

BIOL3403 Immunology (6) Protein structure and function (6) BIOL3404 BIOC4610 Advanced biochemistry (6) Molecular biology of the gene (6) BIOC4612

BIOC4613 Advanced techniques in biochemistry & molecular biology (6)

'Omics' and systems biology (6) **BIOL4417** 

CHEM4444 Chemical biology (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

The Minor in Biochemistry is designed to provide students from all backgrounds with a multidisciplinary perspective on contemporary biochemistry and molecular biology. This minor curriculum incorporates significant flexibility to allow students to select courses that will complement the individual student's Major.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the fundamentals of biochemistry and molecular biology, and apply biochemical knowledge appropriately and effectively (by means of coursework and laboratory-based learning in the curriculum)
- PLO 2: integrate knowledge regarding the structure and function of biological molecules and how they come together to form the systems that make up life (by means of coursework and laboratory-based learning in the curriculum)
- PLO 3: develop a general interest in biochemistry and recognize the inter-relationship of biochemistry with other disciplines (by means of coursework and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Biochemistry

BIOC3601

#### Required courses (36 credits)

# 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses: Perspectives in biochemistry (6) BIOC1600 From molecules to cells (6) BIOL1110 BIOC2600 Basic biochemistry (6)

# 2. Advanced level courses (24 credits)

#### **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses: Basic metabolism (6)

BIOC3604 Essential techniques in biochemistry and molecular biology (6) BIOC3605 Sequence bioinformatics (6) Molecular medicine (6) **BIOC3606** BIOL3202 Nutritional biochemistry (6) Molecular biology (6) BIOL3401

BIOL3402 Cell biology and cell technology (6) BIOL3403 Immunology (6) Protein structure and function (6) BIOL3404 BIOC4610 Advanced biochemistry (6) Molecular biology of the gene (6) BIOC4612

BIOC4613 Advanced techniques in biochemistry & molecular biology (6)

'Omics' and systems biology (6) **BIOL4417** 

CHEM4444 Chemical biology (6)

#### Notes:

# Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Minor Title Minor in Biochemistry

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

The Minor in Biochemistry is designed to provide students from all backgrounds with a multidisciplinary perspective on contemporary biochemistry and molecular biology. This minor curriculum incorporates significant flexibility to allow students to select courses that will complement the individual student's Major.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe the fundamentals of biochemistry and molecular biology, and apply biochemical knowledge appropriately and effectively (by means of coursework and laboratory-based learning in the curriculum)
- PLO 2: integrate knowledge regarding the structure and function of biological molecules and how they come together to form the systems that make up life (by means of coursework and laboratory-based learning in the curriculum)
- PLO 3: develop a general interest in biochemistry and recognize the inter-relationship of biochemistry with other disciplines (by means of coursework and laboratory-based learning in the curriculum)

# Impermissible Combinations:

Major in Biochemistry

BIOC3601

# Required courses (36 credits)

# 1. Introductory level courses (12 credits)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:
BIOC1600 Perspectives in biochemistry (6)
BIOL1110 From molecules to cells (6)
BIOC2600 Basic biochemistry (6)

# 2. Advanced level courses (24 credits)

# **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

Basic metabolism (6)

BIOC3604 Essential techniques in biochemistry and molecular biology (6)
BIOC3605 Sequence bioinformatics (6)
BIOC3606 Molecular medicine (6)
BIOL3202 Nutritional biochemistry (6)
BIOL3401 Molecular biology (6)

BIOL3402 Cell biology and cell technology (6)
BIOL3403 Immunology (6)
BIOL3404 Protein structure and function (6)
BIOC4610 Advanced biochemistry (6)
BIOC4612 Molecular biology of the gene (6)

BIOC4613 Advanced techniques in biochemistry & molecular biology (6)

BIOL4417 'Omics' and systems biology (6)

CHEM4444 Chemical biology (6)

# Notes:

#### . Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Minor Title Minor in Chemistry

Offered to students 2021

admitted to Year 1 in

#### **Objectives:**

The Minor in Chemistry aims to provide students with fundamental knowledge and skills of chemistry. The minor curriculum is flexible. Students of different majors in science and other disciplines will be able to select courses that complement their major areas of study as well as enhance their knowledge in chemistry.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

PLO 1: understand and apply the basic concepts of chemistry (by means of coursework and laboratory-based learning in the

curriculum)

PLO 2: apply chemistry concepts in other subjects (by means of coursework and laboratory-based learning in the curriculum)

PLO 3: transfer the basic concepts to complement their major area of study (by means of coursework and laboratory-based

learning in the curriculum)

#### Impermissible Combinations:

Major in Chemistry

Major in Chemistry (Intensive)

# Required courses (42 credits)

# 1. Introductory level courses (24 credits)

# **Disciplinary Core Courses (12 credits)**

CHEM1042 General chemistry I (6) CHEM1043 General chemistry II (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses: Analytical chemistry I (6) CHEM2241 CHEM2341 Inorganic chemistry I (6)

CHEM2441 Organic chemistry I (6) CHEM2441 and CHEM2442 are mutually

exclusive.

CHEM2442 Fundamentals of organic chemistry (6) CHEM2441 and CHEM2442 are mutually

exclusive.

CHEM2541 Introductory physical chemistry (6)

# 2. Advanced level courses (18 credits)

# **Disciplinary Electives (18 credits)**

At least 18 credits of advanced level Chemistry courses (CHEM3XXX or CHEM4XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

List A

CHEM3141 Environmental chemistry (6)

CHEM3142 Chemical process industries and analysis (6) Introduction to materials chemistry (6) CHFM3143

Principles and applications of spectroscopic and CHEM3146

analytical techniques (6)

Analytical chemistry II: chemical instrumentation (6) CHEM3241

CHEM3242 Food and water analysis (6)

Introductory instrumental chemical analysis (6) CHEM3243

CHEM3341 Inorganic chemistry II (6) Bioinorganic chemistry (6) CHEM3342 Organic chemistry II (6) CHEM3441

Organic chemistry of biomolecules (6) CHEM3442 CHEM3443 Organic chemistry laboratory (6) Integrated laboratory (6)

CHEM3445

Physical chemistry: Introduction to quantum chemistry (6) CHEM3541 Physical chemistry: statistical thermodynamics and CHEM3542

kinetics theory (6)

Directed studies in chemistry (6) CHEM3999

Symmetry, group theory and applications (6) CHEM4142 CHEM4143 Interfacial science and technology (6)

CHEM4144 Advanced materials (6) CHEM4145 Medicinal chemistry (6) Supramolecular chemistry (6) CHEM4147

Frontiers in Modern Chemical Science (6) CHEM4148

Modern chemical instrumentation and applications (6) CHEM4241

CHEM4242 Analytical chemistry (6)

Advanced inorganic chemistry (6) CHFM4341 Organometallic chemistry (6) CHEM4342 Advanced organic chemistry (6) CHEM4441 Integrated organic synthesis (6) CHEM4443 CHEM4444 Chemical biology (6)

CHEM4542 Computational chemistry (6) Advanced physical chemistry (6) CHEM4543

Electrochemical science and technology (6) CHEM4544 CHEM4910 Chemistry literacy and research (6)

CHEM4911

Capstone experience for chemistry undergraduates:

HKUtopia (6)

CHEM4966 Chemistry internship (6) CHEM4999 Chemistry project (12)

# Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fuifill this requirement are advised to take CHEM1041 Foundations of chemistry.

# Remarks:

Minor Title Minor in Chemistry

Offered to students 2020

admitted to Year 1 in

#### **Objectives:**

The Minor in Chemistry aims to provide students with fundamental knowledge and skills of chemistry. The minor curriculum is flexible. Students of different majors in science and other disciplines will be able to select courses that complement their major areas of study as well as enhance their knowledge in chemistry.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

PLO 1: understand and apply the basic concepts of chemistry (by means of coursework and laboratory-based learning in the

curriculum)

PLO 2: apply chemistry concepts in other subjects (by means of coursework and laboratory-based learning in the curriculum)

PLO 3: transfer the basic concepts to complement their major area of study (by means of coursework and laboratory-based

learning in the curriculum)

#### Impermissible Combinations:

Major in Chemistry

Major in Chemistry (Intensive)

# Required courses (42 credits)

# 1. Introductory level courses (24 credits)

# **Disciplinary Core Courses (12 credits)**

CHEM1042 General chemistry I (6) CHEM1043 General chemistry II (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses: Analytical chemistry I (6) CHEM2241 CHEM2341 Inorganic chemistry I (6)

CHEM2441 Organic chemistry I (6) CHEM2441 and CHEM2442 are mutually

exclusive.

CHEM2442 Fundamentals of organic chemistry (6) CHEM2441 and CHEM2442 are mutually

exclusive.

# 2. Advanced level courses (18 credits)

# **Disciplinary Electives (18 credits)**

At least 18 credits of advanced level Chemistry courses (CHEM3XXX or CHEM4XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

List A

CHEM2541

CHEM3141 Environmental chemistry (6)

CHEM3142 Chemical process industries and analysis (6) Introduction to materials chemistry (6) CHFM3143

Principles and applications of spectroscopic and CHEM3146

analytical techniques (6)

Analytical chemistry II: chemical instrumentation (6) CHEM3241

Introductory physical chemistry (6)

CHEM3242 Food and water analysis (6)

Introductory instrumental chemical analysis (6) CHEM3243 CHEM3244 Analytical techniques for pharmacy students (6)

Inorganic chemistry II (6) CHEM3341 Bioinorganic chemistry (6) CHEM3342 Organic chemistry II (6) CHEM3441

Organic chemistry of biomolecules (6) CHEM3442 CHEM3443 Organic chemistry laboratory (6)

Integrated laboratory (6) CHEM3445

Physical chemistry: Introduction to quantum chemistry (6) CHEM3541 Physical chemistry: statistical thermodynamics and CHEM3542

kinetics theory (6)

Directed studies in chemistry (6) CHEM3999

Symmetry, group theory and applications (6) CHEM4142 CHEM4143 Interfacial science and technology (6)

CHEM4144 Advanced materials (6) Medicinal chemistry (6) CHEM4145 Supramolecular chemistry (6) CHEM4147

Frontiers in Modern Chemical Science (6) CHEM4148

CHEM4241 Modern chemical instrumentation and applications (6)

Analytical chemistry (6) CHFM4242

Advanced inorganic chemistry (6) CHEM4341 Organometallic chemistry (6) CHEM4342 Advanced organic chemistry (6) CHEM4441 CHEM4443 Integrated organic synthesis (6) CHEM4444 Chemical biology (6)

Computational chemistry (6) CHEM4542 CHEM4543 Advanced physical chemistry (6)

Electrochemical science and technology (6) CHEM4544

CHEM4910 Chemistry literacy and research (6) CHEM4911 Capstone experience for chemistry undergraduates:

HKUtopia (6)

CHEM4966 Chemistry internship (6) CHEM4999 Chemistry project (12)

# Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fuifill this requirement are advised to take CHEM1041 Foundations of chemistry.

# Remarks:

Minor Title Minor in Chemistry

Offered to students 2019

admitted to Year 1 in

#### **Objectives:**

The Minor in Chemistry aims to provide students with fundamental knowledge and skills of chemistry. The minor curriculum is flexible. Students of different majors in science and other disciplines will be able to select courses that complement their major areas of study as well as enhance their knowledge in chemistry.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

PLO 1: understand and apply the basic concepts of chemistry (by means of coursework and laboratory-based learning in the curriculum)

PLO 2: apply chemistry concepts in other subjects (by means of coursework and laboratory-based learning in the curriculum)

PLO 3: transfer the basic concepts to complement their major area of study (by means of coursework and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Chemistry

Major in Chemistry (Intensive)

# Required courses (42 credits)

# 1. Introductory level courses (24 credits)

# Disciplinary Core Courses (12 credits)

CHEM1042 General chemistry I (6) CHEM1043 General chemistry II (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:
CHEM2241 Analytical chemistry I (6)
CHEM2341 Inorganic chemistry I (6)

CHEM2441 Organic chemistry I (6) CHEM2441 and CHEM2442 are mutually

exclusive.

CHEM2442 Fundamentals of organic chemistry (6) CHEM2441 and CHEM2442 are mutually

exclusive.

# 2. Advanced level courses (18 credits)

# **Disciplinary Electives (18 credits)**

At least 18 credits of advanced level Chemistry courses (CHEM3XXX or CHEM4XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

List A

CHEM2541

CHEM3141 Environmental chemistry (6)

CHEM3142 Chemical process industries and analysis (6)
CHEM3143 Introduction to materials chemistry (6)

CHEM3146 Principles and applications of spectroscopic and

analytical techniques (6)

CHEM3241 Analytical chemistry II: chemical instrumentation (6)

Introductory physical chemistry (6)

CHEM3242 Food and water analysis (6)

CHEM3243 Introductory instrumental chemical analysis (6)
CHEM3244 Analytical techniques for pharmacy students (6)

CHEM3341 Inorganic chemistry II (6)
CHEM3342 Bioinorganic chemistry (6)
CHEM3441 Organic chemistry II (6)

CHEM3442 Organic chemistry of biomolecules (6)
CHEM3443 Organic chemistry laboratory (6)

CHEM3445 Integrated laboratory (6)

CHEM3541 Physical chemistry: Introduction to quantum chemistry (6)
CHEM3542 Physical chemistry: statistical thermodynamics and

kinetics theory (6)

CHEM3999 Directed studies in chemistry (6)

CHEM4142 Symmetry, group theory and applications (6) CHEM4143 Interfacial science and technology (6)

CHEM4144 Advanced materials (6)
CHEM4145 Medicinal chemistry (6)
CHEM4147 Supramolecular chemistry (6)

CHEM4148 Frontiers in Modern Chemical Science (6)

CHEM4241 Modern chemical instrumentation and applications (6)

CHEM4242 Analytical chemistry (6)

CHEM4341 Advanced inorganic chemistry (6)
CHEM4342 Organometallic chemistry (6)
CHEM4441 Advanced organic chemistry (6)
CHEM4443 Integrated organic synthesis (6)
CHEM4444 Chemical biology (6)

CHEM4444 Chemical biology (6)
CHEM4542 Computational chemistry (6)
CHEM4543 Advanced physical chemistry (6)

CHEM4544 Electrochemical science and technology (6)
CHEM4910 Chemistry literacy and research (6)

CHEM4911 Capstone experience for chemistry undergraduates:

HKUtopia (6)

CHEM4966 Chemistry internship (6) CHEM4999 Chemistry project (12)

# Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fuifill this requirement are advised to take CHEM1041 Foundations of chemistry.

# Remarks:

Minor Title Minor in Chemistry

Offered to students 2018

admitted to Year 1 in

#### **Objectives:**

The Minor in Chemistry aims to provide students with fundamental knowledge and skills of chemistry. The minor curriculum is flexible. Students of different majors in science and other disciplines will be able to select courses that complement their major areas of study as well as enhance their knowledge in chemistry.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

PLO 1: understand and apply the basic concepts of chemistry (by means of coursework and laboratory-based learning in the curriculum)

PLO 2: apply chemistry concepts in other subjects (by means of coursework and laboratory-based learning in the curriculum)

PLO 3: transfer the basic concepts to complement their major area of study (by means of coursework and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Chemistry

Major in Chemistry (Intensive)

# Required courses (42 credits)

# 1. Introductory level courses (24 credits)

# **Disciplinary Core Courses (12 credits)**

CHEM1042 General chemistry I (6) CHEM1043 General chemistry II (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses: Analytical chemistry I (6) CHEM2241 CHEM2341 Inorganic chemistry I (6)

CHEM2441 Organic chemistry I (6) CHEM2441 and CHEM2442 are mutually

exclusive.

CHEM2442 Fundamentals of organic chemistry (6) CHEM2441 and CHEM2442 are mutually

exclusive.

# 2. Advanced level courses (18 credits)

# **Disciplinary Electives (18 credits)**

At least 18 credits of advanced level Chemistry courses (CHEM3XXX or CHEM4XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

List A

CHEM2541

CHEM3141 Environmental chemistry (6)

CHEM3142 Chemical process industries and analysis (6) Introduction to materials chemistry (6) CHFM3143

Principles and applications of spectroscopic and CHEM3146

Introductory physical chemistry (6)

analytical techniques (6)

Analytical chemistry II: chemical instrumentation (6) CHEM3241

CHEM3242 Food and water analysis (6)

Introductory instrumental chemical analysis (6) CHEM3243 CHEM3244 Analytical techniques for pharmacy students (6)

Inorganic chemistry II (6) CHEM3341 Bioinorganic chemistry (6) CHEM3342 Organic chemistry II (6) CHEM3441

Organic chemistry of biomolecules (6) CHEM3442 CHEM3443 Organic chemistry laboratory (6)

Integrated laboratory (6) CHEM3445

Physical chemistry: Introduction to quantum chemistry (6) CHEM3541 Physical chemistry: statistical thermodynamics and CHEM3542

kinetics theory (6)

Directed studies in chemistry (6) CHEM3999

Symmetry, group theory and applications (6) CHEM4142 CHEM4143 Interfacial science and technology (6)

CHEM4144 Advanced materials (6) Medicinal chemistry (6) CHEM4145 Supramolecular chemistry (6) CHEM4147

Frontiers in Modern Chemical Science (6) CHEM4148

CHEM4241 Modern chemical instrumentation and applications (6)

Analytical chemistry (6) CHFM4242

Advanced inorganic chemistry (6) CHEM4341 Organometallic chemistry (6) CHEM4342 Advanced organic chemistry (6) CHEM4441 CHEM4443 Integrated organic synthesis (6) CHEM4444 Chemical biology (6)

Computational chemistry (6) CHEM4542 Advanced physical chemistry (6) CHEM4543

Electrochemical science and technology (6) CHEM4544

CHEM4910 Chemistry literacy and research (6) CHEM4911 Capstone experience for chemistry undergraduates:

HKUtopia (6)

CHEM4966 Chemistry internship (6) CHEM4999 Chemistry project (12)

# Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fuifill this requirement are advised to take CHEM1041 Foundations of chemistry.

# Remarks:

Minor Title Minor in Chemistry

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

The Minor in Chemistry aims to provide students with fundamental knowledge and skills of chemistry. The minor curriculum is flexible. Students of different majors in science and other disciplines will be able to select courses that complement their major areas of study as well as enhance their knowledge in chemistry.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

PLO 1: understand and apply the basic concepts of chemistry (by means of coursework and laboratory-based learning in the

curriculum)

PLO 2: apply chemistry concepts in other subjects (by means of coursework and laboratory-based learning in the curriculum)

PLO 3: transfer the basic concepts to complement their major area of study (by means of coursework and laboratory-based

learning in the curriculum)

#### Impermissible Combinations:

Major in Chemistry

Major in Chemistry (Intensive)

# Required courses (42 credits)

# 1. Introductory level courses (24 credits)

# **Disciplinary Core Courses (12 credits)**

CHEM1042 General chemistry I (6) CHEM1043 General chemistry II (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses: Analytical chemistry I (6) CHEM2241 CHEM2341 Inorganic chemistry I (6)

CHEM2441 Organic chemistry I (6) CHEM2441 and CHEM2442 are mutually

exclusive

CHEM2442 Fundamentals of organic chemistry (6) CHEM2441 and CHEM2442 are mutually

exclusive.

CHEM2541 Introductory physical chemistry (6) 2. Advanced level courses (18 credits)

# **Disciplinary Electives (18 credits)**

At least 18 credits of advanced level Chemistry courses (CHEM3XXX or CHEM4XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

List A

CHEM3141 Environmental chemistry (6)

CHEM3142 Chemical process industries and analysis (6) Introduction to materials chemistry (6) CHFM3143

Principles and applications of spectroscopic and CHEM3146

analytical techniques (6)

Analytical chemistry II: chemical instrumentation (6) CHEM3241

CHEM3242 Food and water analysis (6)

Introductory instrumental chemical analysis (6) CHEM3243 CHEM3244 Analytical techniques for pharmacy students (6)

Inorganic chemistry II (6) CHEM3341 Bioinorganic chemistry (6) CHEM3342 Organic chemistry II (6) CHEM3441

Organic chemistry of biomolecules (6) CHEM3442 CHEM3443 Organic chemistry laboratory (6)

Integrated laboratory (6) CHEM3445

Physical chemistry: Introduction to quantum chemistry (6) CHEM3541 Physical chemistry: statistical thermodynamics and CHEM3542

kinetics theory (6)

Directed studies in chemistry (6) CHEM3999

Symmetry, group theory and applications (6) CHEM4142 CHEM4143 Interfacial science and technology (6)

CHEM4144 Advanced materials (6) Medicinal chemistry (6) CHEM4145 Supramolecular chemistry (6) CHEM4147

Frontiers in Modern Chemical Science (6) CHEM4148

CHEM4241 Modern chemical instrumentation and applications (6)

Analytical chemistry (6) CHFM4242

Advanced inorganic chemistry (6) CHEM4341 Organometallic chemistry (6) CHEM4342 Advanced organic chemistry (6) CHEM4441 CHEM4443 Integrated organic synthesis (6) CHEM4444 Chemical biology (6)

Computational chemistry (6) CHEM4542 Advanced physical chemistry (6) CHEM4543

Electrochemical science and technology (6) CHEM4544

CHEM4910 Chemistry literacy and research (6) CHEM4911 Capstone experience for chemistry undergraduates:

HKUtopia (6)

CHEM4966 Chemistry internship (6) CHEM4999 Chemistry project (12)

# Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fuifill this requirement are advised to take CHEM1041 Foundations of chemistry.

# Remarks:

Minor Title Minor in Chemistry

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

The Minor in Chemistry aims to provide students with fundamental knowledge and skills of chemistry. The minor curriculum is flexible. Students of different majors in science and other disciplines will be able to select courses that complement their major areas of study as well as enhance their knowledge in chemistry.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

PLO 1: understand and apply the basic concepts of chemistry (by means of coursework and laboratory-based learning in the curriculum)

PLO 2: apply chemistry concepts in other subjects (by means of coursework and laboratory-based learning in the curriculum)

PLO 3: transfer the basic concepts to complement their major area of study (by means of coursework and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Chemistry

Major in Chemistry (Intensive)

# Required courses (42 credits)

# 1. Introductory level courses (24 credits)

# **Disciplinary Core Courses (12 credits)**

CHEM1042 General chemistry I (6) CHEM1043 General chemistry II (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

CHEM2041 Principles of chemistry (6)

CHEM2241 Analytical chemistry I (6)

CHEM2341 Inorganic chemistry I (6)

CHEM2441 Organic chemistry I (6)

CHEM2441 Organic chemistry I (6) CHEM2441 and CHEM2442 are mutually

exclusive.

CHEM2442 Fundamentals of organic chemistry (6) CHEM2441 and CHEM2442 are mutually exclusive.

CHEM2541 Introductory physical chemistry (6)

# 2. Advanced level courses (18 credits)

# **Disciplinary Electives (18 credits)**

At least 18 credits of advanced level Chemistry courses (CHEM3XXX or CHEM4XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

List A

CHEM3141 Environmental chemistry (6)
CHEM3142 Chemical process industries and analysis (6)

CHEM3143 Introduction to materials chemistry (6)

CHEM3146 Principles and applications of spectroscopic and

analytical techniques (6)

CHEM3241 Analytical chemistry II: chemical instrumentation (6)

CHEM3242 Food and water analysis (6)

CHEM3243 Introductory instrumental chemical analysis (6)
CHEM3244 Analytical techniques for pharmacy students (6)

CHEM3341 Inorganic chemistry II (6)
CHEM3342 Bioinorganic chemistry (6)
CHEM3441 Organic chemistry II (6)

CHEM3442 Organic chemistry of biomolecules (6) CHEM3443 Organic chemistry laboratory (6)

CHEM3445 Integrated laboratory (6)

CHEM3541 Physical chemistry: Introduction to quantum chemistry (6)
CHEM3542 Physical chemistry: statistical thermodynamics and

kinetics theory (6)

CHEM3999 Directed studies in chemistry (6)

CHEM4142 Symmetry, group theory and applications (6) CHEM4143 Interfacial science and technology (6)

CHEM4144 Advanced materials (6)
CHEM4145 Medicinal chemistry (6)
CHEM4147 Supramolecular chemistry (6)

CHEM4148 Frontiers in Modern Chemical Science (6)

CHEM4241 Modern chemical instrumentation and applications (6)

CHEM4242 Analytical chemistry (6)

CHEM4341 Advanced inorganic chemistry (6)
CHEM4342 Organometallic chemistry (6)
CHEM4441 Advanced organic chemistry (6)
CHEM4443 Integrated organic synthesis (6)
CHEM4444 Chemical biology (6)

CHEM4444 Chemical biology (6)
CHEM4542 Computational chemistry (6)
CHEM4543 Advanced physical chemistry (6)

CHEM4544 Electrochemical science and technology (6)

CHEM4910 Chemistry literacy and research (6)

CHEM4911 Capstone experience for chemistry undergraduates:

HKUtopia (6)

CHEM4966 Chemistry internship (6) CHEM4999 Chemistry project (12)

# Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fuifill this requirement are advised to take CHEM1041 Foundations of chemistry.

#### Remarks:

Minor Title Minor in Chemistry

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

The Minor in Chemistry aims to provide students with fundamental knowledge and skills of chemistry. The minor curriculum is flexible. Students of different majors in science and other disciplines will be able to select courses that complement their major areas of study as well as enhance their knowledge in chemistry.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

PLO 1: understand and apply the basic concepts of chemistry (by means of coursework and laboratory-based learning in the

curriculum)

PLO 2: apply chemistry concepts in other subjects (by means of coursework and laboratory-based learning in the curriculum)

PLO 3: transfer the basic concepts to complement their major area of study (by means of coursework and laboratory-based

learning in the curriculum)

#### Impermissible Combinations:

Major in Chemistry

Major in Chemistry (Intensive)

# Required courses (42 credits)

# 1. Introductory level courses (24 credits)

# **Disciplinary Core Courses (12 credits)**

CHEM1042 General chemistry I (6) CHEM1043 General chemistry II (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses: CHEM2041 Principles of chemistry (6) CHEM2241 Analytical chemistry I (6) CHEM2341 Inorganic chemistry I (6) Organic chemistry I (6) CHEM2441

CHEM2441 and CHEM2442 are mutually

exclusive.

CHEM2442 Fundamentals of organic chemistry (6) CHEM2441 and CHEM2442 are mutually

exclusive.

Introductory physical chemistry (6) 2. Advanced level courses (18 credits)

# **Disciplinary Electives (18 credits)**

At least 18 credits of advanced level Chemistry courses (CHEM3XXX or CHEM4XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

List A

CHEM2541

CHEM3141 Environmental chemistry (6) Chemical process industries and analysis (6) CHEM3142

CHEM3143 Introduction to materials chemistry (6)

CHEM3146 Principles and applications of spectroscopic and analytical techniques (6)

Analytical chemistry II: chemical instrumentation (6) CHEM3241 Food and water analysis (6) CHEM3242

CHEM3243 Introductory instrumental chemical analysis (6) Analytical techniques for pharmacy students (6) CHFM3244

Inorganic chemistry II (6) CHEM3341 Bioinorganic chemistry (6) CHEM3342 Organic chemistry II (6) CHEM3441

CHEM3442 Organic chemistry of biomolecules (6) Organic chemistry laboratory (6) CHEM3443

Integrated laboratory (6) CHEM3445

Physical chemistry: Introduction to quantum chemistry (6) CHEM3541 Physical chemistry: statistical thermodynamics and CHEM3542

kinetics theory (6)

Directed studies in chemistry (6) CHEM3999

CHEM4142 Symmetry, group theory and applications (6) CHEM4143 Interfacial science and technology (6)

Advanced materials (6) CHEM4144 Medicinal chemistry (6) CHEM4145 Supramolecular chemistry (6) CHEM4147

CHEM4148 Frontiers in Modern Chemical Science (6)

Modern chemical instrumentation and applications (6) CHFM4241

Analytical chemistry (6) CHEM4242

Advanced inorganic chemistry (6) CHEM4341 Organometallic chemistry (6) CHEM4342 CHEM4441 Advanced organic chemistry (6) CHEM4443 Integrated organic synthesis (6) Chemical biology (6) CHEM4444

Computational chemistry (6) CHEM4542 CHEM4543 Advanced physical chemistry (6)

CHEM4544 Electrochemical science and technology (6) CHEM4910 Chemistry literacy and research (6)

CHEM4911 Capstone experience for chemistry undergraduates:

HKUtopia (6)

CHEM4966 Chemistry internship (6) CHEM4999 Chemistry project (12)

# Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fuifill this requirement are advised to take CHEM1041 Foundations of chemistry.

#### Remarks:

Minor Title Minor in Chemistry

Offered to students

2014

admitted to Year 1 in

#### **Objectives:**

The Minor in Chemistry aims to provide students with fundamental knowledge and skills of chemistry. The minor curriculum is flexible. Students of different majors in science and other disciplines will be able to select courses that complement their major areas of study as well as enhance their knowledge in chemistry.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

PLO 1: understand and apply the basic concepts of chemistry (by means of coursework and laboratory-based learning in the curriculum)

PLO 2: apply chemistry concepts in other subjects (by means of coursework and laboratory-based learning in the curriculum)

PLO 3: transfer the basic concepts to complement their major area of study (by means of coursework and laboratory-based

learning in the curriculum)

#### Impermissible Combinations:

Major in Chemistry

Major in Chemistry (Intensive)

# Required courses (42 credits)

# 1. Introductory level courses (18 credits)

# **Disciplinary Core Courses (6 credits)**

CHEM1042 General chemistry I (6) [previous title: General chemistry (6)]

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

CHEM2041 Principles of chemistry (6)
CHEM2241 Analytical chemistry I (6)
CHEM2341 Inorganic chemistry I (6)
CHEM2441 Organic chemistry I (6)

CHEM2441 Organic chemistry I (6) CHEM2441 and CHEM2442 are mutually exclusive.

CHEM2442 Fundamentals of organic chemistry (6) CHEM2441 and CHEM2442 are mutually exclusive.

CHEM2541 Introductory physical chemistry I (6) [previous title: Physical chemistry I (6)]

# 2. Advanced level courses (24 credits)

#### **Disciplinary Electives (24 credits)**

At least 24 credits of advanced level Chemistry courses (CHEM3XXX or CHEM4XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

List A
CHEM3141 Environmental chemistry (6)

CHEM3142 Chemical process industries and analysis (6)
CHEM3143 Introduction to materials chemistry (6)
CHEM3146 Principles and applications of spectroscopic and

analytical techniques (6)

CHEM3241 Analytical chemistry II: chemical instrumentation

(6)

CHEM3242 Food and water analysis (6)

CHEM3243 Introductory instrumental chemical analysis (6)
CHEM3244 Analytical techniques for pharmacy students (6)

CHEM3341 Inorganic chemistry II (6)
CHEM3342 Bioinorganic chemistry (6)
CHEM3441 Organic chemistry II (6)

CHEM3442 Organic chemistry of biomolecules (6) CHEM3443 Organic chemistry laboratory (6)

CHEM3445 Integrated laboratory (6)

CHEM3541 Physical chemistry: Introduction to quantum

chemistry (6)

CHEM3542 Physical chemistry: statistical thermodynamics

and kinetics theory (6)
CHEM3999 Directed studies in chemistry (6)

CHEM4142 Symmetry, group theory and applications (6)
CHEM4143 Interfacial science and technology (6)

CHEM4144 Advanced materials (6)
CHEM4145 Medicinal chemistry (6)
CHEM4147 Supramolecular chemistry (6)

CHEM4148 Frontiers in Modern Chemical Science (6)
CHEM4241 Modern chemical instrumentation and

applications (6)
CHEM4242 Analytical chemistry (6)

CHEM4341 Advanced inorganic chemistry (6)
CHEM4342 Organometallic chemistry (6)
CHEM4441 Advanced organic chemistry (6)
CHEM4443 Integrated organic synthesis (6)

CHEM4444 Chemical biology (6)
CHEM4542 Computational chemistry (6)
CHEM4543 Advanced physical chemistry (6)

CHEM4544 Electrochemical science and technology (6)

[ previous title: Physical chemistry II: Introduction to quantum chemistry (6) ]

CHEM4910 Chemistry literacy and research (6)
CHEM4911 Capstone experience for chemistry undergraduates: HKUtopia (6)
CHEM4966 Chemistry internship (6)
CHEM4999 Chemistry project (12)

# Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fuifill this requirement are advised to take CHEM1041 Foundations of chemistry.

#### Remarks:

Minor Title Minor in Chemistry

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

The Minor in Chemistry aims to provide students with fundamental knowledge and skills of chemistry. The minor curriculum is flexible. Students of different majors in science and other disciplines will be able to select courses that complement their major areas of study as well as enhance their knowledge in chemistry.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

PLO 1: understand and apply the basic concepts of chemistry (by means of coursework and laboratory-based learning in the curriculum)

PLO 2: apply chemistry concepts in other subjects (by means of coursework and laboratory-based learning in the curriculum)

PLO 3: transfer the basic concepts to complement their major area of study (by means of coursework and laboratory-based

learning in the curriculum)

#### Impermissible Combinations:

Major in Chemistry

Major in Chemistry (Intensive)

# Required courses (42 credits)

# 1. Introductory level courses (18 credits)

# **Disciplinary Core Courses (6 credits)**

CHEM1042 General chemistry I (6) [ previous title: General chemistry (6) ]

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

CHEM2041 Principles of chemistry (6) Analytical chemistry I (6) CHEM2241 CHEM2341 Inorganic chemistry I (6)

CHEM2441 Organic chemistry I (6) CHEM2441 and CHEM2442 are mutually exclusive. Fundamentals of organic chemistry (6) CHEM2441 and CHEM2442 are mutually exclusive. CHEM2442 CHEM2541 Introductory physical chemistry (6) [ previous title: Physical chemistry I (6) ]

# 2. Advanced level courses (24 credits)

#### **Disciplinary Electives (24 credits)**

At least 24 credits of advanced level Chemistry courses (CHEM3XXX or CHEM4XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

[ previous title: Physical chemistry II: Introduction to

quantum chemistry (6) ]

List A CHEM3141 Environmental chemistry (6)

Chemical process industries and analysis (6) CHEM3142 CHEM3143 Introduction to materials chemistry (6) Principles and applications of spectroscopic and CHEM3146

analytical techniques (6)

CHEM3241 Analytical chemistry II: chemical instrumentation

Food and water analysis (6) CHEM3242

CHEM3243 Introductory instrumental chemical analysis (6) Analytical techniques for pharmacy students (6) CHFM3244

Inorganic chemistry II (6) CHEM3341 Bioinorganic chemistry (6) CHEM3342 Organic chemistry II (6) CHEM3441

CHEM3442 Organic chemistry of biomolecules (6) Organic chemistry laboratory (6) CHFM3443

Integrated laboratory (6) CHEM3445

Physical chemistry: Introduction to quantum CHEM3541 chémistry (6)

Physical chemistry: statistical thermodynamics CHEM3542

and kinetics theory (6) Directed studies in chemistry (6) CHEM3999

Symmetry, group theory and applications (6) CHEM4142

CHEM4143 Interfacial science and technology (6) CHEM4144 Advanced materials (6) Medicinal chemistry (6) CHEM4145

Supramolecular chemistry (6) CHEM4147 Frontiers in Modern Chemical Science (6) **CHEM4148** CHEM4241 Modern chemical instrumentation and

applications (6) CHEM4242 Analytical chemistry (6)

Advanced inorganic chemistry (6) CHEM4341 Organometallic chemistry (6) CHEM4342 Advanced organic chemistry (6) CHEM4441 Integrated organic synthesis (6) CHEM4443

CHEM4444 Chemical biology (6)

Physical chemistry III: statistical thermodynamics CHEM4541

and kinetics theory (6) CHEM4542 Computational chemistry (6)

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CHEM4543 CHEM4544	Advanced physical chemistry (6) Electrochemical science and technology (6)
CHEM4910	Chemistry literacy and research (6)
CHEM4911	Capstone experience for chemistry undergraduates: HKUtopia (6)
CHEM4966	Chemistry internship (6)
CHEM4999	Chemistry project (12)

# Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.

#### Remarks:

Minor Title Minor in Chemistry

Offered to students

admitted to Year 1 in

#### **Objectives:**

The Minor in Chemistry aims to provide students with fundamental knowledge and skills of chemistry. The minor curriculum is flexible. Students of different majors in science and other disciplines will be able to select courses that complement their major areas of study as well as enhance their knowledge in chemistry.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

2012

PLO 1: understand and apply the basic concepts of chemistry (by means of coursework and laboratory-based learning in the curriculum)

PLO 2: apply chemistry concepts in other subjects (by means of coursework and laboratory-based learning in the curriculum)

PLO 3: transfer the basic concepts to complement their major area of study (by means of coursework and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Chemistry

Major in Chemistry (Intensive)

# Required courses (42 credits)

# 1. Introductory level courses (18 credits)

# **Disciplinary Core Courses (6 credits)**

CHEM1042 General chemistry I (6) [ previous title: General chemistry (6) ]

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

CHEM2041 Principles of chemistry (6) Analytical chemistry I (6) CHEM2241 CHEM2341 Inorganic chemistry I (6)

CHEM2441 Organic chemistry I (6) CHEM2441 and CHEM2442 are mutually exclusive. Fundamentals of organic chemistry (6) CHEM2441 and CHEM2442 are mutually exclusive. CHEM2442 Introductory physical chemistry (6) [ previous title: Physical chemistry I (6) ] CHEM2541

# 2. Advanced level courses (24 credits)

#### **Disciplinary Electives (24 credits)**

At least 24 credits of advanced level Chemistry courses (CHEM3XXX or CHEM4XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

[ previous title: Physical chemistry II: Introduction to

quantum chemistry (6) ]

List A CHEM3141 Environmental chemistry (6)

Chemical process industries and analysis (6) CHEM3142 CHEM3143 Introduction to materials chemistry (6) Principles and applications of spectroscopic and CHEM3146

analytical techniques (6)

CHEM3241 Analytical chemistry II: chemical instrumentation

Food and water analysis (6) CHEM3242

CHEM3243 Introductory instrumental chemical analysis (6) Analytical techniques for pharmacy students (6) CHFM3244

Inorganic chemistry II (6) CHEM3341 Bioinorganic chemistry (6) CHEM3342 Organic chemistry II (6) CHEM3441

CHEM3442 Organic chemistry of biomolecules (6) Organic chemistry laboratory (6) CHFM3443

Integrated laboratory (6) CHEM3445 Physical chemistry: Introduction to quantum

CHEM3541 chémistry (6)

Physical chemistry: statistical thermodynamics CHEM3542 and kinetics theory (6)

Directed studies in chemistry (6) CHEM3999

Symmetry, group theory and applications (6) CHEM4142 CHEM4143 Interfacial science and technology (6)

CHEM4144 Advanced materials (6) Medicinal chemistry (6) CHEM4145 Supramolecular chemistry (6) CHEM4147

Frontiers in Modern Chemical Science (6) **CHEM4148** CHEM4241 Modern chemical instrumentation and

applications (6) CHEM4242 Analytical chemistry (6) CHEM4341

Advanced inorganic chemistry (6) Organometallic chemistry (6) CHEM4342 Advanced organic chemistry (6) CHEM4441 Integrated organic synthesis (6) CHEM4443

CHEM4444 Chemical biology (6)

Physical chemistry III: statistical thermodynamics CHEM4541

and kinetics theory (6) CHEM4542 Computational chemistry (6)

548

CHEM4543 CHEM4544	Advanced physical chemistry (6) Electrochemical science and technology (6)
CHEM4910 CHEM4911	Chemistry literacy and research (6) Capstone experience for chemistry undergraduates: HKUtopia (6)
CHEM4966 CHEM4999	Chemistry internship (6) Chemistry project (12)

# Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 3 or above in HKDSE Chemistry or equivalent to take this major. Students who do not fulfill this requirement are advised to take CHEM1041 Foundations of chemistry.

#### Remarks:

Offered to students 2021

admitted to Year 1 in

#### **Objectives:**

The Minor in Computational & Financial Mathematics provides students with fundamental knowledge in both computational mathematics and financial mathematics. It is specifically designed for students who are interested in the above subjects and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving and skills to tackle novel situations and ill-defined problems. It is particularly useful for solving mathematical problems arising from computational sciences and financial industry.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe fundamental concepts in computational and financial mathematics (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and projectbased learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

# Impermissible Combinations:

Major in Mathematics

Major in Mathematics (Intensive)

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

# Required courses (42 credits)

1. Introductory level courses (18 credits) (note 3)

**Disciplinary Core Course (6 credits)** 

University mathematics II (6) MATH1013

# **Disciplinary Electives (12 credits)**

Select either List A or List B:

I ist A

MATH2101 Linear algebra I (6) Multivariable calculus (6) MATH2211

List B MATH2012 Fundamental concepts of mathematics (6) MATH2014 Multivariable calculus and linear algebra (6)

# 2. Advanced level courses (24 credits) **Disciplinary Core Courses (12 credits)**

Numerical analysis (6) MATH3601 **MATH3906** Financial calculus (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

MATH3408 Computational methods and differential equations with

applications (6) Probability theory (6) MATH3603

MATH3904 Introduction to optimization (6) MATH3911 Game theory and strategy (6) Scientific computing (6) MATH4602

Numerical methods for financial calculus (6) MATH4907 MATH7217 Topics in financial mathematics (6) Topics in advanced probability theory (6) **MATH7224** 

# Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

# Remarks:

Offered to students 2020

admitted to Year 1 in

#### **Objectives:**

The Minor in Computational & Financial Mathematics provides students with fundamental knowledge in both computational mathematics and financial mathematics. It is specifically designed for students who are interested in the above subjects and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving and skills to tackle novel situations and ill-defined problems. It is particularly useful for solving mathematical problems arising from computational sciences and financial industry.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe fundamental concepts in computational and financial mathematics (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and projectbased learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

# Impermissible Combinations:

Major in Mathematics

Major in Mathematics (Intensive)

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

# Required courses (42 credits)

1. Introductory level courses (18 credits) (note 3)

**Disciplinary Core Course (6 credits)** 

University mathematics II (6) MATH1013

# **Disciplinary Electives (12 credits)**

Select either List A or List B:

I ist A

MATH2101 Linear algebra I (6) Multivariable calculus (6) MATH2211

List B

MATH2012

MATH3603

Fundamental concepts of mathematics (6) MATH2014 Multivariable calculus and linear algebra (6)

# 2. Advanced level courses (24 credits) **Disciplinary Core Courses (12 credits)**

Numerical analysis (6) MATH3601 **MATH3906** Financial calculus (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

MATH3408 Computational methods and differential equations with

applications (6) Probability theory (6)

Introduction to optimization (6) MATH3904 MATH3911 Game theory and strategy (6) Scientific computing (6) MATH4602

Numerical methods for financial calculus (6) MATH4907 MATH7217 Topics in financial mathematics (6) MATH7224 Topics in advanced probability theory (6)

# Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

# Remarks:

Offered to students 2019

admitted to Year 1 in

#### **Objectives:**

The Minor in Computational & Financial Mathematics provides students with fundamental knowledge in both computational mathematics and financial mathematics. It is specifically designed for students who are interested in the above subjects and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving and skills to tackle novel situations and ill-defined problems. It is particularly useful for solving mathematical problems arising from computational sciences and financial industry.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe fundamental concepts in computational and financial mathematics (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

# Impermissible Combinations:

Major in Mathematics

Major in Mathematics (Intensive)

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

# Required courses (42 credits)

1. Introductory level courses (18 credits) (note 3)

**Disciplinary Core Course (6 credits)** 

MATH1013 University mathematics II (6)

# **Disciplinary Electives (12 credits)**

Select either List A or List B:

List A

MATH2101 Linear algebra I (6)
MATH2211 Multivariable calculus (6)

List B

MATH2012 Fundamental concepts of mathematics (6)
MATH2014 Multivariable calculus and linear algebra (6)

# 2. Advanced level courses (24 credits) Disciplinary Core Courses (12 credits)

MATH3601 Numerical analysis (6) MATH3906 Financial calculus (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

MATH3408 Computational methods and differential equations with

applications (6)
MATH3603 Probability theory (6)
MATH3904 Introduction to optimization (6)

MATH3911 Game theory and strategy (6)
MATH4602 Scientific computing (6)
MATH4907 Numerical methods for financial calculus (6)

MATH4907 Numerical methods for financial calculus (6)
MATH7217 Topics in financial mathematics (6)
MATH7224 Topics in advanced probability theory (6)

# Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

# Remarks:

Offered to students 2018

admitted to Year 1 in

#### **Objectives:**

The Minor in Computational & Financial Mathematics provides students with fundamental knowledge in both computational mathematics and financial mathematics. It is specifically designed for students who are interested in the above subjects and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving and skills to tackle novel situations and ill-defined problems. It is particularly useful for solving mathematical problems arising from computational sciences and financial industry.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe fundamental concepts in computational and financial mathematics (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and projectbased learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

# Impermissible Combinations:

Major in Mathematics

Major in Mathematics (Intensive)

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

# Required courses (42 credits)

1. Introductory level courses (18 credits) (note 3)

**Disciplinary Core Course (6 credits)** 

University mathematics II (6) MATH1013

# **Disciplinary Electives (12 credits)**

Select either List A or List B:

I ist A

MATH2101 Linear algebra I (6) Multivariable calculus (6) MATH2211

List B MATH2012 Fundamental concepts of mathematics (6) MATH2014 Multivariable calculus and linear algebra (6)

# 2. Advanced level courses (24 credits) **Disciplinary Core Courses (12 credits)**

Numerical analysis (6) MATH3601 **MATH3906** Financial calculus (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

MATH3408 Computational methods and differential equations with

applications (6) Probability theory (6) MATH3603

Introduction to optimization (6) MATH3904 MATH3911 Game theory and strategy (6) Scientific computing (6) MATH4602

Numerical methods for financial calculus (6) MATH4907 MATH7217 Topics in financial mathematics (6) MATH7224 Topics in advanced probability theory (6)

# Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

# Remarks:

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

The Minor in Computational & Financial Mathematics provides students with fundamental knowledge in both computational mathematics and financial mathematics. It is specifically designed for students who are interested in the above subjects and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving and skills to tackle novel situations and ill-defined problems. It is particularly useful for solving mathematical problems arising from computational sciences and financial industry.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe fundamental concepts in computational and financial mathematics (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

# Impermissible Combinations:

Major in Mathematics

Major in Mathematics (Intensive)

Major in Mathematics/Physics

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

# Required courses (42 credits)

# 1. Introductory level courses (18 credits) (note 3)

**Disciplinary Core Course (6 credits)** 

MATH1013 University mathematics II (6)

# **Disciplinary Electives (12 credits)**

Select either List A or List B:

List A

MATH2101 Linear algebra I (6) MATH2211 Multivariable calculus (6)

List B

MATH2012 Fundamental concepts of mathematics (6)
MATH2014 Multivariable calculus and linear algebra (6)

# 2. Advanced level courses (24 credits)

# Disciplinary Core Courses (12 credits)

MATH3601 Numerical analysis (6) MATH3906 Financial calculus (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

MATH3408 Computational methods and differential equations with

applications (6)

MATH3603 Probability theory (6)
MATH3904 Introduction to optimization (6)

MATH3911 Game theory and strategy (6)
MATH4602 Scientific computing (6)

MATH4907 Numerical methods for financial calculus (6)
MATH7217 Topics in financial mathematics (6)
MATH7224 Topics in advanced probability theory (6)

# Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

# Remarks:

Offered to students 2016

admitted to Year 1 in

# **Objectives:**

The Minor in Computational & Financial Mathematics provides students with fundamental knowledge in both computational mathematics and financial mathematics. It is specifically designed for students who are interested in the above subjects and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving and skills to tackle novel situations and ill-defined problems. It is particularly useful for solving mathematical problems arising from computational sciences and financial industry.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe fundamental concepts in computational and financial mathematics (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

# Impermissible Combinations:

Major in Mathematics

Major in Mathematics (Intensive)

Major in Mathematics/Physics

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

# Required courses (42 credits)

# 1. Introductory level courses (18 credits) (note 3)

**Disciplinary Core Course (6 credits)** 

MATH1013 University mathematics II (6)

# Disciplinary Electives (12 credits)

Select either List A or List B:

List A

MATH2101 Linear algebra I (6) MATH2211 Multivariable calculus (6)

List B

MATH2012 Fundamental concepts of mathematics (6)
MATH2014 Multivariable calculus and linear algebra (6)

# 2. Advanced level courses (24 credits)

# Disciplinary Core Courses (12 credits)

MATH3601 Numerical analysis (6) MATH3906 Financial calculus (6)

# Disciplinary Electives (12 credits)

At least 12 credits selected from the following courses:

MATH3408 Computational methods and differential equations with

applications (6)

MATH3603 Probability theory (6)
MATH3904 Introduction to optimiz

MATH3904 Introduction to optimization (6)
MATH3911 Game theory and strategy (6)
MATH4602 Scientific computing (6)

MATH4907 Numerical methods for financial calculus (6)
MATH7217 Topics in financial mathematics (6)
MATH7224 Topics in advanced probability theory (6)

# Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

# Remarks:

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

The Minor in Computational & Financial Mathematics provides students with fundamental knowledge in both computational mathematics and financial mathematics. It is specifically designed for students who are interested in the above subjects and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving and skills to tackle novel situations and ill-defined problems. It is particularly useful for solving mathematical problems arising from computational sciences and financial industry.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe fundamental concepts in computational and financial mathematics (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Major in Mathematics

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

# Required courses (42 credits)

# 1. Introductory level courses (18 credits) (note 3)

**Disciplinary Core Course (6 credits)** 

MATH1013 University mathematics II (6)

# **Disciplinary Electives (12 credits)**

Select either List A or List B:

LIST A

MATH2101 Linear algebra I (6)

MATH2211 Multivariable calculus (6)

List B

MATH2012 Fundamental concepts of mathematics (6)
MATH2014 Multivariable calculus and linear algebra (6)

# 2. Advanced level courses (24 credits)

# **Disciplinary Core Courses (12 credits)**

MATH3601 Numerical analysis (6) MATH3906 Financial calculus (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

MATH3408 Computational methods and differential equations with

applications (6)

MATH3603 Probability theory (6)

MATH3904 Introduction to optimization (6)
MATH3911 Game theory and strategy (6)
MATH4602 Scientific computing (6)

MATH4907 Numerical methods for financial calculus (6)

# Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

# Remarks:

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

The Minor in Computational & Financial Mathematics provides students with fundamental knowledge in both computational mathematics and financial mathematics. It is specifically designed for students who are interested in the above subjects and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving and skills to tackle novel situations and ill-defined problems. It is particularly useful for solving mathematical problems arising from computational sciences and financial industry.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe fundamental concepts in computational and financial mathematics (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

# Impermissible Combinations:

Major in Mathematics

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

# Required courses (42 credits)

# 1. Introductory level courses (18 credits) (note 3)

# Disciplinary Core Courses (18 credits)

MATH1013 University mathematics II (6)
MATH2101 Linear algebra I (6)
MATH2211 Multivariable calculus (6)

# 2. Advanced level courses (24 credits)

# **Disciplinary Core Courses (12 credits)**

MATH3601 Numerical analysis (6) MATH3906 Financial calculus (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

MATH3408 Computational methods and differential equations with

applications (6)
MATH3603 Probability theory (6)
MATH3904 Introduction to optimization (6)
MATH3911 Game theory and strategy (6)
MATH4602 Scientific computing (6)

MATH4907 Numerical methods for financial calculus (6)

# **Notes**

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

# Remarks:

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

The Minor in Computational & Financial Mathematics provides students with fundamental knowledge in both computational mathematics and financial mathematics. It is specifically designed for students who are interested in the above subjects and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving and skills to tackle novel situations and ill-defined problems. It is particularly useful for solving mathematical problems arising from computational sciences and financial industry.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe fundamental concepts in computational and financial mathematics (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

# Impermissible Combinations:

Major in Mathematics

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

# Required courses (42 credits)

# 1. Introductory level courses (18 credits) (note 3)

# Disciplinary Core Courses (18 credits)

MATH1013 University mathematics II (6)
MATH2101 Linear algebra I (6)
MATH2211 Multivariable calculus (6)

# 2. Advanced level courses (24 credits)

# **Disciplinary Core Courses (12 credits)**

MATH3601 Numerical analysis (6) MATH3906 Financial calculus (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

MATH3408 Computational methods and differential equations with

applications (6)
MATH3603 Probability theory (6)
MATH3904 Introduction to optimization (6)
MATH3911 Game theory and strategy (6)
MATH4602 Scientific computing (6)

MATH4907 Numerical methods for financial calculus (6)

# **Notes**

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
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- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

# Remarks:

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

The Minor in Computational & Financial Mathematics provides students with fundamental knowledge in both computational mathematics and financial mathematics. It is specifically designed for students who are interested in the above subjects and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving and skills to tackle novel situations and ill-defined problems. It is particularly useful for solving mathematical problems arising from computational sciences and financial industry.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe fundamental concepts in computational and financial mathematics (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

# Impermissible Combinations:

Major in Mathematics

Minor in Mathematics

# Required courses (42 credits)

# 1. Introductory level courses (18 credits) (note 3)

# **Disciplinary Core Courses (18 credits)**

MATH1013 University mathematics II (6)
MATH2101 Linear algebra I (6)
MATH2211 Multivariable calculus (6)

# 2. Advanced level courses (24 credits)

# **Disciplinary Core Courses (12 credits)**

MATH3601 Numerical analysis (6) MATH3906 Financial calculus (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

MATH3408 Computational methods and differential equations with

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MATH3603 Probability theory (6)

MATH3904 Introduction to optimization (6)
MATH3911 Game theory and strategy (6)
MATH4602 Scientific computing (6)

MATH4907 Numerical methods for financial calculus (6)

# Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

# Remarks:

Offered to students 2021

admitted to Year 1 in

#### **Objectives:**

The Minor in Earth Sciences aims to provide interested students with an introduction to the fundamental structure, process and history of the Earth. The minor curriculum is designed particularly to provide students from different majors the flexibility to select courses to enhance their interests in Earth Sciences or to complement their major of study.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe the methods used by the Earth scientists to study the Earth systems (by means to coursework, tutorial classes and field-based learning in the curriculum)
- PLO 2: understand and describe the basic nomenclature used in Earth Sciences (by means to coursework, tutorial classes and field-based learning in the curriculum)
- PLO 3: discuss and comment critically issues related to the Earth Sciences in media reports (by means to coursework, tutorial classes and field-based learning in the curriculum)

# Impermissible Combinations:

Major in Earth System Science

Major in Geology

Major in Geology (Intensive)

# Required courses (36 credits)

# 1. Introductory level courses (12 credits)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses: EASC1401 Blue Planet (6) EASC1402 Principles of geology (6)

EASC2401 Fluid/solid interactions in earth processes (6)

# 2. Advanced level courses (24 credits)

#### Disciplinary Electives (24 credits)

At least 24 credits of advanced level Earth Sciences courses (EASC3XXX or EASC4XXX level), subject to prerequisite

requirements. The current course list	includes courses in List A.
List A	
EASC3020	Global change: anthropogenic impacts (6)
EASC3402	Petrology (6)
EASC3403	Sedimentary environments (6)
EASC3404	Structural geology (6)
EASC3405	Environmental remote sensing (6)
EASC3406	Reconstruction of past climate (6)
EASC3408	Geophysics (6)
EASC3409	Igneous and metamorphic petrogenesis (6)
EASC3410	Hydrogeology (6)
EASC3412	Earth resources (6)
EASC3413	Engineering geology (6)
EASC3414	Soil and rock mechanics (6)
EASC3415	Meteorology (6)
EASC3416	Advanced geochemistry and geochronology (6)

Earth through time (6)

EASC3417

Directed studies in earth sciences (6) EASC3999 Biogeochemical cycles (6) EASC4403

EASC4406 Earth dynamics & global tectonics (6)

EASC4407 Regional geology (6)

Special topics in earth sciences (6) EASC4408 EASC4911 Earth system: contemporary issues (6)

Integrated field studies (6) **EASC4955 EASC4966** Earth sciences internship (6) Earth sciences project (12) **EASC4999** 

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Offered to students 2020

admitted to Year 1 in

#### **Objectives:**

The Minor in Earth Sciences aims to provide interested students with an introduction to the fundamental structure, process and history of the Earth. The minor curriculum is designed particularly to provide students from different majors the flexibility to select courses to enhance their interests in Earth Sciences or to complement their major of study.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe the methods used by the Earth scientists to study the Earth systems (by means to coursework, tutorial classes and field-based learning in the curriculum)
- PLO 2: understand and describe the basic nomenclature used in Earth Sciences (by means to coursework, tutorial classes and field-based learning in the curriculum)
- PLO 3: discuss and comment critically issues related to the Earth Sciences in media reports (by means to coursework, tutorial classes and field-based learning in the curriculum)

# Impermissible Combinations:

Major in Earth System Science

Major in Geology

Major in Geology (Intensive)

# Required courses (36 credits)

# 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

EASC1401 Blue Planet (6)

EASC1402 Principles of geology (6)

EASC2401 Fluid/solid interactions in earth processes (6)

# 2. Advanced level courses (24 credits)

# **Disciplinary Electives (24 credits)**

At least 24 credits of advanced level Earth Sciences courses (EASC3XXX or EASC4XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

List A	
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EASC3406	Reconstruction of past climate (6)
EASC3408	Geophysics (6)
EASC3409	Igneous and metamorphic petrogenesis (6)
EASC3410	Hydrogeology (6)
EASC3412	Earth resources (6)
EASC3413	Engineering geology (6)
EASC3414	Soil and rock mechanics (6)
EACC244E	Matagralagy (6)

EASC3414 Soli and rock mechanics (6)

EASC3415 Meteorology (6)

EASC3416 Advanced geochemistry and geochronology (6)

EASC3417 Earth through time (6)

EASC3999 Directed studies in earth sciences (6)

EASC4403 Biogeochemical cycles (6)

EASC4406 Earth dynamics & global tectonics (6)

EASC4407 Regional geology (6)

EASC4408 Special topics in earth sciences (6)
EASC4911 Earth system: contemporary issues (6)

EASC4955 Integrated field studies (6)
EASC4966 Earth sciences internship (6)
EASC4999 Earth sciences project (12)

# Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

# Remarks

Offered to students 2019

admitted to Year 1 in

#### **Objectives:**

The Minor in Earth Sciences aims to provide interested students with an introduction to the fundamental structure, process and history of the Earth. The minor curriculum is designed particularly to provide students from different majors the flexibility to select courses to enhance their interests in Earth Sciences or to complement their major of study.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe the methods used by the Earth scientists to study the Earth systems (by means to coursework, tutorial classes and field-based learning in the curriculum)
- PLO 2: understand and describe the basic nomenclature used in Earth Sciences (by means to coursework, tutorial classes and field-based learning in the curriculum)
- PLO 3: discuss and comment critically issues related to the Earth Sciences in media reports (by means to coursework, tutorial classes and field-based learning in the curriculum)

# Impermissible Combinations:

Major in Earth System Science

Major in Geology

Major in Geology (Intensive)

# Required courses (36 credits)

# 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses: EASC1401 Blue Planet (6) EASC1402 Principles of geology (6)

EASC2401 Fluid/solid interactions in earth processes (6)

# 2. Advanced level courses (24 credits)

# **Disciplinary Electives (24 credits)**

At least 24 credits of advanced level Earth Sciences courses (EASC3XXX or EASC4XXX level), subject to prerequisite requirements. The current course list includes courses in List A

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EASC3408	Geophysics (6)
EASC3409	Igneous and metamorphic petrogenesis (6)
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Advanced geochemistry and geochronology (6) EASC3416

Meteorology (6)

Earth through time (6) EASC3417

Directed studies in earth sciences (6) **EASC3999** 

Biogeochemical cycles (6) EASC4403

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EASC4955 Integrated field studies (6) **EASC4966** Earth sciences internship (6) Earth sciences project (12) **EASC4999** 

# Notes:

**EASC3415** 

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Offered to students 2018

admitted to Year 1 in

#### **Objectives:**

The Minor in Earth Sciences aims to provide interested students with an introduction to the fundamental structure, process and history of the Earth. The minor curriculum is designed particularly to provide students from different majors the flexibility to select courses to enhance their interests in Earth Sciences or to complement their major of study.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe the methods used by the Earth scientists to study the Earth systems (by means to coursework, tutorial classes and field-based learning in the curriculum)
- PLO 2: understand and describe the basic nomenclature used in Earth Sciences (by means to coursework, tutorial classes and field-based learning in the curriculum)
- PLO 3: discuss and comment critically issues related to the Earth Sciences in media reports (by means to coursework, tutorial classes and field-based learning in the curriculum)

# Impermissible Combinations:

Major in Earth System Science

Major in Geology

Major in Geology (Intensive)

# Required courses (36 credits)

# 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses: EASC1401 Blue Planet (6) EASC1402 Principles of geology (6)

EASC2401 Fluid/solid interactions in earth processes (6)

# 2. Advanced level courses (24 credits)

# **Disciplinary Electives (24 credits)**

At least 24 credits of advanced level Earth Sciences courses (EASC3XXX or EASC4XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

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EASC3410	Hydrogeology (6)
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EASC3413	Engineering geology (6)
EASC3414	Soil and rock mechanics (6)
EASC3415	Meteorology (6)
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EASC3417	Earth through time (6)
EASC3999	Directed studies in earth sciences (6)

Biogeochemical cycles (6) FASC4403

Earth dynamics & global tectonics (6) EASC4406

EASC4407 Regional geology (6)

Special topics in earth sciences (6) EASC4408 EASC4911 Earth system: contemporary issues (6)

EASC4955 Integrated field studies (6) **EASC4966** Earth sciences internship (6) Earth sciences project (12) **EASC4999** 

# Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

The Minor in Earth Sciences aims to provide interested students with an introduction to the fundamental structure, process and history of the Earth. The minor curriculum is designed particularly to provide students from different majors the flexibility to select courses to enhance their interests in Earth Sciences or to complement their major of study.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe the methods used by the Earth scientists to study the Earth systems (by means to coursework, tutorial classes and field-based learning in the curriculum)
- PLO 2: understand and describe the basic nomenclature used in Earth Sciences (by means to coursework, tutorial classes and field-based learning in the curriculum)
- PLO 3: discuss and comment critically issues related to the Earth Sciences in media reports (by means to coursework, tutorial classes and field-based learning in the curriculum)

# Impermissible Combinations:

Major in Earth System Science

Major in Geology

Major in Geology (Intensive)

# Required courses (36 credits)

# 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses: EASC1401 Blue Planet (6) EASC1402 Principles of geology (6)

EASC2401 Fluid/solid interactions in earth processes (6)

# 2. Advanced level courses (24 credits)

# **Disciplinary Electives (24 credits)**

At least 24 credits of advanced level Earth Sciences courses (EASC3XXX or EASC4XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

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# Notes:

**EASC3415** 

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Minor Title Minor in Earth Sciences

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

The Minor in Earth Sciences aims to provide interested students with an introduction to the fundamental structure, process and history of the Earth. The minor curriculum is designed particularly to provide students from different majors the flexibility to select courses to enhance their interests in Earth Sciences or to complement their major of study.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe the methods used by the Earth scientists to study the Earth systems (by means to coursework, tutorial classes and field-based learning in the curriculum)
- PLO 2: understand and describe the basic nomenclature used in Earth Sciences (by means to coursework, tutorial classes and field-based learning in the curriculum)
- PLO 3: discuss and comment critically issues related to the Earth Sciences in media reports (by means to coursework, tutorial classes and field-based learning in the curriculum)

#### Impermissible Combinations:

Major in Earth System Science

Major in Geology

Major in Geology (Intensive)

#### Required courses (36 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses: EASC1401 Blue Planet (6) EASC1402 Principles of geology (6)

EASC2401 Fluid/solid interactions in earth processes (6)

#### 2. Advanced level courses (24 credits)

#### **Disciplinary Electives (24 credits)**

At least 24 credits of advanced level Earth Sciences courses (EASC3XXX or EASC4XXX level), subject to prerequisite requirements. The current course list includes courses in List A

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EASC3417

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Integrated field studies (6) **EASC4955 EASC4966** Earth sciences internship (6) Earth sciences project (12) **EASC4999** 

#### Notes:

EASC3415

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Minor Title Minor in Earth Sciences

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

The Minor in Earth Sciences aims to provide interested students with an introduction to the fundamental structure, process and history of the Earth. The minor curriculum is designed particularly to provide students from different majors the flexibility to select courses to enhance their interests in Earth Sciences or to complement their major of study.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe the methods used by the Earth scientists to study the Earth systems (by means to coursework, tutorial classes and field-based learning in the curriculum)
- PLO 2: understand and describe the basic nomenclature used in Earth Sciences (by means to coursework, tutorial classes and field-based learning in the curriculum)
- PLO 3: discuss and comment critically issues related to the Earth Sciences in media reports (by means to coursework, tutorial classes and field-based learning in the curriculum)

#### Impermissible Combinations:

Major in Earth System Science

Major in Geology

Major in Geology (Intensive)

## Required courses (36 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

EASC1401 Blue Planet (6)

EASC1402 Principles of geology (6)

EASC2401 Fluid/solid interactions in earth processes (6)

#### 2. Advanced level courses (24 credits)

#### **Disciplinary Electives (24 credits)**

At least 24 credits of advanced level Earth Sciences courses (EASC3XXX or EASC4XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

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EASC3410	Hydrogeology (6)
EASC3412	Earth resources (6)
EASC3413	Engineering geology (6)
EASC3414	Soil and rock mechanics (6)
EASC3415	Meteorology (6)

EASC3416 Advanced geochemistry and geochronology (6)

EASC3417 Earth through time (6)

EASC3999 Directed studies in earth sciences (6)
EASC4403 Biogeochemical cycles (6)

EASC4406 Earth dynamics & global tectonics (6)

EASC4407 Regional geology (6)

EASC4408 Special topics in earth sciences (6)
EASC4911 Earth system: contemporary issues (6)

EASC4955 Integrated field studies (6)
EASC4966 Earth sciences internship (6)
EASC4999 Earth sciences project (12)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks

Minor Title Minor in Earth Sciences

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

The Minor in Earth Sciences aims to provide interested students with an introduction to the fundamental structure, process and history of the Earth. The minor curriculum is designed particularly to provide students from different majors the flexibility to select courses to enhance their interests in Earth Sciences or to complement their major of study.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe the methods used by the Earth scientists to study the Earth systems (by means to coursework, tutorial classes and field-based learning in the curriculum)
- PLO 2: understand and describe the basic nomenclature used in Earth Sciences (by means to coursework, tutorial classes and field-based learning in the curriculum)
- PLO 3: discuss and comment critically issues related to the Earth Sciences in media reports (by means to coursework, tutorial classes and field-based learning in the curriculum)

#### Impermissible Combinations:

Major in Earth System Science

Major in Geology

Major in Geology (Intensive)

## Required courses (36 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

EASC1401 Blue Planet (6)

EASC1402 Principles of geology (6)

EASC2401 Fluid/solid interactions in earth processes (6)

#### 2. Advanced level courses (24 credits)

#### **Disciplinary Electives (24 credits)**

At least 24 credits of advanced level Earth Sciences courses (EASC3XXX or EASC4XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

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List A	
EASC3020	Global change: anthropogenic impacts (6)
EASC3402	Petrology (6)
EASC3403	Sedimentary environments (6)
EASC3404	Structural geology (6)
EASC3405	Environmental remote sensing (6)
EASC3406	Reconstruction of past climate (6)
EASC3408	Geophysics (6)
EASC3409	Igneous and metamorphic petrogenesis (6)
EASC3410	Hydrogeology (6)
EASC3412	Earth resources (6)
EASC3413	Engineering geology (6)
EASC3414	Soil and rock mechanics (6)
EASC3415	Meteorology (6)

EASC3413 Engineering geology (6)

EASC3414 Soil and rock mechanics (6)

EASC3415 Meteorology (6)

EASC3416 Advanced geochemistry and geochronology (6)

EASC3417 Earth through time (6)

EASC3999 Directed studies in earth sciences (6)

EASC4403 Biogeochemical cycles (6)

EASC4406 Earth dynamics & global tectonics (6)

EASC4407 Regional geology (6)

EASC4408 Special topics in earth sciences (6)
EASC4911 Earth system: contemporary issues (6)

EASC4955 Integrated field studies (6)
EASC4966 Earth sciences internship (6)
EASC4999 Earth sciences project (12)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks

Minor Title Minor in Earth Sciences

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

The Minor in Earth Sciences aims to provide interested students with an introduction to the fundamental structure, process and history of the Earth. The minor curriculum is designed particularly to provide students from different majors the flexibility to select courses to enhance their interests in Earth Sciences or to complement their major of study.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe the methods used by the Earth scientists to study the Earth systems (by means to coursework, tutorial classes and field-based learning in the curriculum)
- PLO 2: understand and describe the basic nomenclature used in Earth Sciences (by means to coursework, tutorial classes and field-based learning in the curriculum)
- PLO 3: discuss and comment critically issues related to the Earth Sciences in media reports (by means to coursework, tutorial classes and field-based learning in the curriculum)

#### Impermissible Combinations:

Major in Earth System Science

Major in Geology

Major in Geology (Intensive)

#### Required courses (36 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses: EASC1401 Blue Planet (6) EASC1402 Principles of geology (6)

EASC2401 Fluid/solid interactions in earth processes (6)

#### 2. Advanced level courses (24 credits)

#### **Disciplinary Electives (24 credits)**

At least 24 credits of advanced level Earth Sciences courses (EASC3XXX or EASC4XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

requirements. The current course list includes courses in List A.		
List A		
EASC3020	Global change: anthropogenic impacts (6)	
EASC3402	Petrology (6)	
EASC3403	Sedimentary environments (6)	
EASC3404	Structural geology (6)	
EASC3405	Environmental remote sensing (6)	
EASC3406	Reconstruction of past climate (6)	
EASC3408	Geophysics (6)	
EASC3409	Igneous and metamorphic petrogenesis (6)	
EASC3410	Hydrogeology (6)	
EASC3412	Earth resources (6)	
EASC3413	Engineering geology (6)	
EASC3414	Soil and rock mechanics (6)	
	List A  EASC3020  EASC3402  EASC3403  EASC3404  EASC3405  EASC3406  EASC3408  EASC3410  EASC3412  EASC3413	

EASC3415 Meteorology (6) Advanced geochemistry and geochronology (6) EASC3416

Earth through time (6) EASC3417

Directed studies in earth sciences (6) **EASC3999** Biogeochemical cycles (6) EASC4403

EASC4406 Earth dynamics & global tectonics (6) EASC4407 Regional geology (6)

Special topics in earth sciences (6) EASC4408 EASC4911 Earth system: contemporary issues (6)

Integrated field studies (6) **EASC4955 EASC4966** Earth sciences internship (6) Earth sciences project (12) **EASC4999** 

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Minor Title Minor in Earth Sciences

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

The Minor in Earth Sciences aims to provide interested students with an introduction to the fundamental structure, process and history of the Earth. The minor curriculum is designed particularly to provide students from different majors the flexibility to select courses to enhance their interests in Earth Sciences or to complement their major of study.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe the methods used by the Earth scientists to study the Earth systems (by means to coursework, tutorial classes and field-based learning in the curriculum)
- PLO 2: understand and describe the basic nomenclature used in Earth Sciences (by means to coursework, tutorial classes and field-based learning in the curriculum)
- PLO 3: discuss and comment critically issues related to the Earth Sciences in media reports (by means to coursework, tutorial classes and field-based learning in the curriculum)

#### Impermissible Combinations:

Major in Earth System Science

Major in Geology

Major in Geology (Intensive)

#### Required courses (36 credits)

#### 1. Introductory level courses (12 credits)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

EASC1401 Blue Planet (6)

EASC1402 Principles of geology (6)

EASC2401 Fluid/solid interactions in earth processes (6)

#### 2. Advanced level courses (24 credits)

#### **Disciplinary Electives (24 credits)**

At least 24 credits of advanced level Earth Sciences courses (EASC3XXX or EASC4XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

requirements. The current course hat	includes courses in List A.
List A	
EASC3020	Global change: anthropogenic impacts (6)
EASC3402	Petrology (6)
EASC3403	Sedimentary environments (6)
EASC3404	Structural geology (6)
EASC3405	Environmental remote sensing (6)
EASC3406	Reconstruction of past climate (6)
EASC3408	Geophysics (6)
EASC3409	Igneous and metamorphic petrogenesis (6)
EASC3410	Hydrogeology (6)
EASC3412	Earth resources (6)
EASC3413	Engineering geology (6)
EASC3414	Soil and rock mechanics (6)
EASC3415	Meteorology (6)

EASC3416 Advanced geochemistry and geochronology (6)

EASC3417 Earth through time (6)

EASC3999 Directed studies in earth sciences (6)
EASC4403 Biogeochemical cycles (6)

EASC4406 Earth dynamics & global tectonics (6)

EASC4407 Regional geology (6)

EASC4408 Special topics in earth sciences (6)
EASC4911 Earth system: contemporary issues (6)

EASC4955 Integrated field studies (6)
EASC4966 Earth sciences internship (6)
EASC4999 Earth sciences project (12)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks

Offered to students 2021

admitted to Year 1 in

#### **Objectives:**

This Minor in Ecology & Biodiversity is an ideal introduction to the natural world, the species and ecosystems it comprises and the biological rules it follows. It aims to allow students to learn about general ecological principles and the local flora and fauna of the region, and the conservation challenges that will need to be addressed in a rapidly-changing world. Students will be able to build upon this basic knowledge developed at the introductory level by selecting from among a wide range of courses that offer learning opportunities through practical and field work, as well as traditional and virtual teaching, in more specialized areas of ecology and biodiversity.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate and describe the importance of ecology and biodiversity, and the importance of the variety of life to humans (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: understand and describe the impacts of environmental change and the causes and consequences of biodiversity loss (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: appreciate and describe the ecological principles underlying different policies and plans for biodiversity conservation and sustainable development in Hong Kong and elsewhere (by means of coursework, tutorial classes and laboratorybased learning in the curriculum)

## Impermissible Combinations:

Major in Ecology & Biodiversity

Major in Ecology & Biodiversity (Intensive)

#### Required courses (36 credits)

## 1. Introductory level courses (12 credits)

## Disciplinary Core Courses (12 credits)

BIOL1309 Evolutionary diversity (6) **BIOL2306** Ecology and evolution (6)

## 2. Advanced level courses (24 credits)

#### Disc

ciplinary Electives (24 credits)			
BIOL3101	Animal behaviour (6)		
BIOL3301	Marine biology (6)		
BIOL3302	Systematics and phylogenetics (6)		
BIOL3303	Conservation biology (6)		
BIOL3313	Freshwater ecology (6)		
BIOL3314	Plant structure and evolution (6)		
BIOL3318	Experimental intertidal ecology (6)		
BIOL3319	Tropical terrestrial ecology (6)		
BIOL3419	Insect ecology: the little things that run the world (6)		
BIOL3506	Evolutionary biology (6)		
BIOL4301	Fish and fisheries (6)		
BIOL4302	Environmental impact assessment (6)		

## Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Offered to students 2020

admitted to Year 1 in

#### **Objectives:**

This Minor in Ecology & Biodiversity is an ideal introduction to the natural world, the species and ecosystems it comprises and the biological rules it follows. It aims to allow students to learn about general ecological principles and the local flora and fauna of the region, and the conservation challenges that will need to be addressed in a rapidly-changing world. Students will be able to build upon this basic knowledge developed at the introductory level by selecting from among a wide range of courses that offer learning opportunities through practical and field work, as well as traditional and virtual teaching, in more specialized areas of ecology and biodiversity.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate and describe the importance of ecology and biodiversity, and the importance of the variety of life to humans (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: understand and describe the impacts of environmental change and the causes and consequences of biodiversity loss (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: appreciate and describe the ecological principles underlying different policies and plans for biodiversity conservation and sustainable development in Hong Kong and elsewhere (by means of coursework, tutorial classes and laboratorybased learning in the curriculum)

## Impermissible Combinations:

Major in Ecology & Biodiversity

Major in Ecology & Biodiversity (Intensive)

#### Required courses (36 credits)

## 1. Introductory level courses (12 credits)

## Disciplinary Core Courses (12 credits)

BIOL1309 Evolutionary diversity (6) Ecology and evolution (6)

## 2. Advanced level courses (24 credits)

#### Disc

ciplinary Electives (24 credits)			
BIOL3101	Animal behaviour (6)		
BIOL3301	Marine biology (6)		
BIOL3302	Systematics and phylogenetics (6)		
BIOL3303	Conservation biology (6)		
BIOL3313	Freshwater ecology (6)		
BIOL3314	Plant structure and evolution (6)		
BIOL3318	Experimental intertidal ecology (6)		
BIOL3319	Tropical terrestrial ecology (6)		
BIOL3419	Insect ecology: the little things that run the world (6)		
BIOL3506	Evolutionary biology (6)		
BIOL4301	Fish and fisheries (6)		
BIOL4302	Environmental impact assessment (6)		

#### Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Offered to students 2019

admitted to Year 1 in

#### **Objectives:**

This Minor in Ecology & Biodiversity is an ideal introduction to the natural world, the species and ecosystems it comprises and the biological rules it follows. It aims to allow students to learn about general ecological principles and the local flora and fauna of the region, and the conservation challenges that will need to be addressed in a rapidly-changing world. Students will be able to build upon this basic knowledge developed at the introductory level by selecting from among a wide range of courses that offer learning opportunities through practical and field work, as well as traditional and virtual teaching, in more specialized areas of ecology and biodiversity.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate and describe the importance of ecology and biodiversity, and the importance of the variety of life to humans (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: understand and describe the impacts of environmental change and the causes and consequences of biodiversity loss (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: appreciate and describe the ecological principles underlying different policies and plans for biodiversity conservation and sustainable development in Hong Kong and elsewhere (by means of coursework, tutorial classes and laboratorybased learning in the curriculum)

## Impermissible Combinations:

Major in Ecology & Biodiversity

Major in Ecology & Biodiversity (Intensive)

#### Required courses (36 credits)

## 1. Introductory level courses (12 credits)

## Disciplinary Core Courses (12 credits)

BIOL1309 Evolutionary diversity (6) Ecology and evolution (6)

## 2. Advanced level courses (24 credits)

#### Disc

ciplinary Electives (24 credits)			
BIOL3101	Animal behaviour (6)		
BIOL3301	Marine biology (6)		
BIOL3302	Systematics and phylogenetics (6)		
BIOL3303	Conservation biology (6)		
BIOL3313	Freshwater ecology (6)		
BIOL3314	Plant structure and evolution (6)		
BIOL3318	Experimental intertidal ecology (6)		
BIOL3319	Tropical terrestrial ecology (6)		
BIOL3419	Insect ecology: the little things that run the world (6)		
BIOL3506	Evolutionary biology (6)		
BIOL4301	Fish and fisheries (6)		
BIOL4302	Environmental impact assessment (6)		

## Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Offered to students 2018

admitted to Year 1 in

#### **Objectives:**

This Minor in Ecology & Biodiversity is an ideal introduction to the natural world, the species and ecosystems it comprises and the biological rules it follows. It aims to allow students to learn about general ecological principles and the local flora and fauna of the region, and the conservation challenges that will need to be addressed in a rapidly-changing world. Students will be able to build upon this basic knowledge developed at the introductory level by selecting from among a wide range of courses that offer learning opportunities through practical and field work, as well as traditional and virtual teaching, in more specialized areas of ecology and biodiversity.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate and describe the importance of ecology and biodiversity, and the importance of the variety of life to humans (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: understand and describe the impacts of environmental change and the causes and consequences of biodiversity loss (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: appreciate and describe the ecological principles underlying different policies and plans for biodiversity conservation and sustainable development in Hong Kong and elsewhere (by means of coursework, tutorial classes and laboratorybased learning in the curriculum)

## Impermissible Combinations:

Major in Ecology & Biodiversity

Major in Ecology & Biodiversity (Intensive)

#### Required courses (36 credits)

## 1. Introductory level courses (12 credits)

## Disciplinary Core Courses (12 credits)

BIOL1309 Evolutionary diversity (6) **BIOL2306** Ecology and evolution (6)

## 2. Advanced level courses (24 credits)

#### Dis

ciplinary Electives (24 credits)			
BIOL3101	Animal behaviour (6)		
BIOL3301	Marine biology (6)		
BIOL3302	Systematics and phylogenetics (6)		
BIOL3303	Conservation biology (6)		
BIOL3313	Freshwater ecology (6)		
BIOL3314	Plant structure and evolution (6)		
BIOL3318	Experimental intertidal ecology (6)		
BIOL3319	Tropical terrestrial ecology (6)		
BIOL3419	Insect ecology: the little things that run the world (6)		
BIOL3506	Evolutionary biology (6)		
BIOL4301	Fish and fisheries (6)		
BIOL4302	Environmental impact assessment (6)		

#### Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

This Minor in Ecology & Biodiversity is an ideal introduction to the natural world, the species and ecosystems it comprises and the biological rules it follows. It aims to allow students to learn about general ecological principles and the local flora and fauna of the region, and the conservation challenges that will need to be addressed in a rapidly-changing world. Students will be able to build upon this basic knowledge developed at the introductory level by selecting from among a wide range of courses that offer learning opportunities through practical and field work, as well as traditional and virtual teaching, in more specialized areas of ecology and biodiversity.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate and describe the importance of ecology and biodiversity, and the importance of the variety of life to humans (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: understand and describe the impacts of environmental change and the causes and consequences of biodiversity loss (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: appreciate and describe the ecological principles underlying different policies and plans for biodiversity conservation and sustainable development in Hong Kong and elsewhere (by means of coursework, tutorial classes and laboratorybased learning in the curriculum)

## Impermissible Combinations:

Major in Ecology & Biodiversity

Major in Ecology & Biodiversity (Intensive)

#### Required courses (36 credits)

## 1. Introductory level courses (12 credits)

## Disciplinary Core Courses (12 credits)

BIOL1309 Evolutionary diversity (6) **BIOL2306** Ecology and evolution (6)

## 2. Advanced level courses (24 credits)

#### Dis

ciplinary Electives (24 credits)			
BIOL3101	Animal behaviour (6)		
BIOL3301	Marine biology (6)		
BIOL3302	Systematics and phylogenetics (6)		
BIOL3303	Conservation biology (6)		
BIOL3313	Freshwater ecology (6)		
BIOL3314	Plant structure and evolution (6)		
BIOL3318	Experimental intertidal ecology (6)		
BIOL3319	Tropical terrestrial ecology (6)		
BIOL3419	Insect ecology: the little things that run the world (6)		
BIOL3506	Evolutionary biology (6)		
BIOL4301	Fish and fisheries (6)		
BIOL4302	Environmental impact assessment (6)		

#### Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

This Minor in Ecology & Biodiversity is an ideal introduction to the natural world, the species and ecosystems it comprises and the biological rules it follows. It aims to allow students to learn about general ecological principles and the local flora and fauna of the region, and the conservation challenges that will need to be addressed in a rapidly-changing world. Students will be able to build upon this basic knowledge developed at the introductory level by selecting from among a wide range of courses that offer learning opportunities through practical and field work, as well as traditional and virtual teaching, in more specialized areas of ecology and biodiversity.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate and describe the importance of ecology and biodiversity, and the importance of the variety of life to humans (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: understand and describe the impacts of environmental change and the causes and consequences of biodiversity loss (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: appreciate and describe the ecological principles underlying different policies and plans for biodiversity conservation and sustainable development in Hong Kong and elsewhere (by means of coursework, tutorial classes and laboratorybased learning in the curriculum)

#### Impermissible Combinations:

Major in Ecology & Biodiversity

Major in Ecology & Biodiversity (Intensive)

## Required courses (36 credits)

#### 1. Introductory level courses (12 credits) Disciplinary Core Courses (12 credits)

BIOL1309 Evolutionary diversity (6) **BIOL2306** Ecology and evolution (6)

## 2. Advanced level courses (24 credits)

#### **Disciplinary Electives (24 credits)**

BIOL3101	Animal behaviour (6)
BIOL3301	Marine biology (6)
BIOL3302	Systematics and phylogenetics (6)
BIOL3303	Conservation biology (6)
BIOL3313	Freshwater ecology (6)
BIOL3314	Plant structure and evolution (6)
BIOL3318	Experimental intertidal ecology (6)
BIOL3319	Tropical terrestrial ecology (6)
BIOL3320	The biology of marine mammals (6)
BIOL3419	Insect ecology: the little things that run the world (6)
BIOL3506	Evolutionary biology (6)
BIOL4301	Fish and fisheries (6)
BIOL4302	Environmental impact assessment (6)

[previous title: Conservation ecology (6) ]

[previous title: Terrestrail ecology (6)]

### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

exclusive.

Minor Title Minor in Ecology & Biodiversity

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

This Minor in Ecology & Biodiversity is an ideal introduction to the natural world, the species and ecosystems it comprises and the biological rules it follows. It aims to allow students to learn about general ecological principles and the local flora and fauna of the region, and the conservation challenges that will need to be addressed in a rapidly-changing world. Students will be able to build upon this basic knowledge developed at the introductory level by selecting from among a wide range of courses that offer learning opportunities through practical and field work, as well as traditional and virtual teaching, in more specialized areas of ecology and biodiversity.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate and describe the importance of ecology and biodiversity, and the importance of the variety of life to humans (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: understand and describe the impacts of environmental change and the causes and consequences of biodiversity loss (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: appreciate and describe the ecological principles underlying different policies and plans for biodiversity conservation and sustainable development in Hong Kong and elsewhere (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)

## Impermissible Combinations:

Major in Ecology & Biodiversity

BIOL3101

Major in Ecology & Biodiversity (Intensive)

# 1. Introductory level courses (12 credits) Disciplinary Core Courses (12 credits)

BIOL1309 Evolutionary diversity (6)
BIOL2306 Ecology and evolution (6)

Animal behaviour (6)

# 2. Advanced level courses (24 credits) Disciplinary Electives (24 credits)

BIOLOTOT		this 24 credits requirement, but not both. BIOL3101 and BIOL4303 are mutually exclusive.
BIOL3301	Marine biology (6)	
BIOL3302	Systematics and phylogenetics (6)	
BIOL3303	Conservation biology (6)	[previous title: Conservation ecology (6)]
BIOL3313	Freshwater ecology (6)	
BIOL3314	Plant structure and evolution (6)	
BIOL3318	Experimental intertidal ecology (6)	
BIOL3319	Tropical terrestrial ecology (6)	[previous title: Terrestrial ecology (6)]
BIOL3320	The biology of marine mammals (6)	
BIOL3419	Insect ecology: the little things that run the world (6)	
BIOL3506	Evolutionary biology (6)	
BIOL4301	Fish and fisheries (6)	
BIOL4302	Environmental impact assessment (6)	
BIOL4303	Animal behaviour (6)	Take either BIOL3101 or BIOL4303 to fulfill this 24 credits requirement, but not both. BIOL3101 and BIOL4303 are mutually

#### Notes

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

## Remarks:

exclusive.

Minor Title Minor in Ecology & Biodiversity

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

This Minor in Ecology & Biodiversity is an ideal introduction to the natural world, the species and ecosystems it comprises and the biological rules it follows. It aims to allow students to learn about general ecological principles and the local flora and fauna of the region, and the conservation challenges that will need to be addressed in a rapidly-changing world. Students will be able to build upon this basic knowledge developed at the introductory level by selecting from among a wide range of courses that offer learning opportunities through practical and field work, as well as traditional and virtual teaching, in more specialized areas of ecology and biodiversity.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate and describe the importance of ecology and biodiversity, and the importance of the variety of life to humans (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: understand and describe the impacts of environmental change and the causes and consequences of biodiversity loss (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: appreciate and describe the ecological principles underlying different policies and plans for biodiversity conservation and sustainable development in Hong Kong and elsewhere (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)

## Impermissible Combinations:

Major in Ecology & Biodiversity

BIOL3101

Major in Ecology & Biodiversity (Intensive)

# 1. Introductory level courses (12 credits) Disciplinary Core Courses (12 credits)

BIOL1309 Evolutionary diversity (6)
BIOL2306 Ecology and evolution (6)

Animal behaviour (6)

# 2. Advanced level courses (24 credits) Disciplinary Electives (24 credits)

		this 24 credits requirement, but not both. BIOL3101 and BIOL4303 are mutually exclusive.
BIOL3301	Marine biology (6)	
BIOL3302	Systematics and phylogenetics (6)	
BIOL3303	Conservation biology (6)	[previous title: Conservation ecology (6)]
BIOL3313	Freshwater ecology (6)	
BIOL3314	Plant structure and evolution (6)	
BIOL3318	Experimental intertidal ecology (6)	
BIOL3319	Tropical terrestrial ecology (6)	[previous title: Terrestrial ecology (6)]
BIOL3320	The biology of marine mammals (6)	
BIOL3419	Insect ecology: the little things that run the world (6)	
BIOL4301	Fish and fisheries (6)	
BIOL4302	Environmental impact assessment (6)	
BIOL4303	Animal behaviour (6)	Take either BIOL3101 or BIOL4303 to fulfill this 24 credits requirement, but not both. BIOL3101 and BIOL4303 are mutually

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

exclusive.

Minor Title Minor in Ecology & Biodiversity

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

This Minor in Ecology & Biodiversity is an ideal introduction to the natural world, the species and ecosystems it comprises and the biological rules it follows. It aims to allow students to learn about general ecological principles and the local flora and fauna of the region, and the conservation challenges that will need to be addressed in a rapidly-changing world. Students will be able to build upon this basic knowledge developed at the introductory level by selecting from among a wide range of courses that offer learning opportunities through practical and field work, as well as traditional and virtual teaching, in more specialized areas of ecology and biodiversity.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate and describe the importance of ecology and biodiversity, and the importance of the variety of life to humans (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: understand and describe the impacts of environmental change and the causes and consequences of biodiversity loss (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: appreciate and describe the ecological principles underlying different policies and plans for biodiversity conservation and sustainable development in Hong Kong and elsewhere (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Ecology & Biodiversity

BIOL3101

Major in Ecology & Biodiversity (Intensive)

#### Required courses (36 credits)

# 1. Introductory level courses (12 credits) Disciplinary Core Courses (12 credits)

BIOL1309 Evolutionary diversity (6)
BIOL2306 Ecology and evolution (6)

Animal behaviour (6)

# 2. Advanced level courses (24 credits) Disciplinary Electives (24 credits)

		this 24 credits requirement, but not both. BIOL3101 and BIOL4303 are mutually exclusive.
BIOL3301	Marine biology (6)	
BIOL3302	Systematics and phylogenetics (6)	
BIOL3303	Conservation biology (6)	[previous title: Conservation ecology (6)]
BIOL3313	Freshwater ecology (6)	
BIOL3314	Plant structure and evolution (6)	
BIOL3318	Experimental intertidal ecology (6)	
BIOL3319	Tropical terrestrial ecology (6)	[previous title: Terrestrial ecology (6)]
BIOL3320	The biology of marine mammals (6)	
BIOL3419	Insect ecology: the little things that run the world (6)	
BIOL4301	Fish and fisheries (6)	
BIOL4302	Environmental impact assessment (6)	
BIOL4303	Animal behaviour (6)	Take either BIOL3101 or BIOL4303 to fulfill this 24 credits requirement, but not both. BIOL3101 and BIOL4303 are mutually

## Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

exclusive.

Minor Title Minor in Ecology & Biodiversity

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

This Minor in Ecology & Biodiversity is an ideal introduction to the natural world, the species and ecosystems it comprises and the biological rules it follows. It aims to allow students to learn about general ecological principles and the local flora and fauna of the region, and the conservation challenges that will need to be addressed in a rapidly-changing world. Students will be able to build upon this basic knowledge developed at the introductory level by selecting from among a wide range of courses that offer learning opportunities through practical and field work, as well as traditional and virtual teaching, in more specialized areas of ecology and biodiversity.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate and describe the importance of ecology and biodiversity, and the importance of the variety of life to humans (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: understand and describe the impacts of environmental change and the causes and consequences of biodiversity loss (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: appreciate and describe the ecological principles underlying different policies and plans for biodiversity conservation and sustainable development in Hong Kong and elsewhere (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Ecology & Biodiversity

BIOL3101

Major in Ecology & Biodiversity (Intensive)

Required	courses	(36	credits)
4 14	_4		/40

# 1. Introductory level courses (12 credits) Disciplinary Core Courses (12 credits)

BIOL1309 Evolutionary diversity (6)
BIOL2306 Ecology and evolution (6)

Animal behaviour (6)

# 2. Advanced level courses (24 credits) Disciplinary Electives (24 credits)

		this 24 credits requirement, but not both. BIOL3101 and BIOL4303 are mutually exclusive.
BIOL3301	Marine biology (6)	
BIOL3302	Systematics and phylogenetics (6)	
BIOL3303	Conservation biology (6)	[previous title: Conservation ecology (6)]
BIOL3313	Freshwater ecology (6)	
BIOL3314	Plant structure and evolution (6)	
BIOL3318	Experimental intertidal ecology (6)	
BIOL3319	Tropical terrestrial ecology (6)	[previous title: Terrestrial ecology (6)]
BIOL3320	The biology of marine mammals (6)	
BIOL3419	Insect ecology: the little things that run the world (6)	
BIOL4301	Fish and fisheries (6)	
BIOL4302	Environmental impact assessment (6)	
BIOL4303	Animal behaviour (6)	Take either BIOL3101 or BIOL4303 to fulfill this 24 credits requirement, but not both. BIOL3101 and BIOL4303 are mutually

## Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Offered to students 2021

admitted to Year 1 in

#### **Objectives:**

The Minor in Environmental Science aims to provide students with an introduction to some complex environmental issues. Students will gain ecological and physical knowledge of the environment, become literate in issues related to environmental sustainability, monitoring and management, and be able to explore interdisciplinary solutions to these problems. This training will help student understand certain aspects of the environment and possible ways to solving environmental problems which will be useful to students to enhance their career prospects.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe different components of the environmental systems and key issues in environmental science (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 2: observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 3: appropriately use and critically analyze a range of forms and sources of environmental data, and assess environmental problems (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 4: gain skills in scientific inquiry and effective communication of global environmental problems, issues of resource management, policies and management methods (by means of field/ laboratory/ team-based learning, research projects, presentation opportunities and capstone experiences in the curriculum)

#### Impermissible Combinations:

Major in Environmental Science

#### Required courses (42 credits)

#### 1. Introductory level courses (18 credits)

**Disciplinary Core Courses (6 credits)** 

ENVS1401 Introduction to environmental science (6)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses (Level 1 & 2):

CHEM1042 General chemistry I (6)

EASC1020 Introduction to climate science (6)

EASC1401 Blue Planet (6)

EASC2404 Introduction to atmosphere and hydrosphere (6)

ENVS1301 Environmental life science (6)
ENVS2001 Methods in environmental science (6)
ENVS2002 Environmental data analysis (6)

## 2. Advanced level courses (24 credits)

#### **Disciplinary Core Courses (6 credits)**

ENVS3004 Environment, society and economics (6)

#### **Disciplinary Electives (18 credits)**

At least 18 credits selected from the following courses:

BIOL3110 Environmental toxicology (6) BIOL3303 Conservation biology (6)

BIOL4302 Environmental impact assessment (6)

CHEM3141 Environmental chemistry (6)

CHEM3241 Analytical chemistry II: chemical instrumentation (6) EASC3020 Global change: anthropogenic impacts (6)

EASC3405 Environmental remote sensing (6)
ENVS3007 Natural hazards and mitigation (6)
ENVS3010 Sustainable energy and environment (6)

ENVS3019 Urban ecology (6)

ENVS3020 Global change ecology (6)

ENVS3042 Pollution (6)

ENVS3202 Plant physiology and climate change (6) ENVS3313 Environmental oceanography (6)

ENVS3401 Understanding tropical ecosystems in a changing world (6)

ENVS4110 Environmental remediation (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Offered to students 2020

admitted to Year 1 in

#### **Objectives:**

The Minor in Environmental Science aims to provide students with an introduction to some complex environmental issues. Students will gain ecological and physical knowledge of the environment, become literate in issues related to environmental sustainability, monitoring and management, and be able to explore interdisciplinary solutions to these problems. This training will help student understand certain aspects of the environment and possible ways to solving environmental problems which will be useful to students to enhance their career prospects.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe different components of the environmental systems and key issues in environmental science (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 2: observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 3: appropriately use and critically analyze a range of forms and sources of environmental data, and assess environmental problems (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 4: gain skills in scientific inquiry and effective communication of global environmental problems, issues of resource management, policies and management methods (by means of field/ laboratory/ team-based learning, research projects, presentation opportunities and capstone experiences in the curriculum)

#### Impermissible Combinations:

Major in Environmental Science

## Required courses (42 credits)

#### 1. Introductory level courses (18 credits)

**Disciplinary Core Courses (6 credits)** 

Introduction to environmental science (6) ENVS1401

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses (Level 1 & 2):

General chemistry I (6) CHEM1042

EASC1020 Introduction to climate science (6)

Blue Planet (6) EASC1401

EASC2404 Introduction to atmosphere and hydrosphere (6)

ENVS1301 Environmental life science (6) Methods in environmental science (6) ENVS2001 ENVS2002 Environmental data analysis (6)

## 2. Advanced level courses (24 credits)

## **Disciplinary Core Courses (6 credits)**

Environment, society and economics (6) ENVS3004

#### **Disciplinary Electives (18 credits)**

At least 18 credits selected from the following courses:

Environmental toxicology (6) BIOL3110 Conservation biology (6) BIOL3303

BIOL4302 Environmental impact assessment (6) Environmental chemistry (6)

CHEM3141

CHEM3241 Analytical chemistry II: chemical instrumentation (6) Global change: anthropogenic impacts (6) EASC3020

Environmental remote sensing (6) EASC3405 Natural hazards and mitigation (6) ENVS3007 Sustainable energy and environment (6) ENVS3010

ENVS3019 Urban ecology (6) Global change ecology (6) ENVS3020

ENVS3042 Pollution (6)

Plant physiology and climate change (6) ENVS3202 **FNVS3313** Environmental oceanography (6)

ENVS3401 Understanding tropical ecosystems in a changing world (6)

ENVS4110 Environmental remediation (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Offered to students 2019

admitted to Year 1 in

#### **Objectives:**

The Minor in Environmental Science aims to provide students with an introduction to some complex environmental issues. Students will gain ecological and physical knowledge of the environment, become literate in issues related to environmental sustainability, monitoring and management, and be able to explore interdisciplinary solutions to these problems. This training will help student understand certain aspects of the environment and possible ways to solving environmental problems which will be useful to students to enhance their career prospects.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe different components of the environmental systems and key issues in environmental science (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 2: observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 3: appropriately use and critically analyze a range of forms and sources of environmental data, and assess environmental problems (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 4: gain skills in scientific inquiry and effective communication of global environmental problems, issues of resource management, policies and management methods (by means of field/ laboratory/ team-based learning, research projects, presentation opportunities and capstone experiences in the curriculum)

#### Impermissible Combinations:

Major in Environmental Science

#### Required courses (42 credits)

#### 1. Introductory level courses (18 credits)

**Disciplinary Core Courses (6 credits)** 

ENVS1401 Introduction to environmental science (6)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses (Level 1 & 2):

CHEM1042 General chemistry I (6)

EASC1020 Introduction to climate science (6)

EASC1401 Blue Planet (6)

EASC2404 Introduction to atmosphere and hydrosphere (6)

ENVS1301 Environmental life science (6)
ENVS2001 Methods in environmental science (6)
ENVS2002 Environmental data analysis (6)

## 2. Advanced level courses (24 credits)

#### **Disciplinary Core Courses (6 credits)**

ENVS3004 Environment, society and economics (6)

#### **Disciplinary Electives (18 credits)**

At least 18 credits selected from the following courses:

BIOL3110 Environmental toxicology (6) BIOL3303 Conservation biology (6)

BIOL4302 Environmental impact assessment (6)

CHEM3141 Environmental chemistry (6)

CHEM3241 Analytical chemistry II: chemical instrumentation (6) EASC3020 Global change: anthropogenic impacts (6)

EASC3020 Global change: anthropogenic impacts
EASC3405 Environmental remote sensing (6)
ENVS3007 Natural hazards and mitigation (6)

ENVS3017 Natural nazards and mitigation (6)
ENVS3010 Sustainable energy and environment (6)

ENVS3019 Urban ecology (6) ENVS3020 Global change ecology (6)

ENVS3042 Pollution (6)

ENVS3313 Environmental oceanography (6) ENVS4110 Environmental remediation (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Offered to students 2018

admitted to Year 1 in

#### **Objectives:**

The Minor in Environmental Science aims to provide students with an introduction to some complex environmental issues. Students will gain ecological and physical knowledge of the environment, become literate in issues related to environmental sustainability, monitoring and management, and be able to explore interdisciplinary solutions to these problems. This training will help student understand certain aspects of the environment and possible ways to solving environmental problems which will be useful to students to enhance their career prospects.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe different components of the environmental systems and key issues in environmental science (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 2: observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 3: appropriately use and critically analyze a range of forms and sources of environmental data, and assess environmental problems (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 4: gain skills in scientific inquiry and effective communication of global environmental problems, issues of resource management, policies and management methods (by means of field/ laboratory/ team-based learning, research projects, presentation opportunities and capstone experiences in the curriculum)

#### Impermissible Combinations:

Major in Environmental Science

#### Required courses (42 credits)

#### 1. Introductory level courses (18 credits)

**Disciplinary Core Courses (6 credits)** 

ENVS1401 Introduction to environmental science (6)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses (Level 1 & 2):

CHEM1042 General chemistry I (6)

EASC1020 Introduction to climate science (6)

EASC1401 Blue Planet (6)

EASC2404 Introduction to atmosphere and hydrosphere (6)

ENVS1301 Environmental life science (6)
ENVS2001 Methods in environmental science (6)
ENVS2002 Environmental data analysis (6)

## 2. Advanced level courses (24 credits)

#### **Disciplinary Core Courses (6 credits)**

ENVS3004 Environment, society and economics (6)

#### **Disciplinary Electives (18 credits)**

At least 18 credits selected from the following courses:

BIOL3110 Environmental toxicology (6) BIOL3303 Conservation biology (6)

BIOL4302 Environmental impact assessment (6)

CHEM3141 Environmental chemistry (6)

CHEM3241 Analytical chemistry II: chemical instrumentation (6) EASC3020 Global change: anthropogenic impacts (6)

EASC3020 Global change: anthropogenic impact EASC3405 Environmental remote sensing (6) ENVS3007 Natural hazards and mitigation (6)

ENVS3010 Sustainable energy and environment (6)

ENVS3019 Urban ecology (6) ENVS3020 Global change ecology (6)

ENV53020 Global change ecology (o

ENVS3042 Pollution (6)

ENVS3313 Environmental oceanography (6) ENVS4110 Environmental remediation (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

The Minor in Environmental Science aims to provide students with an introduction to some complex environmental issues. Students will gain ecological and physical knowledge of the environment, become literate in issues related to environmental sustainability, monitoring and management, and be able to explore interdisciplinary solutions to these problems. This training will help student understand certain aspects of the environment and possible ways to solving environmental problems which will be useful to students to enhance their career prospects.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe different components of the environmental systems and key issues in environmental science (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 2: observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 3: appropriately use and critically analyze a range of forms and sources of environmental data, and assess environmental problems (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 4: gain skills in scientific inquiry and effective communication of global environmental problems, issues of resource management, policies and management methods (by means of field/ laboratory/ team-based learning, research projects, presentation opportunities and capstone experiences in the curriculum)

#### Impermissible Combinations:

Major in Environmental Science

#### Required courses (42 credits)

#### 1. Introductory level courses (18 credits)

**Disciplinary Core Courses (6 credits)** 

ENVS1401 Introduction to environmental science (6)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses (Level 1 & 2):

CHEM1042 General chemistry I (6)
CHEM2041 Principles of chemistry I (6)
CHEM2241 Analytical chemistry I (6)

CHEM2442 Fundamentals of organic chemistry (6)
EASC1020 Introduction to climate science (6)

EASC1401 Blue Planet (6)

EASC2404 Introduction to atmosphere and hydrosphere (6)

ENVS1301 Environmental life science (6)
ENVS2001 Methods in environmental science (6)
ENVS2002 Environmental data analysis (6)

## 2. Advanced level courses (24 credits)

### **Disciplinary Core Courses (6 credits)**

ENVS3004 Environment, society and economics (6)

## **Disciplinary Electives (18 credits)**

At least 18 credits selected from the following courses:

BIOL3110 Environmental toxicology (6)
BIOL3303 Conservation biology (6)

BIOL4302 Environmental impact assessment (6)

CHEM3141 Environmental chemistry (6)

CHEM3241 Analytical chemistry II: chemical instrumentation (6)

CHEM3242 Food and water analysis (6)

EASC3020 Global change: anthropogenic impacts (6)
EASC3405 Environmental remote sensing (6)
ENVS3006 Environmental radiation (6)
ENVS3007 Natural hazards and mitigation (6)

ENVS3010 Sustainable energy and environment (6)
ENVS3019 Urban ecology (6)
ENVS3020 Global change ecology (6)

ENVS3042 Pollution (6)

ENVS3313 Environmental oceanography (6) ENVS4110 Environmental remediation (6)

### Notes:

#### Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

The Minor in Environmental Science aims to provide students with an introduction to some complex environmental issues. Students will gain ecological and physical knowledge of the environment, become literate in issues related to environmental sustainability, monitoring and management, and be able to explore interdisciplinary solutions to these problems. This training will help student understand certain aspects of the environment and possible ways to solving environmental problems which will be useful to students to enhance their career prospects.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe different components of the environmental systems and key issues in environmental science (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 2: observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 3: appropriately use and critically analyze a range of forms and sources of environmental data, and assess environmental problems (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 4: gain skills in scientific inquiry and effective communication of global environmental problems, issues of resource management, policies and management methods (by means of field/ laboratory/ team-based learning, research projects, presentation opportunities and capstone experiences in the curriculum)

#### Impermissible Combinations:

Major in Environmental Science

#### Required courses (42 credits)

#### 1. Introductory level courses (18 credits)

**Disciplinary Core Courses (6 credits)** 

ENVS1401 Introduction to environmental science (6)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses (Level 1 & 2):

CHEM1042 General chemistry I (6)
CHEM2041 Principles of chemistry I (6)
CHEM2241 Analytical chemistry I (6)

CHEM2442 Fundamentals of organic chemistry (6) EASC1020 Introduction to climate science (6)

EASC1401 Blue Planet (6)

EASC2404 Introduction to atmosphere and hydrosphere (6)

ENVS1301 Environmental life science (6)
ENVS2001 Methods in environmental science (6)
ENVS2002 Environmental data analysis (6)

## 2. Advanced level courses (24 credits)

### **Disciplinary Core Courses (6 credits)**

ENVS3004 Environment, society and economics (6)

## **Disciplinary Electives (18 credits)**

At least 18 credits selected from the following courses:

BIOL3110 Environmental toxicology (6) BIOL3303 Conservation biology (6)

BIOL4302 Environmental impact assessment (6)

CHEM3141 Environmental chemistry (6)

CHEM3241 Analytical chemistry II: chemical instrumentation (6)

CHEM3242 Food and water analysis (6)

EASC3020 Global change: anthropogenic impacts (6)
EASC3405 Environmental remote sensing (6)
ENVS3006 Environmental radiation (6)
ENVS3007 Natural hazards and mitigation (6)

ENVS3010 Sustainable energy and environment (6)
ENVS3019 Urban ecology (6)
ENVS3020 Global change ecology (6)

ENVS3042 Pollution (6)

ENVS3313 Environmental oceanography (6) ENVS4110 Environmental remediation (6)

### Notes:

#### Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

The Minor in Environmental Science aims to provide students with an introduction to some complex environmental issues. Students will gain ecological and physical knowledge of the environment, become literate in issues related to environmental sustainability, monitoring and management, and be able to explore interdisciplinary solutions to these problems. This training will help student understand certain aspects of the environment and possible ways to solving environmental problems which will be useful to students to enhance their career prospects.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe different components of the environmental systems and key issues in environmental science (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 2: observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 3: appropriately use and critically analyze a range of forms and sources of environmental data, and assess environmental problems (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 4: gain skills in scientific inquiry and effective communication of global environmental problems, issues of resource management, policies and management methods (by means of field/ laboratory/ team-based learning, research projects, presentation opportunities and capstone experiences in the curriculum)

#### Impermissible Combinations:

Major in Environmental Science

#### Required courses (42 credits)

#### 1. Introductory level courses (18 credits)

**Disciplinary Core Courses (6 credits)** 

ENVS1401 Introduction to environmental science (6)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses (Level 1 & 2):

CHEM1042 General chemistry I (6)
CHEM2041 Principles of chemistry I (6)
CHEM2241 Analytical chemistry I (6)

CHEM2442 Fundamentals of organic chemistry (6)
EASC1020 Introduction to climate science (6)

EASC1401 Blue Planet (6)

EASC2404 Introduction to atmosphere and hydrosphere (6)

ENVS1301 Environmental life science (6)
ENVS2001 Methods in environmental science (6)
ENVS2002 Environmental data analysis (6)

## 2. Advanced level courses (24 credits)

## Disciplinary Core Courses (6 credits)

ENVS3004 Environment, society and economics (6)

## **Disciplinary Electives (18 credits)**

At least 18 credits selected from the following courses:

BIOL3110 Environmental toxicology (6) BIOL3303 Conservation biology (6)

BIOL4302 Environmental impact assessment (6)

CHEM3141 Environmental chemistry (6)

CHEM3241 Analytical chemistry II: chemical instrumentation (6)

CHEM3242 Food and water analysis (6)

EASC3020 Global change: anthropogenic impacts (6)
EASC3405 Environmental remote sensing (6)
ENVS3006 Environmental radiation (6)
ENVS3007 Natural hazards and mitigation (6)

ENVS3010 Sustainable energy and environment (6)
ENVS3019 Urban ecology (6)
ENVS3020 Global change ecology (6)

ENVS3042 Pollution (6)

ENVS3313 Environmental oceanography (6) ENVS4110 Environmental remediation (6)

### Notes:

#### Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

The Minor in Environmental Science aims to provide students with an introduction to some complex environmental issues. Students will gain ecological and physical knowledge of the environment, become literate in issues related to environmental sustainability, monitoring and management, and be able to explore interdisciplinary solutions to these problems. This training will help student understand certain aspects of the environment and possible ways to solving environmental problems which will be useful to students to enhance their career prospects.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe different components of the environmental systems and key issues in environmental science (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 2: observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 3: appropriately use and critically analyze a range of forms and sources of environmental data, and assess environmental problems (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 4: gain skills in scientific inquiry and effective communication of global environmental problems, issues of resource management, policies and management methods (by means of field/ laboratory/ team-based learning, research projects, presentation opportunities and capstone experiences in the curriculum)

#### Impermissible Combinations:

Major in Environmental Science

#### Required courses (42 credits)

#### 1. Introductory level courses (18 credits)

**Disciplinary Core Courses (6 credits)** 

ENVS1401 Introduction to environmental science (6)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses (Level 1 & 2):

CHEM1042 General chemistry I (6)
CHEM2041 Principles of chemistry I (6)
CHEM2241 Analytical chemistry I (6)

CHEM2442 Fundamentals of organic chemistry (6) EASC1020 Introduction to climate science (6)

EASC1401 Blue Planet (6)

EASC2404 Introduction to atmosphere and hydrosphere (6)

ENVS1301 Environmental life science (6)
ENVS2001 Methods in environmental science (6)
ENVS2002 Environmental data analysis (6)

## 2. Advanced level courses (24 credits)

### **Disciplinary Core Courses (6 credits)**

ENVS3004 Environment, society and economics (6)

## **Disciplinary Electives (18 credits)**

At least 18 credits selected from the following courses:

BIOL3110 Environmental toxicology (6) BIOL3303 Conservation biology (6)

BIOL4302 Environmental impact assessment (6)

CHEM3141 Environmental chemistry (6)

CHEM3241 Analytical chemistry II: chemical instrumentation (6)

CHEM3242 Food and water analysis (6)
EASC3020 Global change: anthropogenic impacts (6)

EASC3405 Environmental remote sensing (6)
ENVS3006 Environmental radiation (6)
ENVS3007 Natural hazards and mitigation (6)

ENVS3010 Sustainable energy and environment (6) ENVS3019 Urban ecology (6)

ENVS3020 Global change ecology (6) ENVS3042 Pollution (6)

ENVS3313 Environmental oceanography (6) ENVS4110 Environmental remediation (6)

### Notes:

#### Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

The Minor in Environmental Science aims to provide students with an introduction to some complex environmental issues. Students will gain ecological and physical knowledge of the environment, become literate in issues related to environmental sustainability, monitoring and management, and be able to explore interdisciplinary solutions to these problems. This training will help student understand certain aspects of the environment and possible ways to solving environmental problems which will be useful to students to enhance their career prospects.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe different components of the environmental systems and key issues in environmental science (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 2: observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 3: appropriately use and critically analyze a range of forms and sources of environmental data, and assess environmental problems (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 4: gain skills in scientific inquiry and effective communication of global environmental problems, issues of resource management, policies and management methods (by means of field/ laboratory/ team-based learning, research projects, presentation opportunities and capstone experiences in the curriculum)

#### Impermissible Combinations:

Major in Environmental Science

#### Required courses (42 credits)

#### 1. Introductory level courses (18 credits)

#### **Disciplinary Core Courses (6 credits)**

ENVS1401 Introduction to environmental science (6)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses (Level 1 & 2):

CHEM1042 General chemistry I (6)
CHEM2041 Principles of chemistry I (6)
CHEM2241 Analytical chemistry I (6)

CHEM2442 Fundamentals of organic chemistry (6)
EASC1020 Introduction to climate science (6)

EASC1401 Blue Planet (6)

EASC2404 Introduction to atmosphere and hydrosphere (6)

ENVS1301 Environmental life science (6)
ENVS2001 Methods in environmental science (6)
ENVS2002 Environmental data analysis (6)

## 2. Advanced level courses (24 credits)

### **Disciplinary Core Courses (6 credits)**

ENVS3004 Environment, society and economics (6)

## **Disciplinary Electives (18 credits)**

At least 18 credits selected from the following courses:

BIOL3110 Environmental toxicology (6)
BIOL3303 Conservation biology (6)

BIOL4302 Environmental impact assessment (6)

CHEM3141 Environmental chemistry (6)

CHEM3241 Analytical chemistry II: chemical instrumentation (6)

CHEM3242 Food and water analysis (6)

EASC3020 Global change: anthropogenic impacts (6)
EASC3405 Environmental remote sensing (6)
ENVS3006 Environmental radiation (6)

ENVS3007 Natural hazards and mitigation (6)
ENVS3010 Sustainable energy and environment (6)
ENVS3019 Urban ecology (6)

ENVS3019 Global change ecology (6)

ENVS3042 Pollution (6)

ENVS3313 Environmental oceanography (6) ENVS4110 Environmental remediation (6)

### Notes:

#### Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

The Minor in Environmental Science aims to provide students with an introduction to some complex environmental issues. Students will gain ecological and physical knowledge of the environment, become literate in issues related to environmental sustainability, monitoring and management, and be able to explore interdisciplinary solutions to these problems. This training will help student understand certain aspects of the environment and possible ways to solving environmental problems which will be useful to students to enhance their career prospects.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe different components of the environmental systems and key issues in environmental science (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 2: observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 3: appropriately use and critically analyze a range of forms and sources of environmental data, and assess environmental problems (by means of lectures, coursework, tutorial classes and field/ laboratory/ team-based learning in the curriculum)
- PLO 4: gain skills in scientific inquiry and effective communication of global environmental problems, issues of resource management, policies and management methods (by means of field/ laboratory/ team-based learning, research projects, presentation opportunities and capstone experiences in the curriculum)

#### Impermissible Combinations:

Major in Environmental Science

#### Required courses (42 credits) 1. Introductory level courses (18 credits) **Disciplinary Core Courses (6 credits)** Introduction to environmental science (6) ENVS1401 **Disciplinary Electives (12 credits)** At least 6 credits selected from the following courses (Level 1) in List A: List A CHEM1042 General chemistry I (6) EASC1401 Blue Planet (6) ENVS1301 Environmental life science (6) At least 6 credits selected from the following courses (Level 2) in List B: List B BIOL2102 Biostatistics (6) Principles of chemistry (6) CHEM2041 CHEM2241 Analytical chemistry I (6) CHEM2442 Fundamentals of organic chemistry (6) Introduction to atmosphere and hydrosphere (6) EASC2404 ENVS2001 Methods in environmental science (6) ENVS2002 Environmental data analysis (6) 2. Advanced level courses (24 credits) **Disciplinary Core Courses (6 credits)** Environment, society and economics (6) FNVS3004 **Disciplinary Electives (18 credits)** At least 18 credits selected from the following courses: BIOL3110 Environmental toxicology (6) Conservation biology (6) **BIOL3303** Environmental impact assessment (6) BIOL4302

Environmental chemistry (6)

Food and water analysis (6)

Environmental radiation (6)

Urban ecology (6)

Environmental remote sensing (6)

Natural hazards and mitigation (6) Sustainable energy and environment (6)

Analytical chemistry II: chemical instrumentation (6)

Global change: anthropogenic impacts (6)

## ENVS3020 Global change ecology (6) ENVS3042 Pollution (6)

ENVS3313 Environmental oceanography (6) ENVS4110 Environmental remediation (6)

#### Notes:

CHEM3141

CHEM3241 CHEM3242

EASC3020

EASC3405 ENVS3006

ENVS3007

ENVS3010 ENVS3019

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Minor Title Minor in Food & Nutritional Science

Offered to students

2021

admitted to Year 1 in

#### **Objectives:**

The Minor in Food and Nutritional Science aims to provide a comprehensive education in food, nutrition and related sociological and technological topics, enabling graduates to develop their interest in food and nutrition and have a wide range of employment and progression options.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: demonstrate broad knowledge in the field of food and nutritional science (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: recognize and describe the health risks associated with food and specific nutrients, and discuss how to prevent these risks (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: understand and describe ethical perspectives and practice in food product development, food safety and public health nutrition (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: synthesize and summarize information from a wide range of sources and draw reasoned conclusions with particular reference to food and nutritional sciences and related global and commercial issues (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Food & Nutritional Science

## 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 cred	its selected from the following courses:
BIOL1110	From molecules to cells (6)
BIOL1201	Introduction to food and nutrition (6)
BIOL2101	Principles of food chemistry (6)
DIOLOGGO	Duin sinte a of his shamping (0)

BIOL2220 Principles of biochemistry (6)

> BIOL2220 and BIOC2600 are mutually exclusive. Take either BIOL2220 or BIOC2600 o fulfill

this 12 credits requirement, but not both.

Take either BIOL2220 or BIOC2600 o fulfill

BIOC2600 Basic biochemistry (6)

this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

[previous title: Food and nutritional toxicology

#### 2. Advanced level courses (24 credits) **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

BIOL3202 BIOL3203	Food microbiology (6)
BIOL3204	Nutrition and the life cycle (6)
BIOL3205	Human physiology (6)
BIOL3207	Principles of toxicology (6)
BIOL3209	Food and nutrient analysis (6)
	North and a series (O)
BIOL3211	Nutrigenomics (6)

(6)1

BIOL3216 Food waste management (6) Food, environment and health (6) **BIOL3217** BIOL3218 Food hygiene and quality control (6) BIOL3606 Diet and disease (6)

**BIOL3608** Food commodities (6) Public health nutrition (6) BIOL4201

Nutrition and sports performance (6) BIOL4202

BIOL4205 Food technology (6)

[previous title: Food processing and engineering (6) ]

BIOL4209 Functional foods (6)

BIOL4411 Plant and food biotechnology (6)

#### Notes:

#### Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Minor Title Minor in Food & Nutritional Science

Offered to students

2020

admitted to Year 1 in

#### **Objectives:**

The Minor in Food and Nutritional Science aims to provide a comprehensive education in food, nutrition and related sociological and technological topics, enabling graduates to develop their interest in food and nutrition and have a wide range of employment and progression options.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: demonstrate broad knowledge in the field of food and nutritional science (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: recognize and describe the health risks associated with food and specific nutrients, and discuss how to prevent these risks (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: understand and describe ethical perspectives and practice in food product development, food safety and public health nutrition (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: synthesize and summarize information from a wide range of sources and draw reasoned conclusions with particular reference to food and nutritional sciences and related global and commercial issues (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Food & Nutritional Science

Required of	courses	(36	credits)
4 1 4			

## 1. Introductory level courses (12 credits)

**Disciplinary Electives (12 credits)** 

At least 12 credits selected from the following courses: From molecules to cells (6) BIOL1110 Introduction to food and nutrition (6) BIOL1201 Principles of food chemistry (6) BIOL2101

Principles of biochemistry (6) BIOL2220

Take either BIOL2220 or BIOC2600 o fulfill this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

BIOC2600 Basic biochemistry (6) Take either BIOL2220 or BIOC2600 o fulfill this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually

exclusive.

#### 2. Advanced level courses (24 credits) **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

BIOL3202	Nutritional biochemistry (6)
BIOL3203	Food microbiology (6)
BIOL3204	Nutrition and the life cycle (6)
BIOL3205	Human physiology (6)
BIOL3207	Principles of toxicology (6)
BIOL3209	Food and nutrient analysis (6)

[previous title: Food and nutritional toxicology

(6)1

BIOL3211 Nutrigenomics (6)

BIOL3216 Food waste management (6) **BIOL3217** Food, environment and health (6) BIOL3218 Food hygiene and quality control (6)

BIOL3606 Diet and disease (6) **BIOL3608** Food commodities (6) Public health nutrition (6) BIOL4201

Nutrition and sports performance (6) BIOL4202

BIOL4205 Food technology (6) [previous title: Food processing and engineering (6) ]

BIOL4209 Functional foods (6)

BIOL4411 Plant and food biotechnology (6)

#### Notes:

#### Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Minor Title Minor in Food & Nutritional Science

Offered to students

2019

admitted to Year 1 in

#### **Objectives:**

The Minor in Food and Nutritional Science aims to provide a comprehensive education in food, nutrition and related sociological and technological topics, enabling graduates to develop their interest in food and nutrition and have a wide range of employment and progression options.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: demonstrate broad knowledge in the field of food and nutritional science (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: recognize and describe the health risks associated with food and specific nutrients, and discuss how to prevent these risks (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: understand and describe ethical perspectives and practice in food product development, food safety and public health nutrition (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: synthesize and summarize information from a wide range of sources and draw reasoned conclusions with particular reference to food and nutritional sciences and related global and commercial issues (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Food & Nutritional Science

## 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)** At least 12 credits selected from the following courses:

ALIEASL 12 CIEUR	is selected from the following courses
BIOL1110	From molecules to cells (6)
BIOL1201	Introduction to food and nutrition (6)
BIOL2101	Principles of food chemistry (6)

BIOL2220 Principles of biochemistry (6)

Take either BIOL2220 or BIOC2600 o fulfill this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

BIOC2600 Basic biochemistry (6)

Take either BIOL2220 or BIOC2600 o fulfill this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

#### 2. Advanced level courses (24 credits) **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses: BIOL3202 Nutritional biochemistry (6)

Egod migrahiology (6)

BIOL3203	Food microbiology (6)
BIOL3204	Nutrition and the life cycle (6)
BIOL3205	Human physiology (6)
BIOL3207	Principles of toxicology (6)
BIOL3209	Food and nutrient analysis (6)
BIOL3211	Nutrigenomics (6)
BIOL3216	Food waste management (6)
BIOL3217	Food, environment and health (6)
BIOL3218	Food hygiene and quality control (6)
BIOL3606	Diet and disease (6)
BIOI 3608	Food commodities (6)

[previous title: Food and nutritional toxicology (6)1

Food commodities (6) BIOL3608 BIOL4201 Public health nutrition (6)

Nutrition and sports performance (6) BIOL4202 BIOL4204 Diet, brain function and behavior (6)

BIOL4205 Food technology (6)

[previous title: Food processing and engineering (6) 1

**BIOI 4209** Functional foods (6)

BIOL4411 Plant and food biotechnology (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Minor Title Minor in Food & Nutritional Science

Offered to students

2018

admitted to Year 1 in

#### Objectives:

The Minor in Food and Nutritional Science aims to provide a comprehensive education in food, nutrition and related sociological and technological topics, enabling graduates to develop their interest in food and nutrition and have a wide range of employment and progression options.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: demonstrate broad knowledge in the field of food and nutritional science (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: recognize and describe the health risks associated with food and specific nutrients, and discuss how to prevent these risks (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: understand and describe ethical perspectives and practice in food product development, food safety and public health nutrition (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: synthesize and summarize information from a wide range of sources and draw reasoned conclusions with particular reference to food and nutritional sciences and related global and commercial issues (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Food & Nutritional Science

Required course	s (36 credits)	
-	vel courses (12 credits)	
Disciplinary Elect		
	its selected from the following courses:	
BIOL1110	From molecules to cells (6)	
BIOL110	Introduction to food and nutrition (6)	
BIOL 1201	Principles of food chemistry (6)	
		Take either BIOL2220 or BIOC2600 o fulfill
BIOL2220	Principles of biochemistry (6)	this 12 credits requirement, but not both.
		BIOL2220 and BIOC2600 are mutually
		exclusive.
BIOC2600	Basic biochemistry (6)	Take either BIOL2220 or BIOC2600 o fulfill
2.002000	<b>3</b> (-7	this 12 credits requirement, but not both.
		BIOL2220 and BIOC2600 are mutually
		exclusive.
	courses (24 credits)	
Disciplinary Elect		
At least 24 cred	its selected from the following courses:	
BIOL3202	Nutritional biochemistry (6)	
BIOL3203	Food microbiology (6)	
BIOL3204	Nutrition and the life cycle (6)	
BIOL3205	Human physiology (6)	
BIOL3206	Clinical nutrition (6)	Take either BIOL3206 or BIOL3606 to fulfill
	`,	this 24 credits requirement, but not both.
		BIOL3206 and BIOL3606 are mutually
		exclusive.
BIOL3207	Principles of toxicology (6)	[previous title: Food and nutritional toxicology
DIOL 2000	Food and nutrient analysis (6)	(6) ]
BIOL3209	Food and nutrient analysis (6)	
BIOL3211	Nutrigenomics (6)	
BIOL3216	Food waste management (6)	
BIOL3217	Food, environment and health (6)	
BIOL3218	Food hygiene and quality control (6)	
BIOL3606	Diet and disease (6)	Take either BIOL3206 or BIOL3606 to fulfill
		this 24 credits requirement, but not both.
		BIOL3206 and BIOL3606 are mutually exclusive.
BIOL3608	Food commodities (6)	Take either BIOL3608 or BIOL4208 to fulfill
DIOLSOO	1 ood commodities (o)	this 24 credits requirement, but not both.
		BIOL3608 and BIOL4208 are mutually
		exclusive.
BIOL4201	Public health nutrition (6)	
BIOL4202	Nutrition and sports performance (6)	
BIOL4204	Diet, brain function and behavior (6)	
BIOL4205	Food technology (6)	[previous title: Food processing and
	<del></del> · ·	engineering (6) ]
BIOL4208	Meat, dairy and grain sciences (6)	Take either BIOL3608 or BIOL4208 to fulfill
		this 24 credits requirement, but not both.
		BIOL3608 and BIOL4208 are mutually
DIOI 4000	Franchism of foods (0)	exclusive.
BIOL4209	Functional foods (6)	
BIOL4411	Plant and food biotechnology (6)	

# Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks

Minor Title Minor in Food & Nutritional Science

Offered to students admitted to Year 1 in

2017

## Objectives:

The Minor in Food and Nutritional Science aims to provide a comprehensive education in food, nutrition and related sociological and technological topics, enabling graduates to develop their interest in food and nutrition and have a wide range of employment and progression options.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: demonstrate broad knowledge in the field of food and nutritional science (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: recognize and describe the health risks associated with food and specific nutrients, and discuss how to prevent these risks (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: understand and describe ethical perspectives and practice in food product development, food safety and public health nutrition (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: synthesize and summarize information from a wide range of sources and draw reasoned conclusions with particular reference to food and nutritional sciences and related global and commercial issues (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Food & Nutritional Science

Major in Food & Nutri	lional Science	
Required course	s (36 credits)	
•	/el courses (12 credits)	
Disciplinary Elect		
	its selected from the following courses:	
BIOL1110	From molecules to cells (6)	
BIOL1201	Introduction to food and nutrition (6)	
BIOL2101	Principles of food chemistry (6)	
BIOL2220	Principles of biochemistry (6)	Take either BIOL2220 or BIOC2600 o fulfill
		this 12 credits requirement, but not both.
		BIOL2220 and BIOC2600 are mutually
	5	exclusive.
BIOC2600	Basic biochemistry (6)	Take either BIOL2220 or BIOC2600 o fulfill
		this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually
		exclusive.
2. Advanced level	courses (24 credits)	
Disciplinary Elect		
	its selected from the following courses:	
BIOL3202	Nutritional biochemistry (6)	
BIOL3203	Food microbiology (6)	
BIOL3204	Nutrition and the life cycle (6)	
BIOL3205	Human physiology (6)	
BIOL3206	Clinical nutrition (6)	Take either BIOL3206 or BIOL3606 to fulfill
		this 24 credits requirement, but not both.
		BIOL3206 and BIOL3606 are mutually
BIOL3207	Principles of toxicology (6)	exclusive. [previous title: Food and nutritional toxicology
DIOL3201	Findiples of toxicology (0)	(6)]
BIOL3209	Food and nutrient analysis (6)	(9)]
BIOL3211	Nutrigenomics (6)	
BIOL3216	Food waste management (6)	
BIOL3217	Food, environment and health (6)	
BIOL3218	Food hygiene and quality control (6)	
BIOL3606	Diet and disease (6)	Take either BIOL3206 or BIOL3606 to fulfill
		this 24 credits requirement, but not both.
		BIOL3206 and BIOL3606 are mutually
BIOL3608	Food commodities (6)	exclusive. Take either BIOL3608 or BIOL4208 to fulfill
DIOLSOO	1 dod commodities (0)	this 24 credits requirement, but not both.
		BIOL3608 and BIOL4208 are mutually
		exclusive.
BIOL4201	Public health nutrition (6)	
BIOL4202	Nutrition and sports performance (6)	
BIOL4204	Diet, brain function and behavior (6)	
BIOL4205	Food technology (6)	[previous title: Food processing and
DIOI 4200	Most dairy and grain sciences (6)	engineering (6) ] Take either BIOL3608 or BIOL4208 to fulfill
BIOL4208	Meat, dairy and grain sciences (6)	this 24 credits requirement, but not both.
		BIOL3608 and BIOL4208 are mutually
		exclusive.
BIOL4209	Functional foods (6)	
BIOL4411	Plant and food biotechnology (6)	

# Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks

Minor Title Minor in Food & Nutritional Science

Offered to students

2016

admitted to Year 1 in

#### Objectives:

The Minor in Food and Nutritional Science aims to provide a comprehensive education in food, nutrition and related sociological and technological topics, enabling graduates to develop their interest in food and nutrition and have a wide range of employment and progression options.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: demonstrate broad knowledge in the field of food and nutritional science (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: recognize and describe the health risks associated with food and specific nutrients, and discuss how to prevent these risks (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: understand and describe ethical perspectives and practice in food product development, food safety and public health nutrition (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: synthesize and summarize information from a wide range of sources and draw reasoned conclusions with particular reference to food and nutritional sciences and related global and commercial issues (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Food & Nutritional Science

BIOC2600

## 1. Introductory level courses (12 credits)

**Disciplinary Electives (12 credits)** 

At least 12 credits selected from the following courses:

BIOL1110 From molecules to cells (6)
BIOL1201 Introduction to food and nutrition (6)
BIOL2220 Principles of biochemistry (6)

Basic biochemistry (6)

Take either BIOL2220 or BIOC2600 to fulfill this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually

exclusive.

Take either BIOL2220 or BIOC2600 to fulfill this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

## 2. Advanced level courses (24 credits)

ווופוטצוט	าary ⊑เต	ectives	s (24 creai	ts)

At least 24 credits selected from the following courses:		
BIOL3201	Food chemistry (6)	
BIOL3202	Nutritional biochemistry (6)	
BIOL3203	Food microbiology (6)	
	N ( '''	

BIOL3204 Nutrition and the life cycle (6)
BIOL3205 Human physiology (6)
BIOL3206 Clinical nutrition (6)

BIOL3207 Principles of toxicology (6)

BIOL3208 Food safety and quality management (6)

BIOL3209 Food and nutrient analysis (6)
BIOL3210 Grain production and utilization (6)

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BIOL3211 Nutrigenomics (6)

BIOL3216 Food waste management (6)
BIOL3217 Food, environment and health (6)
BIOL3218 Food hygiene and quality control (6)

BIOL3606 Diet and disease (6)

BIOL3608 Food commodities (6)

Take either BIOL3206 or BIOL3606 to fulfill this 24 credits requirement, but not both. BIOL3206 and BIOL3606 are mutually exclusive.

[previous title: Food and nutritional toxicology (6)]

Take either BIOL3208 or BIOL3218 to fulfill this 24 credits requirement, but not both. BIOL3208 and BIOL3218 are mutually exclusive.

Take either BIOL3210 or BIOL4208 or BIOL3608 to fulfill this 24 credits requirement, but not both. BIOL3210 and BIOL4208 or BIOL3608 are mutually exclusive.

Take either BIOL3208 or BIOL3218 to fulfill this 24 credits requirement, but not both. BIOL3208 and BIOL3218 are mutually exclusive.

Take either BIOL3206 or BIOL3606 to fulfill this 24 credits requirement, but not both. BIOL3206 and BIOL3606 are mutually exclusive.

Take either BIOL3210 or BIOL4208 or BIOL3608; BIOL4207 or BIOL4208 or BIOL3608 to fufill this 24 credits requirement, but not both. BIOL3210, BIOL3608, BIOL4207 and BIOL4208 are mutually exclusive.

BIOL4201 BIOL4202 BIOL4204	Public health nutrition (6) Nutrition and sports performance (6) Diet, brain function and behavior (6)	
BIOL4205	Food technology (6)	[previous title: Food processing and engineering (6) ]
BIOL4207	Meat and dairy sciences (6)	Take either BIOL4207 or BIOL4208 or BIOL3608 to fufill this 24 credits requirement, but not both. BIOL3608, BIOL4207 and BIOL4208 are mutually exclusive.
BIOL4208	Meat, dairy and grain sciences (6)	Take either BIOL3210 or BIOL4208 or BIOL3608; BIOL4207 or BIOL4208 or BIOL3608 to fufill this 24 credits requirement, but not both. BIOL3210, BIOL3608, BIOL4207 and BIOL4208 are mutually exclusive.
BIOL4209	Functional foods (6)	
BIOL4210	Food product development (6)	
BIOL4411	Plant and food biotechnology (6)	

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Minor Title Minor in Food & Nutritional Science

Offered to students

2015

admitted to Year 1 in

#### **Objectives:**

The Minor in Food and Nutritional Science aims to provide a comprehensive education in food, nutrition and related sociological and technological topics, enabling graduates to develop their interest in food and nutrition and have a wide range of employment and progression options.

## **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: demonstrate broad knowledge in the field of food and nutritional science (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: recognize and describe the health risks associated with food and specific nutrients, and discuss how to prevent these risks (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: understand and describe ethical perspectives and practice in food product development, food safety and public health nutrition (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: synthesize and summarize information from a wide range of sources and draw reasoned conclusions with particular reference to food and nutritional sciences and related global and commercial issues (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Food & Nutritional Science

## 1. Introductory level courses (12 credits)

**Disciplinary Electives (12 credits)** 

At least 12 credits selected from the following courses:

BIOL1110 From molecules to cells (6)
BIOL1201 Introduction to food and nutrition (6)
BIOL2220 Principles of biochemistry (6)

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BIOC2600 Basic biochemistry (6)

Take either BIOL2220 or BIOC2600 to fulfill this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutaully

exclusive.

Take either BIOL2220 or BIOC2600 to fulfill this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutaully exclusive.

## 2. Advanced level courses (24 credits)

**Disciplinary Electives (24 credits)** 

At least 24 credits selected from the following courses: BIOL3201 Food chemistry (6)

BIOL3202 Nutritional biochemistry (6)
BIOL3203 Food microbiology (6)
BIOL3204 Nutrition and the life cycle (6)
BIOL3205 Human physiology (6)
BIOL3206 Clinical nutrition (6)

BIOL3207 Principles of toxicology (6)

BIOL3208 Food safety and quality management (6)

BIOL3209 Food and nutrient analysis (6)

BIOL3210 Grain production and utilization (6)

BIOL3211 Nutrigenomics (6)

BIOL3216 Food waste management (6)
BIOL3217 Food, environment and health (6)
BIOL3218 Food hygiene and quality control (6)

BIOL3606 Diet and disease (6)

BIOL3608 Food commodities (6)

Take either BIOL3206 or BIOL3606 to fulfill this 24 credits requirement, but not both. BIOL3206 and BIOL3606 are mutually exclusive.

[previous title: Food and nutritional toxicology (6) ]

Take either BIOL3208 or BIOL3218 to fulfill this 24 credits requirement, but not both. BIOL3208 and BIOL3218 are mutaully exclusive.

Take either BIOL3210 or BIOL4208 or BIOL3608 to fulfill this 24 credits requirement, but not both. BIOL3210 and BIOL4208 or BIOL3608 are mutually exclusive.

Take either BIOL3208 or BIOL3218 to fulfill this 24 credits requirement, but not both. BIOL3208 and BIOL3218 are mutaully

exclusive.

Take either BIOL3206 or BIOL3606 to fulfill

this 24 credits requirement, but not both. BIOL3206 and BIOL3606 are mutually exclusive.

Take either BIOL3210 or BIOL4208 or BIOL3608; BIOL4207 or BIOL4208 or BIOL3608 to fufill this 24 credits requirement, but not both. BIOL3210, BIOL3608, BIOL4207 and BIOL4208 are mutually exclusive.

BIOL4201 BIOL4202 BIOL4204	Public health nutrition (6) Nutrition and sports performance (6) Diet, brain function and behavior (6)	
BIOL4205	Food technology (6)	[previous title: Food processing and engineering (6) ]
BIOL4207	Meat and dairy sciences (6)	Take either BIOL4207 or BIOL4208 or BIOL3608 to fufill this 24 credits requirement, but not both. BIOL3608, BIOL4207 and BIOL4208 are mutually exclusive.
BIOL4208	Meat, dairy and grain sciences (6)	Take either BIOL3210 or BIOL4208 or BIOL3608; BIOL4207 or BIOL4208 or BIOL3608 to fuffil this 24 credits requirement, but not both. BIOL3210, BIOL3608, BIOL4207 and BIOL4208 are mutually exclusive.
BIOL4209	Functional foods (6)	
BIOL4210	Food product development (6)	
BIOL4411	Plant and food biotechnology (6)	

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Minor Title Minor in Food & Nutritional Science

Offered to students admitted to Year 1 in 2014

#### **Objectives:**

The Minor in Food and Nutritional Science aims to provide a comprehensive education in food, nutrition and related sociological and technological topics, enabling graduates to develop their interest in food and nutrition and have a wide range of employment and progression options.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: demonstrate broad knowledge in the field of food and nutritional science (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: recognize and describe the health risks associated with food and specific nutrients, and discuss how to prevent these risks (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: understand and describe ethical perspectives and practice in food product development, food safety and public health nutrition (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: synthesize and summarize information from a wide range of sources and draw reasoned conclusions with particular reference to food and nutritional sciences and related global and commercial issues (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Food & Nutritional Science

1. In	ıtrodu	ctory	level	courses	(12	credits)

**Disciplinary Electives (12 credits)** 

At least 12 credits selected from the following courses:

BIOL1110 From molecules to cells (6) Introduction to food and nutrition (6) BIOL1201 Principles of biochemistry (6) **BIOL2220** 

BIOC2600 Basic biochemistry (6)

exclusvie. Take either BIOL2220 or BIOC2600 to fulfill this 12 credits requirement, but not both.

BIOL2220 and BIOC2600 are mutually exclusvie.

exclusive.

exclusvie.

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2. Advanced level courses (24 credits)

**Disciplinary Electives (24 credits)** At least 24 credits selected from the following courses:

BIOL3201 Food chemistry (6) BIOL3202 Nutritional biochemistry (6) BIOL3203 Food microbiology (6) Nutrition and the life cycle (6) BIOL3204 BIOL3205 Human physiology (6) Clinical nutrition (6) **BIOL3206** 

**BIOL 3207** Principles of toxicology (6)

**BIOL3208** Food safety and quality management (6)

BIOL3209 Food and nutrient analysis (6)

BIOL3210 Grain production and utilization (6)

Nutrigenomics (6) BIOL3211

Food waste management (6) BIOL3216 **BIOL3217** Food, environment and health (6) Food hygiene and quality control (6) **BIOL3218** 

**BIOL3606** Diet and disease (6)

**BIOL3608** Food commodities (6) Take either BIOL3210 or BIOL4208 or BIOL3608 to fulfill this 24 credits requirement, but not both. BIOL3210 and

Take either BIOL3206 or BIOL3606 to fulfill

[previous title: Food and nutritional toxicology

Take either BIOL3208 or BIOL3218 to fulfill

this 24 credits requirement, but not both. BIOL3208 and BIOL3218 are mutually

this 24 credits requirement, but not both. BIOL3206 and BIOL3606 are mutually

Take either BIOL2220 or BIOC2600 to fulfill

this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually

BIOL4208 or BIOL3608 are mutually exclusive.

Take either BIOL3208 or BIOL3218 to fulfill this 24 credits requirement, but not both. BIOL3208 and BIOL3218 are mutually

exclusvie.

Take either BIOL3206 or BIOL3606 to fulfill this 24 credits requirement, but not both. BIOL3206 and BIOL3606 are mutually

exclusive.

Take either BIOL3210 or BIOL4208 or BIOL3608; BIOL4207 or BIOL4208 or BIOL3608 to fufill this 24 credits requirement, but not both. BIOL3210, BIOL3608, BIOL4207 and BIOL4208 are mutually

exclusive.

BIOL4201 BIOL4202 BIOL4204	Public health nutrition (6) Nutrition and sports performance (6) Diet, brain function and behavior (6)	
BIOL4205	Food technology (6)	[previous title: Food processing and engineering (6) ]
BIOL4207	Meat and dairy sciences (6)	Take either BIOL4207 or BIOL4208 or BIOL3608 to fufill this 24 credits requirement, but not both. BIOL3608, BIOL4207 and BIOL4208 are mutually exclusive.
BIOL4208	Meat, dairy and grain sciences (6)	Take either BIOL3210 or BIOL4208 or BIOL3608; BIOL4207 or BIOL4208 or BIOL3608 to fufill this 24 credits requirement, but not both. BIOL3210, BIOL3608, BIOL4207 and BIOL4208 are mutually exclusive.
BIOL4209	Functional foods (6)	
BIOL4210	Food product development (6)	
BIOL4411	Plant and food biotechnology (6)	

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Minor Title Minor in Food & Nutritional Science

Offered to students

2013

admitted to Year 1 in

#### **Objectives:**

The Minor in Food and Nutritional Science aims to provide a comprehensive education in food, nutrition and related sociological and technological topics, enabling graduates to develop their interest in food and nutrition and have a wide range of employment and progression options.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: demonstrate broad knowledge in the field of food and nutritional science (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: recognize and describe the health risks associated with food and specific nutrients, and discuss how to prevent these risks (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: understand and describe ethical perspectives and practice in food product development, food safety and public health nutrition (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: synthesize and summarize information from a wide range of sources and draw reasoned conclusions with particular reference to food and nutritional sciences and related global and commercial issues (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Food & Nutritional Science

# 1. Introductory level courses (12 credits)

**Disciplinary Electives (12 credits)** 

At least 12 credits selected from the following courses:

BIOL1110 From molecules to cells (6)
BIOL1201 Introduction to food and nutrition (6)
BIOL2220 Principles of biochemistry (6)

BIOC2600 Basic biochemistry (6)

Take either BIOL2220 or BIOC2600 to fulfill this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually

exclusive.

Take either BIOL2220 or BIOC2600 to fulfill this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually

exclusive.

# 2. Advanced level courses (24 credits)

**Disciplinary Electives (24 credits)** 

At least 24 credit	s selected from the following courses:
BIOL3201	Food chemistry (6)

BIOL3202	Nutritional biochemistry (6)
BIOL3203	Food microbiology (6)
BIOL3204	Nutrition and the life cycle (6)
BIOL3205	Human physiology (6)
BIOL3206	Clinical nutrition (6)

BIOL3207 Principles of toxicology (6)

BIOL3208 Food safety and quality management (6)

BIOL 3209 Food and nutrient analysis (6)

BIOL3210 Grain production and utilization (6)

BIOL3211 Nutrigenomics (6)

BIOL3216 Food waste management (6)
BIOL3217 Food, environment and health (6)
BIOL3218 Food hygiene and quality control (6)

BIOL3606 Diet and disease (6)

BIOL3608 Food commodities (6)

Take either BIOL3206 or BIOL3606 to fulfill this 24 credits requirement, but not both. BIOL3206 and BIOL3606 are mutually

exclusive.

[previous title: Food and nutritional toxicology (6) ]

Take either BIOL3208 or BIOL3218 to fulfill this 24 credits requirement, but not both. BIOL3208 and BIOL3218 are mutually exclusive.

Take either BIOL3210 or BIOL4208 or BIOL3608 to fulfill this 24 credits requirement, but not both. BIOL3210 and BIOL4208 or BIOL3608 are mutually

exclusive.

Take either BIOL3208 or BIOL3218 to fulfill this 24 credits requirement, but not both. BIOL3208 and BIOL3218 are mutually

exclusive.

Take either BIOL3206 or BIOL3606 to fulfill this 24 credits requirement, but not both. BIOL3206 and BIOL3606 are mutually

exclusive.

Take either BIOL3210 or BIOL4208 or BIOL3608; BIOL4207 or BIOL4208 or BIOL3608 to fufill this 24 credits requirement, but not both. BIOL3210, BIOL3608, BIOL4207 and BIOL4208 are mutually exclusive.

BIOL4201 BIOL4202 BIOL4204	Public health nutrition (6) Nutrition and sports performance (6) Diet, brain function and behavior (6)	
BIOL4205	Food technology (6)	[previous title: Food processing and engineering (6) ]
BIOL4207	Meat and dairy sciences (6)	Take either BIOL4207 or BIOL4208 or BIOL3608 to fufill this 24 credits requirement, but not both. BIOL3608, BIOL4207 and BIOL4208 are mutually exclusive.
BIOL4208	Meat, dairy and grain sciences (6)	Take either BIOL3210 or BIOL4208 or BIOL3608; BIOL4207 or BIOL4208 or BIOL3608 to fufill this 24 credits requirement, but not both. BIOL3210, BIOL3608, BIOL4207 and BIOL4208 are mutually exclusive.
BIOL4209	Functional foods (6)	
BIOL4210	Food product development (6)	
BIOL4411	Plant and food biotechnology (6)	

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Minor Title Minor in Food & Nutritional Science 2012

Offered to students

admitted to Year 1 in

#### **Objectives:**

The Minor in Food and Nutritional Science aims to provide a comprehensive education in food, nutrition and related sociological and technological topics, enabling graduates to develop their interest in food and nutrition and have a wide range of employment and progression options.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: demonstrate broad knowledge in the field of food and nutritional science (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 2: recognize and describe the health risks associated with food and specific nutrients, and discuss how to prevent these risks (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 3: understand and describe ethical perspectives and practice in food product development, food safety and public health nutrition (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
- PLO 4: synthesize and summarize information from a wide range of sources and draw reasoned conclusions with particular reference to food and nutritional sciences and related global and commercial issues (by means of coursework, tutorial classes and laboratory-based learning in the curriculum)

#### Impermissible Combinations:

Major in Food & Nutritional Science

# 1. Introductory level courses (12 credits)

**Disciplinary Electives (12 credits)** 

At least 12 credits selected from the following courses:

From molecules to cells (6) BIOL1110 Introduction to food and nutrition (6) BIOL1201 Principles of biochemistry (6) **BIOL2220** 

Basic biochemistry (6)

Take either BIOL2220 or BIOC2600 to fulfill this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually

exclusive.

Take either BIOL2220 or BIOC2600 to fulfill this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually

exclusive.

# 2. Advanced level courses (24 credits)

**Disciplinary Electives (24 credits)** 

BIOC2600

**BIOL3208** 

4.5	scipilially Licculves	(27 Cicuito)
	At least 24 credits se	lected from the following courses:
	BIOL3201	Food chemistry (6)
	BIOL3202	Nutritional biochemistry (6)
	BIOL3203	Food microbiology (6)
	BIOL3204	Nutrition and the life cycle (6)
	BIOL3205	Human physiology (6)
	BIOL3206	Clinical nutrition (6)
	DIOI 2007	Dringiples of toyinglessy (6)
	BIOL3207	Principles of toxicology (6)

Food safety and quality management (6)

BIOL3209 Food and nutrient analysis (6) Grain production and utilization (6) **BIOL3210** 

Nutrigenomics (6) BIOL3211

Food waste management (6) BIOL3216 **BIOL3217** Food, environment and health (6) Food hygiene and quality control (6) **BIOL3218** 

**BIOL3606** Diet and disease (6)

**BIOL3608** Food commodities (6) Take either BIOL3206 or BIOL3606 to fulfill this 24 credits requirement, but not both. BIOL3206 and BIOL3606 are mutually exclusive.

[previous title: Food and nutritional toxicology (6)1

Take either BIOL3208 or BIOL3218 to fulfill this 24 credits requirement, but not both. BIOL3208 and BIOL3218 are mutually exclusive.

Take either BIOL3210 or BIOL4208 or BIOL3608 to fulfill this 24 credits requirement, but not both. BIOL3210 and BIOL4208 or BIOL3608 are mutually

exclusive.

Take either BIOL3208 or BIOL3218 to fulfill this 24 credits requirement, but not both. BIOL3208 and BIOL3218 are mutually exclusive.

Take either BIOL3206 or BIOL3606 to fulfill this 24 credits requirement, but not both. BIOL3206 and BIOL3606 are mutually

exclusive. Take either BIOL3210 or BIOL4208 or

BIOL3608; BIOL4207 or BIOL4208 or BIOL3608 to fufill this 24 credits requirement, but not both. BIOL3210, BIOL3608, BIOL4207 and BIOL4208 are mutually exclusive.

BIOL4201 BIOL4202 BIOL4204	Public health nutrition (6) Nutrition and sports performance (6) Diet, brain function and behavior (6)	
BIOL4205	Food technology (6)	[previous title: Food processing and engineering (6) ]
BIOL4207	Meat and dairy sciences (6)	Take either BIOL4207 or BIOL4208 or BIOL3608 to fufill this 24 credits requirement, but not both. BIOL3608, BIOL4207 and BIOL4208 are mutually exclusive.
BIOL4208	Meat, dairy and grain sciences (6)	Take either BIOL3210 or BIOL4208 or BIOL3608; BIOL4207 or BIOL4208 or BIOL3608 to fufill this 24 credits requirement, but not both. BIOL3210, BIOL3608, BIOL4207 and BIOL4208 are mutually exclusive.
BIOL4209	Functional foods (6)	
BIOL4210	Food product development (6)	
BIOL4411	Plant and food biotechnology (6)	

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Offered to students 2021

admitted to Year 1 in

#### **Objectives:**

The field of marine biology has become increasingly popular as interest in and awareness of our marine environment grows. Hong Kong already has strong cultural and historical links with the sea as well as a strong economic and societal interest in natural marine resources. This Minor aims to introduce students to the field of marine biology from species, habitat and ecosystem levels, ranging from the deep ocean to intertidal environments, and from both theoretical and practical perspectives. Material will be global and include organisms and their physical, behavioral and physiological adaptations to the marine environment, as well as techniques for marine study, Major marine issues will be covered including benefits derived from the marine environment and possible implications of climate change for marine systems. Particularly relevant examples from Hong Kong and the Southeast Asia region will be highlighted. This minor will provide students from diverse backgrounds (e.g. business, engineering and social science) an excellent opportunity to enter into a career or research in marine environmentrelated fields such as coastal ecosystem management, fisheries, marine environmental protection, marine resource management, etc.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate the requirements and constraints to life in different marine environments (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 2: gain a comprehensive foundation for pursuing marine-orientated studies (by means of coursework, labtoratorybased, and tutorial classes and project-based learning in the curriculum)
- PLO 3: have a general insight into an ecosystem that covers two-thirds of the planet and supports the only remaining natural resource harvested on a large scale (by means of coursework, labtoratory-based, and tutorial classes and projectbased learning in the curriculum)
- PLO 4: understand the major marine issues both locally and globally (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 5: appreciate the possible implications of climate change on marine systems (by means of coursework, labtoratorybased, and tutorial class and project-based learning in the curriculum)

#### Impermissible Combinations:

#### Required courses (36 credits)

# 1. Introductory level courses (12 credits)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL1309 Evolutionary diversity (6) Environmental life science (6) FNVS1301 Ecology and evolution (6) BIOL2306

# 2. Advanced level courses (24 credits)

# **Disciplinary Core Courses (12 credits)**

BIOL3301 Marine biology (6)

Environmental oceanography (6) **FNVS3313** 

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL3303 Conservation biology (6)

Tropical and temperate marine ecology field course (6) **BIOL3305** 

Experimental intertidal ecology (6) BIOL3318 Marine invertebrate zoology (6) BIOL3322

**BIOL3328** Nearshore marine and estuarine ecology (6)

BIOL4301 Fish and fisheries (6)

### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc svllabuses.

#### Remarks:

Offered to students 2020

admitted to Year 1 in

#### **Objectives:**

The field of marine biology has become increasingly popular as interest in and awareness of our marine environment grows. Hong Kong already has strong cultural and historical links with the sea as well as a strong economic and societal interest in natural marine resources. This Minor aims to introduce students to the field of marine biology from species, habitat and ecosystem levels, ranging from the deep ocean to intertidal environments, and from both theoretical and practical perspectives. Material will be global and include organisms and their physical, behavioral and physiological adaptations to the marine environment, as well as techniques for marine study, Major marine issues will be covered including benefits derived from the marine environment and possible implications of climate change for marine systems. Particularly relevant examples from Hong Kong and the Southeast Asia region will be highlighted. This minor will provide students from diverse backgrounds (e.g. business, engineering and social science) an excellent opportunity to enter into a career or research in marine environmentrelated fields such as coastal ecosystem management, fisheries, marine environmental protection, marine resource management, etc.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate the requirements and constraints to life in different marine environments (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 2: gain a comprehensive foundation for pursuing marine-orientated studies (by means of coursework, labtoratorybased, and tutorial classes and project-based learning in the curriculum)
- PLO 3: have a general insight into an ecosystem that covers two-thirds of the planet and supports the only remaining natural resource harvested on a large scale (by means of coursework, labtoratory-based, and tutorial classes and projectbased learning in the curriculum)
- PLO 4: understand the major marine issues both locally and globally (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 5: appreciate the possible implications of climate change on marine systems (by means of coursework, labtoratorybased, and tutorial class and project-based learning in the curriculum)

#### Impermissible Combinations:

#### Required courses (36 credits)

# 1. Introductory level courses (12 credits)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL1309 Evolutionary diversity (6) Environmental life science (6) FNVS1301 Ecology and evolution (6) BIOL2306

# 2. Advanced level courses (24 credits)

# **Disciplinary Core Courses (12 credits)**

BIOL3301 Marine biology (6)

Environmental oceanography (6) **FNVS3313** 

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL3303 Conservation biology (6)

Tropical and temperate marine ecology field course (6) **BIOL3305** 

Experimental intertidal ecology (6) BIOL3318 Marine invertebrate zoology (6) BIOL3322

**BIOL3328** Nearshore marine and estuarine ecology (6)

BIOL4301 Fish and fisheries (6)

# Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc svllabuses.

#### Remarks:

Offered to students 2019

admitted to Year 1 in

#### **Objectives:**

The field of marine biology has become increasingly popular as interest in and awareness of our marine environment grows. Hong Kong already has strong cultural and historical links with the sea as well as a strong economic and societal interest in natural marine resources. This Minor aims to introduce students to the field of marine biology from species, habitat and ecosystem levels, ranging from the deep ocean to intertidal environments, and from both theoretical and practical perspectives. Material will be global and include organisms and their physical, behavioral and physiological adaptations to the marine environment, as well as techniques for marine study, Major marine issues will be covered including benefits derived from the marine environment and possible implications of climate change for marine systems. Particularly relevant examples from Hong Kong and the Southeast Asia region will be highlighted. This minor will provide students from diverse backgrounds (e.g. business, engineering and social science) an excellent opportunity to enter into a career or research in marine environmentrelated fields such as coastal ecosystem management, fisheries, marine environmental protection, marine resource management, etc.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate the requirements and constraints to life in different marine environments (by means of coursework. labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 2: gain a comprehensive foundation for pursuing marine-orientated studies (by means of coursework, labtoratorybased, and tutorial classes and project-based learning in the curriculum)
- PLO 3: have a general insight into an ecosystem that covers two-thirds of the planet and supports the only remaining natural resource harvested on a large scale (by means of coursework, labtoratory-based, and tutorial classes and projectbased learning in the curriculum)
- PLO 4: understand the major marine issues both locally and globally (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 5: appreciate the possible implications of climate change on marine systems (by means of coursework, labtoratorybased, and tutorial class and project-based learning in the curriculum)

#### Impermissible Combinations:

#### Required courses (36 credits)

# 1. Introductory level courses (12 credits)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL1309 Evolutionary diversity (6) Environmental life science (6) FNVS1301 Ecology and evolution (6) BIOL2306

# 2. Advanced level courses (24 credits)

# **Disciplinary Core Courses (12 credits)**

BIOL3301 Marine biology (6)

Environmental oceanography (6) **FNVS3313** 

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL3303 Conservation biology (6)

Tropical and temperate marine ecology field course (6) **BIOL3305** 

Experimental intertidal ecology (6) BIOL3318 Marine invertebrate zoology (6) BIOL3322

**BIOL3328** Nearshore marine and estuarine ecology (6)

Fish and fisheries (6) BIOL4301

# Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc svllabuses.

#### Remarks:

Offered to students 2018

admitted to Year 1 in

#### **Objectives:**

The field of marine biology has become increasingly popular as interest in and awareness of our marine environment grows. Hong Kong already has strong cultural and historical links with the sea as well as a strong economic and societal interest in natural marine resources. This Minor aims to introduce students to the field of marine biology from species, habitat and ecosystem levels, ranging from the deep ocean to intertidal environments, and from both theoretical and practical perspectives. Material will be global and include organisms and their physical, behavioral and physiological adaptations to the marine environment, as well as techniques for marine study, Major marine issues will be covered including benefits derived from the marine environment and possible implications of climate change for marine systems. Particularly relevant examples from Hong Kong and the Southeast Asia region will be highlighted. This minor will provide students from diverse backgrounds (e.g.business, engineering and social science) an excellent opportunity to enter into a career or research in marine environment-related fields such as coastal ecosystem management, fisheries, marine environmental protection, marine resource management, etc.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate the requirements and constraints to life in different marine environments (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 2: gain a comprehensive foundation for pursuing marine-orientated studies (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 3: have a general insight into an ecosystem that covers two-thirds of the planet and supports the only remaining natural resource harvested on a large scale (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 4: understand the major marine issues both locally and globally (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 5: appreciate the possible implications of climate change on marine systems (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)

#### Impermissible Combinations:

NII

#### Required courses (36 credits)

# 1. Introductory level courses (12 credits)

# Disciplinary Electives (12 credits)

At least 12 credits selected from the following courses:

BIOL1309 Evolutionary diversity (6)
ENVS1301 Environmental life science (6)
BIOL2306 Ecology and evolution (6)

# 2. Advanced level courses (24 credits)

# Disciplinary Core Courses (12 credits)

BIOL3301 Marine biology (6)

ENVS3313 Environmental oceanography (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL3303 Conservation biology (6)

BIOL3305 Tropical and temperate marine ecology field course (6)

BIOL3318 Experimental intertidal ecology (6)
BIOL3322 Marine invertebrate zoology (6)

BIOL3328 Nearshore marine and estuarine ecology (6)

BIOL4301 Fish and fisheries (6)

# Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

The field of marine biology has become increasingly popular as interest in and awareness of our marine environment grows. Hong Kong already has strong cultural and historical links with the sea as well as a strong economic and societal interest in natural marine resources. This Minor aims to introduce students to the field of marine biology from species, habitat and ecosystem levels, ranging from the deep ocean to intertidal environments, and from both theoretical and practical perspectives. Material will be global and include organisms and their physical, behavioral and physiological adaptations to the marine environment, as well as techniques for marine study, Major marine issues will be covered including benefits derived from the marine environment and possible implications of climate change for marine systems. Particularly relevant examples from Hong Kong and the Southeast Asia region will be highlighted. This minor will provide students from diverse backgrounds (e.g. business, engineering and social science) an excellent opportunity to enter into a career or research in marine environmentrelated fields such as coastal ecosystem management, fisheries, marine environmental protection, marine resource management, etc.

### Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: appreciate the requirements and constraints to life in different marine environments (by means of coursework. labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 2: gain a comprehensive foundation for pursuing marine-orientated studies (by means of coursework, labtoratorybased, and tutorial classes and project-based learning in the curriculum)
- PLO 3: have a general insight into an ecosystem that covers two-thirds of the planet and supports the only remaining natural resource harvested on a large scale (by means of coursework, labtoratory-based, and tutorial classes and projectbased learning in the curriculum)
- PLO 4: understand the major marine issues both locally and globally (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 5: appreciate the possible implications of climate change on marine systems (by means of coursework, labtoratorybased, and tutorial class and project-based learning in the curriculum)

#### Impermissible Combinations:

#### Required courses (36 credits)

# 1. Introductory level courses (12 credits)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL1309 Evolutionary diversity (6) Environmental life science (6) FNVS1301 Ecology and evolution (6) BIOL2306

# 2. Advanced level courses (24 credits)

# **Disciplinary Core Courses (12 credits)**

BIOL3301 Marine biology (6)

Environmental oceanography (6) **FNVS3313** 

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL3303 Conservation biology (6)

Tropical and temperate marine ecology field course (6) **BIOL3305** 

Experimental intertidal ecology (6) BIOL3318 Marine invertebrate zoology (6) BIOL3322

**BIOL3328** Nearshore marine and estuarine ecology (6)

Fish and fisheries (6) BIOL4301

# Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc svllabuses.

#### Remarks:

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

The field of marine biology has become increasingly popular as interest in and awareness of our marine environment grows. Hong Kong already has strong cultural and historical links with the sea as well as a strong economic and societal interest in natural marine resources. This Minor aims to introduce students to the field of marine biology from species, habitat and ecosystem levels, ranging from the deep ocean to intertidal environments, and from both theoretical and practical perspectives. Material will be global and include organisms and their physical, behavioral and physiological adaptations to the marine environment, as well as techniques for marine study, Major marine issues will be covered including benefits derived from the marine environment and possible implications of climate change for marine systems. Particularly relevant examples from Hong Kong and the Southeast Asia region will be highlighted. This minor will provide students from diverse backgrounds (e.g.business, engineering and social science) an excellent opportunity to enter into a career or research in marine environment-related fields such as coastal ecosystem management, fisheries, marine environmental protection, marine resource management, etc.

### Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: appreciate the requirements and constraints to life in different marine environments (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 2: gain a comprehensive foundation for pursuing marine-orientated studies (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 3: have a general insight into an ecosystem that covers two-thirds of the planet and supports the only remaining natural resource harvested on a large scale (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 4: understand the major marine issues both locally and globally (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 5: appreciate the possible implications of climate change on marine systems (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)

#### Impermissible Combinations:

NII

#### Required courses (36 credits)

# 1. Introductory level courses (12 credits)

# Disciplinary Electives (12 credits)

At least 12 credits selected from the following courses:

BIOL1309 Evolutionary diversity (6)
ENVS1301 Environmental life science (6)
BIOL2306 Ecology and evolution (6)

# 2. Advanced level courses (24 credits)

# Disciplinary Core Courses (12 credits)

BIOL3301 Marine biology (6)

ENVS3313 Environmental oceanography (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL3303 Conservation biology (6)

BIOL3305 Tropical and temperate marine ecology field course (6)

BIOL3318 Experimental intertidal ecology (6)
BIOL3320 The biology of marine mammals (6)
BIOL3322 Marine invertebrate zoology (6)

BIOL3328 Nearshore marine and estuarine ecology (6)

BIOL4301 Fish and fisheries (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

# Remarks:

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

The field of marine biology has become increasingly popular as interest in and awareness of our marine environment grows. Hong Kong already has strong cultural and historical links with the sea as well as a strong economic and societal interest in natural marine resources. This Minor aims to introduce students to the field of marine biology from species, habitat and ecosystem levels, ranging from the deep ocean to intertidal environments, and from both theoretical and practical perspectives. Material will be global and include organisms and their physical, behavioral and physiological adaptations to the marine environment, as well as techniques for marine study, Major marine issues will be covered including benefits derived from the marine environment and possible implications of climate change for marine systems. Particularly relevant examples from Hong Kong and the Southeast Asia region will be highlighted. This minor will provide students from diverse backgrounds (e.g.business, engineering and social science) an excellent opportunity to enter into a career or research in marine environment-related fields such as coastal ecosystem management, fisheries, marine environmental protection, marine resource management, etc.

#### Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: appreciate the requirements and constraints to life in different marine environments (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 2: gain a comprehensive foundation for pursuing marine-orientated studies (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
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- PLO 5: appreciate the possible implications of climate change on marine systems (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)

#### Impermissible Combinations:

NII

#### Required courses (36 credits)

#### 1. Introductory level courses (12 credits)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL1309 Evolutionary diversity (6)
ENVS1301 Environmental life science (6)
BIOL2306 Ecology and evolution (6)

# 2. Advanced level courses (24 credits)

# Disciplinary Core Courses (12 credits)

BIOL3301 Marine biology (6)

ENVS3313 Environmental oceanography (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL3303 Conservation biology (6)

BIOL3305 Tropical and temperate marine ecology field course (6)

BIOL3318 Experimental intertidal ecology (6)
BIOL3320 The biology of marine mammals (6)
BIOL3322 Marine invertebrate zoology (6)

BIOL3328 Nearshore marine and estuarine ecology (6)

BIOL4301 Fish and fisheries (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

The field of marine biology has become increasingly popular as interest in and awareness of our marine environment grows. Hong Kong already has strong cultural and historical links with the sea as well as a strong economic and societal interest in natural marine resources. This Minor aims to introduce students to the field of marine biology from species, habitat and ecosystem levels, ranging from the deep ocean to intertidal environments, and from both theoretical and practical perspectives. Material will be global and include organisms and their physical, behavioral and physiological adaptations to the marine environment, as well as techniques for marine study, Major marine issues will be covered including benefits derived from the marine environment and possible implications of climate change for marine systems. Particularly relevant examples from Hong Kong and the Southeast Asia region will be highlighted. This minor will provide students from diverse backgrounds (e.g.business, engineering and social science) an excellent opportunity to enter into a career or research in marine environment-related fields such as coastal ecosystem management, fisheries, marine environmental protection, marine resource management, etc.

#### Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: appreciate the requirements and constraints to life in different marine environments (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 2: gain a comprehensive foundation for pursuing marine-orientated studies (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
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- PLO 4: understand the major marine issues both locally and globally (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 5: appreciate the possible implications of climate change on marine systems (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)

#### Impermissible Combinations:

NII

#### Required courses (36 credits)

# 1. Introductory level courses (12 credits)

# Disciplinary Electives (12 credits)

At least 12 credits selected from the following courses:

BIOL1309 Evolutionary diversity (6)
ENVS1301 Environmental life science (6)
BIOL2306 Ecology and evolution (6)

# 2. Advanced level courses (24 credits)

# Disciplinary Core Courses (12 credits)

BIOL3301 Marine biology (6)

ENVS3313 Environmental oceanography (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL3303 Conservation biology (6)

BIOL3305 Tropical and temperate marine ecology field course (6)

BIOL3318 Experimental intertidal ecology (6)
BIOL3320 The biology of marine mammals (6)
BIOL3322 Marine invertebrate zoology (6)

BIOL3328 Nearshore marine and estuarine ecology (6)

BIOL4301 Fish and fisheries (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

The field of marine biology has become increasingly popular as interest in and awareness of our marine environment grows. Hong Kong already has strong cultural and historical links with the sea as well as a strong economic and societal interest in natural marine resources. This Minor aims to introduce students to the field of marine biology from species, habitat and ecosystem levels, ranging from the deep ocean to intertidal environments, and from both theoretical and practical perspectives. Material will be global and include organisms and their physical, behavioral and physiological adaptations to the marine environment, as well as techniques for marine study, Major marine issues will be covered including benefits derived from the marine environment and possible implications of climate change for marine systems. Particularly relevant examples from Hong Kong and the Southeast Asia region will be highlighted. This minor will provide students from diverse backgrounds (e.g. business, engineering and social science) an excellent opportunity to enter into a career or research in marine environmentrelated fields such as coastal ecosystem management, fisheries, marine environmental protection, marine resource management, etc.

### Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: appreciate the requirements and constraints to life in different marine environments (by means of coursework. labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 2: gain a comprehensive foundation for pursuing marine-orientated studies (by means of coursework, labtoratorybased, and tutorial classes and project-based learning in the curriculum)
- PLO 3: have a general insight into an ecosystem that covers two-thirds of the planet and supports the only remaining natural resource harvested on a large scale (by means of coursework, labtoratory-based, and tutorial classes and projectbased learning in the curriculum)
- PLO 4: understand the major marine issues both locally and globally (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 5: appreciate the possible implications of climate change on marine systems (by means of coursework, labtoratorybased, and tutorial class and project-based learning in the curriculum)

#### Impermissible Combinations:

#### Required courses (36 credits)

# 1. Introductory level courses (12 credits)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

Evolutionary diversity (6) BIOL1309 Environmental life science (6) FNVS1301 Ecology and evolution (6) BIOL2306

# 2. Advanced level courses (24 credits)

# **Disciplinary Core Courses (12 credits)**

BIOL3301 Marine biology (6)

Environmental oceanography (6) **FNVS3313** 

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL3303 Conservation biology (6)

Tropical and temperate marine ecology field course (6) BIOL3305

Experimental intertidal ecology (6) BIOL3318 BIOL3320 The biology of marine mammals (6) BIOL3322 Marine invertebrate zoology (6)

Nearshore marine and estuarine ecology (6) **BIOL3328** 

Fish and fisheries (6) BIOL4301

#### Remarks:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

The field of marine biology has become increasingly popular as interest in and awareness of our marine environment grows. Hong Kong already has strong cultural and historical links with the sea as well as a strong economic and societal interest in natural marine resources. This Minor aims to introduce students to the field of marine biology from species, habitat and ecosystem levels, ranging from the deep ocean to intertidal environments, and from both theoretical and practical perspectives. Material will be global and include organisms and their physical, behavioral and physiological adaptations to the marine environment, as well as techniques for marine study, Major marine issues will be covered including benefits derived from the marine environment and possible implications of climate change for marine systems. Particularly relevant examples from Hong Kong and the Southeast Asia region will be highlighted. This minor will provide students from diverse backgrounds (e.g.business, engineering and social science) an excellent opportunity to enter into a career or research in marine environment-related fields such as coastal ecosystem management, fisheries, marine environmental protection, marine resource management, etc.

### Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: appreciate the requirements and constraints to life in different marine environments (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 2: gain a comprehensive foundation for pursuing marine-orientated studies (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 3: have a general insight into an ecosystem that covers two-thirds of the planet and supports the only remaining natural resource harvested on a large scale (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 4: understand the major marine issues both locally and globally (by means of coursework, labtoratory-based, and tutorial classes and project-based learning in the curriculum)
- PLO 5: appreciate the possible implications of climate change on marine systems (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)

#### Impermissible Combinations:

NII

#### Required courses (36 credits)

# 1. Introductory level courses (12 credits)

# Disciplinary Electives (12 credits)

At least 12 credits selected from the following courses:

BIOL1309 Evolutionary diversity (6)
ENVS1301 Environmental life science (6)
BIOL2306 Ecology and evolution (6)

# 2. Advanced level courses (24 credits)

# Disciplinary Core Courses (12 credits)

BIOL3301 Marine biology (6)

ENVS3313 Environmental oceanography (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL3303 Conservation biology (6)

BIOL3305 Tropical and temperate marine ecology field course (6)

BIOL3318 Experimental intertidal ecology (6)
BIOL3320 The biology of marine mammals (6)
BIOL3322 Marine invertebrate zoology (6)

BIOL3328 Nearshore marine and estuarine ecology (6)

BIOL4301 Fish and fisheries (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Offered to students 2021

admitted to Year 1 in

#### **Objectives:**

The Minor in Mathematics provides students with fundamental knowledge in the subject. It is specifically designed for students who are interested in the subject and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving, and capability to tackle novel situations and ill-defined problems.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe fundamental concepts of mathematics (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics. (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Major in Mathematics

Major in Mathematics (Intensive)

Minor in Computational & Financial Mathematics

Minor in Operations Research & Mathematical Programming

#### Required courses (36 credits)

#### 1. Introductory level courses (18 credits) (note 4)

**Disciplinary Core Course (6 credits)** 

MATH1013 University mathematics II (6)

### **Disciplinary Electives (12 credits)**

Select either List A or List B:

List A

MATH2101 Linear algebra I (6)
MATH2211 Multivariable calculus (6)

List B

MATH2012 Fundamental concepts of mathematics (6)
MATH2014 Fundamental concepts of mathematics (6)
Multivariable calculus and linear algebra (6)

# 2. Advanced level courses (18 credits)

### **Disciplinary Electives (18 credits)**

At least 18 credits of advanced level Mathematics courses (MATH3XXX or MATH4XXX or MATH7XXX level), subject to pre-requisite requirements. The current course list includes courses in List A:

List A

MATH3001 Development of mathematical ideas (6)

MATH3002 Mathematics seminar (6)

MATH3301 Algebra I (6)

MATH3303 Matrix theory and its applications (6) MATH3304 Introduction to number theory (6)

MATH3401 Analysis I (6)

MATH3403 Functions of a complex variable (6)

MATH3405 Differential equations (6)

MATH3408 Computational methods and differential equations with

applications (6)

MATH3541 Introduction to topology (6)
MATH3600 Discrete mathematics (6)
MATH3601 Numerical analysis (6)
MATH3603 Probability theory (6)
MATH3901 Operations research I (6)
MATH3904 Introduction to optimization (6)
MATH3905 Queueing theory and simulation (6)
MATH3906 Financial calculus (6)

MATH3906 Financial calculus (6)
MATH3911 Game theory and strategy (6)

MATH3943 Network models in operations research (6)

MATH4302 Algebra II (6)
MATH4402 Analysis II (6)
MATH4404 Functional analysis (6)

MATH4406 Introduction to partial differential equations (6)

MATH4501 Geometry (6)

MATH4511 Introduction to differentiable manifolds (6)

MATH4602 Scientific computing (6)
MATH4902 Operations research II (6)

MATH4907 Numerical methods for financial calculus (6)
MATH7101 Intermediate complex analysis (6)

MATH7201 Topics in geometry (6)
MATH7202 Complex manifolds (6)

MATH7217 Topics in financial mathematics (6)

MATH7219 MATH7224 MATH7501 MATH7502 MATH7503 MATH7504 MATH7505	Topics in applied functional analysis (6) Topics in advanced probability theory (6) Topics in algebra (6) Topics in applied discrete mathematics (6) Topics in mathematical programming and optimization (6) Geometric topology (6) Real analysis (6)
MATH7505	Real analysis (6)

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 3. If students would like to take more courses in analysis such as MATH3401 (Analysis I), they are advised to take the introductory course MATH2241 Introduction to mathematical analysis first.
- 4. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

#### Remarks:

Offered to students 2020

admitted to Year 1 in

#### Objectives:

The Minor in Mathematics provides students with fundamental knowledge in the subject. It is specifically designed for students who are interested in the subject and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving, and capability to tackle novel situations and ill-defined problems.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe fundamental concepts of mathematics (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics. (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Major in Mathematics

Major in Mathematics (Intensive)

Minor in Computational & Financial Mathematics

Minor in Operations Research & Mathematical Programming

#### Required courses (36 credits)

### 1. Introductory level courses (18 credits) (note 4)

**Disciplinary Core Course (6 credits)** 

MATH1013 University mathematics II (6)

#### **Disciplinary Electives (12 credits)**

Select either List A or List B:

List A

MATH2101 Linear algebra I (6)
MATH2211 Multivariable calculus (6)

List B

MATH2012 Fundamental concepts of mathematics (6)
MATH2014 Fundamental concepts of mathematics (6)
Multivariable calculus and linear algebra (6)

# 2. Advanced level courses (18 credits)

### **Disciplinary Electives (18 credits)**

At least 18 credits of advanced level Mathematics courses (MATH3XXX or MATH4XXX or MATH7XXX level), subject to pre-requisite requirements. The current course list includes courses in List A:

List A

MATH3001 Development of mathematical ideas (6)

MATH3002 Mathematics seminar (6)

MATH3301 Algebra I (6)

MATH3303 Matrix theory and its applications (6) MATH3304 Introduction to number theory (6)

MATH3401 Analysis I (6)

MATH3403 Functions of a complex variable (6)

MATH3405 Differential equations (6)

MATH3408 Computational methods and differential equations with

applications (6)
MATH3541 Introduction to topology (6)

MATH3600 Discrete mathematics (6)
MATH3601 Numerical analysis (6)
MATH3603 Probability theory (6)
MATH3901 Operations research I (6)
MATH3904 Introduction to optimization (6)
MATH3905 Queueing theory and simulation (6)
MATH3906 Financial calculus (6)

MATH3901 Game theory and strategy (6)

MATH3911 Set Math 13002

MATH3943 Network models in operations research (6)

MATH4302 Algebra II (6)
MATH4402 Analysis II (6)
MATH4404 Functional analysis (6)

MATH4406 Introduction to partial differential equations (6)

MATH4501 Geometry (6)

MATH4511 Introduction to differentiable manifolds (6)

MATH4602 Scientific computing (6)
MATH4902 Operations research II (6)

MATH4907 Numerical methods for financial calculus (6)
MATH7101 Intermediate complex analysis (6)

MATH7201 Topics in geometry (6)
MATH7202 Complex manifolds (6)

MATH7217 Topics in financial mathematics (6)

MATH7219 MATH7224 MATH7501 MATH7502 MATH7503 MATH7504 MATH7505	Topics in applied functional analysis (6) Topics in advanced probability theory (6) Topics in algebra (6) Topics in applied discrete mathematics (6) Topics in mathematical programming and optimization (6) Geometric topology (6) Real analysis (6)
MATH7505	Real analysis (6)

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
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#### Remarks:

Offered to students 2019

admitted to Year 1 in

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#### Impermissible Combinations:

Major in Mathematics

Major in Mathematics (Intensive)

Minor in Computational & Financial Mathematics

Minor in Operations Research & Mathematical Programming

#### Required courses (36 credits)

### 1. Introductory level courses (18 credits) (note 4)

**Disciplinary Core Course (6 credits)** 

MATH1013 University mathematics II (6)

#### **Disciplinary Electives (12 credits)**

Select either List A or List B:

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MATH2014 Fundamental concepts of mathematics (6)
Multivariable calculus and linear algebra (6)

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MATH3401 Analysis I (6)

MATH3403 Functions of a complex variable (6)

MATH3405 Differential equations (6)

MATH3408 Computational methods and differential equations with

applications (6)

MATH3541 Introduction to topology (6)
MATH3600 Discrete mathematics (6)
MATH3601 Numerical analysis (6)
MATH3603 Probability theory (6)
MATH3901 Operations research I (6)
MATH3904 Introduction to optimization (6)
MATH3905 Queueing theory and simulation (6)
MATH3906 Financial calculus (6)

MATH3906 Financial calculus (6)
MATH3911 Game theory and strategy (6)

MATH3943 Network models in operations research (6)

MATH4302 Algebra II (6)
MATH4402 Analysis II (6)
MATH4404 Functional analysis (6)

MATH4406 Introduction to partial differential equations (6)

MATH4501 Geometry (6)

MATH4511 Introduction to differentiable manifolds (6)

MATH4602 Scientific computing (6)
MATH4902 Operations research II (6)

MATH4907 Numerical methods for financial calculus (6)
MATH7101 Intermediate complex analysis (6)

MATH7201 Topics in geometry (6)
MATH7202 Complex manifolds (6)

MATH7217 Topics in financial mathematics (6)

MATH7219	Topics in applied functional analysis (6) Topics in advanced probability theory (6)
MATH7224 MATH7501	Topics in advanced probability theory (6)  Topics in algebra (6)
MATH7502	Topics in applied discrete mathematics (6)
MATH7503	Topics in mathematical programming and optimization (6)
MATH7504	Geometric topology (6)
MATH7505	Real analysis (6)

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
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#### Remarks:

Offered to students 2018

admitted to Year 1 in

#### **Objectives:**

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By the end of this programme, students should be able to:

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#### Impermissible Combinations:

Major in Mathematics

Major in Mathematics (Intensive)

Minor in Computational & Financial Mathematics

Minor in Operations Research & Mathematical Programming

#### Required courses (36 credits)

### 1. Introductory level courses (18 credits) (note 4)

**Disciplinary Core Course (6 credits)** 

MATH1013 University mathematics II (6)

#### **Disciplinary Electives (12 credits)**

Select either List A or List B:

List A

MATH2101 Linear algebra I (6)
MATH2211 Multivariable calculus (6)

List B

MATH2012 Fundamental concepts of mathematics (6)
MATH2014 Fundamental concepts of mathematics (6)
Multivariable calculus and linear algebra (6)

# 2. Advanced level courses (18 credits)

### **Disciplinary Electives (18 credits)**

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MATH3403 Functions of a complex variable (6)

MATH3405 Differential equations (6)

MATH3408 Computational methods and differential equations with

applications (6)

MATH3541 Introduction to topology (6) Discrete mathematics (6) MATH3600 MATH3601 Numerical analysis (6) Probability theory (6) MATH3603 Operations research I (6) MATH3901 Introduction to optimization (6) MATH3904 Queueing theory and simulation (6) **MATH3905** MATH3906 Financial calculus (6)

MATH3911 Game theory and strategy (6)
MATH3943 Network models in operations research (6)

MATH4302 Algebra II (6)

MATH4402 Algebra II (6)
MATH4404 Analysis II (6)
MATH4404 Functional analysis (6)

MATH4406 Introduction to partial differential equations (6)

MATH4501 Geometry (6)

MATH4511 Introduction to differentiable manifolds (6)

MATH4602 Scientific computing (6)
MATH4902 Operations research II (6)

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MATH7101 Intermediate complex analysis (6)

MATH7201 Topics in geometry (6)
MATH7202 Complex manifolds (6)

MATH7217 Topics in financial mathematics (6)

MATH7219 MATH7224 MATH7501	Topics in applied functional analysis (6) Topics in advanced probability theory (6) Topics in algebra (6)
MATH7502 MATH7503 MATH7504	Topics in applied discrete mathematics (6) Topics in mathematical programming and optimization (6) Geometric topology (6)
MATH7505	Real analysis (6)

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
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#### Remarks:

Offered to students 2017

admitted to Year 1 in

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#### Impermissible Combinations:

Major in Mathematics

Major in Mathematics (Intensive)

Major in Mathematics/Physics

Minor in Computational & Financial Mathematics

Minor in Operations Research & Mathematical Programming

#### Required courses (36 credits)

#### 1. Introductory level courses (18 credits) (note 4)

**Disciplinary Core Course (6 credits)** 

MATH1013 University mathematics II (6)

# **Disciplinary Electives (12 credits)**

Select either List A or List B:

List A

MATH2101 Linear algebra I (6) MATH2211 Multivariable calculus (6)

List B

Fundamental concepts of mathematics (6) MATH2012 MATH2014 Multivariable calculus and linear algebra (6)

### 2. Advanced level courses (18 credits)

#### **Disciplinary Electives (18 credits)**

At least 18 credits of advanced level Mathematics courses (MATH3XXX or MATH4XXX or MATH7XXX level), subject to pre-requisite requirements. The current course list includes courses in List A:

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MATH3301 Algebra I (6)

MATH3303 Matrix theory and its applications (6) **MATH3304** Introduction to number theory (6)

MATH3401 Analysis I (6)

Functions of a complex variable (6) MATH3403

Differential equations (6) MATH3405

Computational methods and differential equations with MATH3408

applications (6) Introduction to topology (6)

MATH3541 MATH3600 Discrete mathematics (6) Numerical analysis (6) MATH3601 Probability theory (6) MATH3603 Operations research I (6) MATH3901 Introduction to optimization (6) MATH3904 MATH3905 Queueing theory and simulation (6)

Financial calculus (6) **MATH3906** MATH3911 Game theory and strategy (6)

Network models in operations research (6) MATH3943

MATH4302 Algebra II (6) MATH4402 Analysis II (6) Functional analysis (6) MATH4404

Introduction to partial differential equations (6) **MATH4406** 

MATH4501 Geometry (6)

Introduction to differentiable manifolds (6) MATH4511

MATH4602 Scientific computing (6) Operations research II (6) MATH4902

Numerical methods for financial calculus (6) MATH4907

MATH7101 Intermediate complex analysis (6)

Topics in geometry (6) MATH7201 MATH7202 Complex manifolds (6)

MATH7217	Topics in financial mathematics (6)
MATH7219	Topics in applied functional analysis (6)
MATH7224	Topics in advanced probability theory (6)
MATH7501	Topics in algebra (6)
MATH7502	Topics in applied discrete mathematics (6)
MATH7503	Topics in mathematical programming and optimization (6)
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MATH7505	Real analysis (6)

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#### Remarks:

Offered to students 2016

admitted to Year 1 in

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#### Impermissible Combinations:

Major in Mathematics

Major in Mathematics (Intensive)

Major in Mathematics/Physics

Minor in Computational & Financial Mathematics

Minor in Operations Research & Mathematical Programming

#### Required courses (36 credits)

#### 1. Introductory level courses (18 credits) (note 4)

**Disciplinary Core Course (6 credits)** 

MATH1013 University mathematics II (6)

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List A

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List B

MATH2012 Fundamental concepts of mathematics (6)
MATH2014 Multivariable calculus and linear algebra (6)

### 2. Advanced level courses (18 credits)

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MATH3403 Functions of a complex variable (6)

MATH3405 Differential equations (6)

MATH3408 Computational methods and differential equations with

applications (6)

Introduction to topology (6) MATH3541 MATH3600 Discrete mathematics (6) Numerical analysis (6) MATH3601 Probability theory (6) MATH3603 Operations research I (6) MATH3901 Introduction to optimization (6) MATH3904 MATH3905 Queueing theory and simulation (6) Financial calculus (6) **MATH3906** 

MATH3911 Game theory and strategy (6)

MATH3943 Network models in operations research (6) MATH4302 Algebra II (6)

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MATH7101 Intermediate complex analysis (6)

MATH7201 Topics in geometry (6) MATH7202 Complex manifolds (6)

MATH7217	Topics in financial mathematics (6)
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#### Remarks:

Offered to students 2015

admitted to Year 1 in

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#### Impermissible Combinations:

Major in Mathematics

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Minor in Operations Research & Mathematical Programming

#### Required courses (36 credits)

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MATH1013 University mathematics II (6)

#### **Disciplinary Electives (12 credits)**

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MATH2101 Linear algebra I (6)
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MATH3405 Differential equations (6)

MATH3408 Computational methods and differential equations with

applications (6)

MATH3541 Introduction to topology (6)
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#### Remarks:

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

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#### Impermissible Combinations:

Major in Mathematics

Major in Mathematics/Physics

Minor in Computational & Financial Mathematics

Minor in Operations Research & Mathematical Programming

#### Required courses (36 credits)

#### 1. Introductory level courses (18 credits) (note 4)

**Disciplinary Core Courses (18 credits)** 

MATH1013 University mathematics II (6)
MATH2101 Linear algebra I (6)
MATH2211 Multivariable calculus (6)

# 2. Advanced level courses (18 credits)

**Disciplinary Electives (18 credits)** 

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MATH3002 Mathematics seminar (6)

MATH3301 Algebra I (6)

MATH3303 Matrix theory and its applications (6) MATH3304 Introduction to number theory (6)

MATH3401 Analysis I (6)

MATH3403 Functions of a complex variable (6)

MATH3405 Differential equations (6)

MATH3408 Computational methods and differential equations with

applications (6)

MATH3541 Introduction to topology (6)
MATH3600 Discrete mathematics (6)
MATH3601 Numerical analysis (6)
MATH3603 Probability theory (6)
MATH3901 Operations research I (6)
MATH3904 Introduction to optimization (6)
MATH3905 Queueing theory and simulation (6)

MATH3906 Financial calculus (6)
MATH3911 Game theory and strategy (6)

MATH3943 Network models in operations research (6)

MATH4302 Algebra II (6)
MATH4402 Analysis II (6)
MATH4404 Functional analysis (6)

MATH4406 Introduction to partial differential equations (6)

MATH4501 Geometry (6)

MATH4511 Introduction to differentiable manifolds (6)

MATH4602 Scientific computing (6)
MATH4902 Operations research II (6)

MATH4907 Numerical methods for financial calculus (6)

MATH7101 Intermediate complex analysis (6) MATH7201 Topics in geometry (6)

MATH7202 Complex manifolds (6)
MATH7217 Topics in financial mathematics (6)
MATH7219 Topics in applied functional analysis (6)
MATH7224 Topics in advanced probability theory (6)

MATH7501 Topics in algebra (6)

MATH7502 Topics in applied discrete mathematics (6)

MATH7503 Topics in mathematical programming and optimization (6)

MATH7504 Geometric topology (6)

MATH7505 Real analysis (6)

#### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 3. If students would like to take more courses in analysis such as MATH3401 (Analysis I), they are advised to take the introductory course MATH2241 Introduction to mathematical analysis first.
- 4. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

### Remarks:

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

The Minor in Mathematics provides students with fundamental knowledge in the subject. It is specifically designed for students who are interested in the subject and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving, and capability to tackle novel situations and ill-defined problems.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe fundamental concepts of mathematics (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics. (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Major in Mathematics

Major in Mathematics/Physics

Minor in Computational & Financial Mathematics

Minor in Operations Research & Mathematical Programming

#### Required courses (36 credits)

#### 1. Introductory level courses (18 credits) (note 4)

**Disciplinary Core Courses (18 credits)** 

MATH1013 University mathematics II (6)
MATH2101 Linear algebra I (6)
MATH2211 Multivariable calculus (6)

# 2. Advanced level courses (18 credits)

#### **Disciplinary Electives (18 credits)**

At least 18 credits of advanced level Mathematics courses (MATH3XXX or MATH4XXX or MATH7XXX level), subject to pre-requisite requirements. The current course list includes courses in List A:

List A

MATH3001 Development of mathematical ideas (6)

MATH3002 Mathematics seminar (6)

MATH3301 Algebra I (6)

MATH3303 Matrix theory and its applications (6) MATH3304 Introduction to number theory (6)

MATH3401 Analysis I (6)

MATH3403 Functions of a complex variable (6)

MATH3405 Differential equations (6)

MATH3408 Computational methods and differential equations with

applications (6)

MATH3541 Introduction to topology (6)
MATH3600 Discrete mathematics (6)
MATH3601 Numerical analysis (6)
MATH3603 Probability theory (6)
MATH3901 Operations research I (6)
MATH3904 Introduction to optimization (6)
MATH3905 Queueing theory and simulation (6)

MATH3906 Financial calculus (6)
MATH3911 Game theory and strategy (6)

MATH3943 Network models in operations research (6)

MATH4302 Algebra II (6)
MATH4402 Analysis II (6)
MATH4404 Functional analysis (6)

MATH4406 Introduction to partial differential equations (6)

MATH4501 Geometry (6)

MATH4511 Introduction to differentiable manifolds (6)

MATH4602 Scientific computing (6)
MATH4902 Operations research II (6)

MATH4907 Numerical methods for financial calculus (6)

MATH7101 Intermediate complex analysis (6) MATH7201 Topics in geometry (6)

MATH7202 Complex manifolds (6)
MATH7217 Topics in financial mathematics (6)
MATH7219 Topics in applied functional analysi

MATH7217 Topics in infancial matternatics (6)
MATH7219 Topics in applied functional analysis (6)
MATH7224 Topics in advanced probability theory (6)

MATH7501 Topics in algebra (6)

MATH7502 Topics in applied discrete mathematics (6)

MATH7503 Topics in mathematical programming and optimization (6)

MATH7504 Geometric topology (6)

MATH7505 Real analysis (6)

#### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 3. If students would like to take more courses in analysis such as MATH3401 (Analysis I), they are advised to take the introductory course MATH2241 Introduction to mathematical analysis first.
- 4. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

### Remarks:

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

The Minor in Mathematics provides students with fundamental knowledge in the subject. It is specifically designed for students who are interested in the subject and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving, and capability to tackle novel situations and ill-defined problems.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: understand and describe fundamental concepts of mathematics (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics. (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Major in Mathematics

Major in Mathematics/Physics

Minor in Computational & Financial Mathematics

#### Required courses (36 credits)

#### 1. Introductory level courses (18 credits) (note 4)

**Disciplinary Core Courses (18 credits)** 

MATH1013 University mathematics II (6)
MATH2101 Linear algebra I (6)
MATH2211 Multivariable calculus (6)

# 2. Advanced level courses (18 credits)

#### **Disciplinary Electives (18 credits)**

At least 18 credits of advanced level Mathematics courses (MATH3XXX or MATH4XXX or MATH7XXX level), subject to pre-requisite requirements. The current course list includes courses in List A:

List A

MATH3541

MATH3001 Development of mathematical ideas (6)

MATH3002 Mathematics seminar (6)

MATH3301 Algebra I (6)

MATH3303 Matrix theory and its applications (6) MATH3304 Introduction to number theory (6)

MATH3401 Analysis I (6)

MATH3403 Functions of a complex variable (6)

MATH3405 Differential equations (6)

MATH3408 Computational methods and differential equations with

applications (6)
Introduction to topology (6)

MATH3600 Discrete mathematics (6)
MATH3601 Numerical analysis (6)
MATH3603 Probability theory (6)
MATH3901 Operations research I (6)
MATH3904 Introduction to optimization (6)
MATH3905 Queueing theory and simulation (6)

MATH3906 Financial calculus (6)
MATH3911 Game theory and strategy (6)

MATH3943 Network models in operations research (6)

MATH4302 Algebra II (6)
MATH4402 Analysis II (6)
MATH4404 Functional analysis (6)

MATH4406 Introduction to partial differential equations (6)

MATH4501 Geometry (6)

MATH4511 Introduction to differentiable manifolds (6)

MATH4602 Scientific computing (6)
MATH4902 Operations research II (6)

MATH4907 Numerical methods for financial calculus (6)

MATH7101 Intermediate complex analysis (6)
MATH7201 Topics in geometry (6)
MATH7202 Complex manifolds (6)

MATH7217 Topics in financial mathematics (6)
MATH7219 Topics in applied functional analysis (6)
MATH7224 Topics in advanced probability theory (6)

MATH7501 Topics in algebra (6)

MATH7502 Topics in applied discrete mathematics (6)

MATH7503 Topics in mathematical programming and optimization (6)

MATH7504 Geometric topology (6) MATH7505 Real analysis (6)

# Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this major. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I.
- 3. If students would like to take more courses in analysis such as MATH3401 (Analysis I), they are advised to take the introductory course MATH2241 Introduction to mathematical analysis first.
- 4. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

# Remarks:

Offered to students

2021

admitted to Year 1 in

The Minor in Molecular Biology & Biotechnology aims to provide students with a fundamental understanding of molecular biology and biotechnology which are relevant to many other disciplines of study and our daily life. Students will learn the principles underlying current molecular and cell biology advances, and biotechnological applications and will become literate in biotechnology business and advancements.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: develop and apply basic technical and knowledge-based skills in molecular and cell biology, and biotechnology (by means of coursework and laboratory-based learning in the curriculum)
- PLO 2: develop and apply skills of critical inquiry, teamwork, and effective communication (by means of group projects, tutorial classes and presentation opportunities in the curriculum)
- PLO 3: understand and describe the issues and concerns fundamental to the field (by means of coursework and laboratorybased learning in the curriculum)

### Impermissible Combinations:

Major in Molecular Biology & Biotechnology

Major in Molecular Biology & Biotechnology (Intensive)

### Required courses (36 credits)

# 1. Introductory level courses (12 credits)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL1110 From molecules to cells (6) BIOL1309 Evolutionary diversity (6)

**BIOC2600** Basic biochemistry (6)

fulfill this 12 credits requirement, but not both. May take either BIOL2220 or BIOC2600 to fulfill this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually

May take either BIOL1309 or BIOL2306 to

May take either BIOL2220 or BIOC2600 to

exclusive.

Biostatistics (6) **BIOL2102** 

BIOL2103 Biological sciences laboratory course (6)

**BIOL2220** Principles of biochemistry (6)

fulfill this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

**BIOI 2306** Ecology and evolution (6)

May take either BIOL1309 or BIOL2306 to fulfill this 12 credits requirement, but not both.

# 2. Advanced level courses (24 credits)

# **Disciplinary Core Courses (6 credits)**

BIOL3401 Molecular biology (6)

# **Disciplinary Electives (18 credits)**

At least 18 credits selected from the following courses: BIOL3402 Cell biology and cell technology (6)

BIOL3403 Immunology (6)

Business aspects of biotechnology (6) **BIOL3409** BIOL3508 Microbial physiology and biotechnology (6)

BIOL4411 Plant and food biotechnology (6) BIOL4415 Healthcare biotechnology (6)

Stem cells and regenerative biology (6) BIOL4416 'Omics' and systems biology (6) **BIOL4417** Environmental remediation (6) ENVS4110

### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc

### Remarks:

Offered to students

2020

admitted to Year 1 in

### **Objectives:**

The Minor in Molecular Biology & Biotechnology aims to provide students with a fundamental understanding of molecular biology and biotechnology which are relevant to many other disciplines of study and our daily life. Students will learn the principles underlying current molecular and cell biology advances, and biotechnological applications and will become literate in biotechnology business and advancements.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: develop and apply basic technical and knowledge-based skills in molecular and cell biology, and biotechnology (by means of coursework and laboratory-based learning in the curriculum)
- PLO 2: develop and apply skills of critical inquiry, teamwork, and effective communication (by means of group projects, tutorial classes and presentation opportunities in the curriculum)
- PLO 3: understand and describe the issues and concerns fundamental to the field (by means of coursework and laboratory-based learning in the curriculum)

### Impermissible Combinations:

Major in Molecular Biology & Biotechnology

Major in Molecular Biology & Biotechnology (Intensive)

### Required courses (36 credits)

# 1. Introductory level courses (12 credits)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL1110 From molecules to cells (6)
BIOL1309 Evolutionary diversity (6)

BIOC2600 Basic biochemistry (6)

BIOL2102 Biostatistics (6)
BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

BIOL2306 Ecology and evolution (6)

May take either BIOL1309 or BIOL2306 to fulfill this 12 credits requirement, but not both. May take either BIOL2220 or BIOC2600 to fulfill this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

May take either BIOL2220 or BIOC2600 to fulfill this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

May take either BIOL1309 or BIOL2306 to fulfill this 12 credits requirement, but not both.

# 2. Advanced level courses (24 credits)

# **Disciplinary Core Courses (6 credits)**

BIOL3401 Molecular biology (6)

# Disciplinary Electives (18 credits)

At least 18 credits selected from the following courses: BIOL3402 Cell biology and cell technology (6)

BIOL3403 Immunology (6)

BIOL3409 Business aspects of biotechnology (6)
BIOL3508 Microbial physiology and biotechnology (6)
BIOL4401 Medical microbiology and applied immunology (6)

BIOL4411 Plant and food biotechnology (6)
BIOL4415 Healthcare biotechnology (6)
BIOL4416 Stem cells and regenerative biology (6)
BIOL4417 'Omics' and systems biology (6)
ENVS4110 Environmental remediation (6)

# Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

### Remarks:

Offered to students

2019

admitted to Year 1 in

### **Objectives:**

The Minor in Molecular Biology & Biotechnology aims to provide students with a fundamental understanding of molecular biology and biotechnology which are relevant to many other disciplines of study and our daily life. Students will learn the principles underlying current molecular and cell biology advances, and biotechnological applications and will become literate in biotechnology business and advancements.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: develop and apply basic technical and knowledge-based skills in molecular and cell biology, and biotechnology (by means of coursework and laboratory-based learning in the curriculum)
- PLO 2: develop and apply skills of critical inquiry, teamwork, and effective communication (by means of group projects, tutorial classes and presentation opportunities in the curriculum)
- PLO 3: understand and describe the issues and concerns fundamental to the field (by means of coursework and laboratorybased learning in the curriculum)

### Impermissible Combinations:

Major in Molecular Biology & Biotechnology

Major in Molecular Biology & Biotechnology (Intensive)

### Required courses (36 credits)

# 1. Introductory level courses (12 credits)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL1110 From molecules to cells (6) BIOL1309 Evolutionary diversity (6)

**BIOC2600** Basic biochemistry (6)

May take either BIOL2220 or BIOC2600 to fulfill this 12 credits requirement, but not

both. BIOL2220 and BIOC2600 are mutually

May take either BIOL1309 or BIOL2306 to fulfill this 12 credits requirement, but not both.

exclusive.

Biostatistics (6) **BIOL2102** 

BIOL2103 Biological sciences laboratory course (6)

**BIOL2220** Principles of biochemistry (6)

May take either BIOL2220 or BIOC2600 to fulfill this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually

exclusive.

**BIOI 2306** Ecology and evolution (6)

May take either BIOL1309 or BIOL2306 to fulfill this 12 credits requirement, but not both.

# 2. Advanced level courses (24 credits)

# **Disciplinary Core Courses (6 credits)**

BIOL3401 Molecular biology (6)

# **Disciplinary Electives (18 credits)**

At least 18 credits selected from the following courses: BIOL3402 Cell biology and cell technology (6)

BIOL3403 Immunology (6)

Business aspects of biotechnology (6) **BIOL3409** BIOL3508 Microbial physiology and biotechnology (6) BIOL4401 Medical microbiology and applied immunology (6)

BIOL4411 Plant and food biotechnology (6) Healthcare biotechnology (6) **BIOL4415** Stem cells and regenerative biology (6) BIOL4416 'Omics' and systems biology (6) **BIOI 4417** ENVS4110 Environmental remediation (6)

# Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

### Remarks:

Offered to students

2018

admitted to Year 1 in

### **Objectives:**

The Minor in Molecular Biology & Biotechnology aims to provide students with a fundamental understanding of molecular biology and biotechnology which are relevant to many other disciplines of study and our daily life. Students will learn the principles underlying current molecular and cell biology advances, and biotechnological applications and will become literate in biotechnology business and advancements.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: develop and apply basic technical and knowledge-based skills in molecular and cell biology, and biotechnology (by means of coursework and laboratory-based learning in the curriculum)
- PLO 2: develop and apply skills of critical inquiry, teamwork, and effective communication (by means of group projects, tutorial classes and presentation opportunities in the curriculum)
- PLO 3: understand and describe the issues and concerns fundamental to the field (by means of coursework and laboratory-based learning in the curriculum)

### Impermissible Combinations:

Major in Molecular Biology & Biotechnology

Major in Molecular Biology & Biotechnology (Intensive)

# Required courses (36 credits)

# 1. Introductory level courses (12 credits)

**Disciplinary Electives (12 credits)** 

At least 12 credits selected from the following courses:

BIOL1110 From molecules to cells (6)
BIOL1309 Evolutionary diversity (6)

BIOC2600 Basic biochemistry (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

BIOL2306 Ecology and evolution (6)

fulfill this 12 credits requirement, but not both. May take either BIOL2220 or BIOC2600 to fulfill this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

May take either BIOL1309 or BIOL2306 to

May take either BIOL2220 or BIOC2600 to fulfill this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

May take either BIOL1309 or BIOL2306 to fulfill this 12 credits requirement, but not both.

# 2. Advanced level courses (24 credits)

**Disciplinary Core Courses (6 credits)** 

BIOL3401 Molecular biology (6)

Disciplinary Electives (18 credits)

At least 18 credits selected from the following courses: BIOL3402 Cell biology and cell technology (6)

BIOL3403 Immunology (6)

BIOL3409 Business aspects of biotechnology (6)
BIOL3508 Microbial physiology and biotechnology (6)
BIOL4401 Medical microbiology and applied immunology (6)

BIOL4411 Plant and food biotechnology (6)
BIOL4415 Healthcare biotechnology (6)
BIOL4416 Stem cells and regenerative biology (6)
BIOL4417 'Omics' and systems biology (6)
ENVS4110 Environmental remediation (6)

# Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

### Remarks:

Offered to students

2017

admitted to Year 1 in

### **Objectives:**

The Minor in Molecular Biology & Biotechnology aims to provide students with a fundamental understanding of molecular biology and biotechnology which are relevant to many other disciplines of study and our daily life. Students will learn the principles underlying current molecular and cell biology advances, and biotechnological applications and will become literate in biotechnology business and advancements.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: develop and apply basic technical and knowledge-based skills in molecular and cell biology, and biotechnology (by means of coursework and laboratory-based learning in the curriculum)
- PLO 2: develop and apply skills of critical inquiry, teamwork, and effective communication (by means of group projects, tutorial classes and presentation opportunities in the curriculum)
- PLO 3: understand and describe the issues and concerns fundamental to the field (by means of coursework and laboratory-based learning in the curriculum)

### Impermissible Combinations:

Major in Molecular Biology & Biotechnology

Major in Molecular Biology & Biotechnology (Intensive)

### Required courses (36 credits)

# 1. Introductory level courses (12 credits)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL1110 From molecules to cells (6)
BIOL1309 Evolutionary diversity (6)

BIOC2600 Basic biochemistry (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

BIOL2306 Ecology and evolution (6)

May take either BIOL2220 or BIOC2600 to fulfill this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

May take either BIOL1309 or BIOL2306 to fulfill this 12 credits requirement, but not both.

May take either BIOL2220 or BIOC2600 to fulfill this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

May take either BIOL1309 or BIOL2306 to fulfill this 12 credits requirement, but not both.

# 2. Advanced level courses (24 credits)

# **Disciplinary Core Courses (6 credits)**

BIOL3401 Molecular biology (6)

# **Disciplinary Electives (18 credits)**

At least 18 credits selected from the following courses: BIOL3402 Cell biology and cell technology (6)

BIOL3403 Immunology (6)

BIOL3409 Business aspects of biotechnology (6)
BIOL3508 Microbial physiology and biotechnology (6)
BIOL4401 Medical microbiology and applied immunology (6)

BIOL4411 Plant and food biotechnology (6)
BIOL4415 Healthcare biotechnology (6)
BIOL4416 Stem cells and regenerative biology (6)
BIOL4417 'Omics' and systems biology (6)
ENVS4110 Environmental remediation (6)

# Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

### Remarks:

Offered to students

2016

admitted to Year 1 in

### **Objectives:**

The Minor in Molecular Biology & Biotechnology aims to provide students with a fundamental understanding of molecular biology and biotechnology which are relevant to many other disciplines of study and our daily life. Students will learn the principles underlying current molecular and cell biology advances, and biotechnological applications and will become literate in biotechnology business and advancements.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: develop and apply basic technical and knowledge-based skills in molecular and cell biology, and biotechnology (by means of coursework and laboratory-based learning in the curriculum)
- PLO 2: develop and apply skills of critical inquiry, teamwork, and effective communication (by means of group projects, tutorial classes and presentation opportunities in the curriculum)
- PLO 3: understand and describe the issues and concerns fundamental to the field (by means of coursework and laboratory-based learning in the curriculum)

### Impermissible Combinations:

Major in Molecular Biology & Biotechnology

Major in Molecular Biology & Biotechnology (Intensive)

# Required courses (36 credits)

# 1. Introductory level courses (12 credits)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL1110 From molecules to cells (6)
BIOL1309 Evolutionary diversity (6)

BIOC2600 Basic biochemistry (6)

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

BIOL2306 Ecology and evolution (6)

May take either BIOL2220 or BIOC2600 to fulfill this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

May take either BIOL1309 or BIOL2306 to fulfill this 12 credits requirement, but not both.

May take either BIOL2220 or BIOC2600 to fulfill this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.

May take either BIOL1309 or BIOL2306 to fulfill this 12 credits requirement, but not both.

# 2. Advanced level courses (24 credits)

# **Disciplinary Core Courses (6 credits)**

BIOL3401 Molecular biology (6)

# **Disciplinary Electives (18 credits)**

At least 18 credits selected from the following courses: BIOL3402 Cell biology and cell technology (6)

BIOL3402 Cell biology and of BIOL3403 Immunology (6)

BIOL3409 Business aspects of biotechnology (6)
BIOL3508 Microbial physiology and biotechnology (6)
BIOL4401 Medical microbiology and applied immunology (6)

BIOL4411 Plant and food biotechnology (6)
BIOL4415 Healthcare biotechnology (6)
BIOL4416 Stem cells and regenerative biology (6)
BIOL4417 'Omics' and systems biology (6)
ENVS4110 Environmental remediation (6)

# Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

### Remarks:

2015

Offered to students

admitted to Year 1 in

### **Objectives:**

The Minor in Molecular Biology & Biotechnology aims to provide students with a fundamental understanding of molecular biology and biotechnology which are relevant to many other disciplines of study and our daily life. Students will learn the principles underlying current molecular and cell biology advances, and biotechnological applications and will become literate in biotechnology business and advancements.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: develop and apply basic technical and knowledge-based skills in molecular and cell biology, and biotechnology (by means of coursework and laboratory-based learning in the curriculum)
- PLO 2: develop and apply skills of critical inquiry, teamwork, and effective communication (by means of group projects, tutorial classes and presentation opportunities in the curriculum)
- PLO 3: understand and describe the issues and concerns fundamental to the field (by means of coursework and laboratorybased learning in the curriculum)

# Impermissible Combinations:

Major in Molecular Biology & Biotechnology

Major in Molecular Biol	logy & Biotechnology (Intensive)	
Required courses	(36 credits)	
	el courses (12 credits)	
Disciplinary Electiv	•	
BIOL1110	s selected from the following courses: From molecules to cells (6)	
BIOL110	Evolutionary diversity (6)	May take either BIOL1309 or BIOL2306 to
DIOL 1309	Evolutionary diversity (o)	fulfill this 12 credits requirement, but not both.
BIOC2600	Basic biochemistry (6)	May take either BIOL2220 or BIOC2600 to fulfill this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.
BIOL2102	Biostatistics (6)	
BIOL2103	Biological sciences laboratory course (6)	
BIOL2220	Principles of biochemistry (6)	May take either BIOL2220 or BIOC2600 to fulfill this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.
BIOL2306	Ecology and evolution (6)	May take either BIOL1309 or BIOL2306 to fulfill this 12 credits requirement, but not both.
2. Advanced level of	courses (24 credits)	,
Disciplinary Core C	Courses (6 credits)	
BIOL3401	Molecular biology (6)	
Disciplinary Elective	ves (18 credits)	
	s selected from the following courses:	
BIOL3402	Cell biology and cell technology (6)	
BIOL3403	Immunology (6)	
BIOL3409	Business aspects of biotechnology (6)	
BIOL3508	Microbial physiology and biotechnology (6)	Take either BIOL3508 or BIOL4402 to fulfill this 18 credits requirement, but not both. BIOL3508 and BIOL4402 are mutually exclusive.
BIOL4401	Medical microbiology and applied immunology (6)	
BIOL4402	Microbial biotechnology (6)	Take either BIOL3508 or BIOL4402 to fulfill this 18 credits requirement, but not both. BIOL3508 and BIOL4402 are mutually exclusive.
BIOL4411	Plant and food biotechnology (6)	
BIOL4415	Healthcare biotechnology (6)	
BIOL4416	Stem cells and regenerative biology (6)	
BIOL4417	'Omics' and systems biology (6)	
ENVS4110	Environmental remediation (6)	

# Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

# Remarks:

Offered to students

2014

admitted to Year 1 in

### **Objectives:**

The Minor in Molecular Biology & Biotechnology aims to provide students with a fundamental understanding of molecular biology and biotechnology which are relevant to many other disciplines of study and our daily life. Students will learn the principles underlying current molecular and cell biology advances, and biotechnological applications and will become literate in biotechnology business and advancements.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: develop and apply basic technical and knowledge-based skills in molecular and cell biology, and biotechnology (by means of coursework and laboratory-based learning in the curriculum)
- PLO 2: develop and apply skills of critical inquiry, teamwork, and effective communication (by means of group projects, tutorial classes and presentation opportunities in the curriculum)
- PLO 3: understand and describe the issues and concerns fundamental to the field (by means of coursework and laboratorybased learning in the curriculum)

# Impermissible Combinations:

Major in Molecular Biology & Biotechnology

Major in Molecular Bio	logy & Biotechnology (Intensive)	
Required courses	s (36 credits)	
1. Introductory lev	el courses (12 credits)	
Disciplinary Elective	ves (12 credits)	
	's selected from the following courses:	
BIOL1110	From molecules to cells (6)	
BIOL1309	Evolutionary diversity (6)	May take either BIOL1309 or BIOL2306 to fulfill this 12 credits requirement, but not both.
BIOC2600	Basic biochemistry (6)	May take either BIOL2220 or BIOC2600 to fulfill this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.
BIOL2102	Biostatistics (6)	
BIOL2103	Biological sciences laboratory course (6)	
BIOL2220	Principles of biochemistry (6)	May take either BIOL2220 or BIOC2600 to fulfill this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.
BIOL2306	Ecology and evolution (6)	May take either BIOL1309 or BIOL2306 to fulfill this 12 credits requirement, but not both.
2. Advanced level	courses (24 credits)	, ,
Disciplinary Core	Courses (6 credits)	
BIOL3401	Molecular biology (6)	
Disciplinary Elective		
II .	's selected from the following courses:	
BIOL3402	Cell biology and cell technology (6)	
BIOL3403	Immunology (6)	
BIOL3409	Business aspects of biotechnology (6)	T   '/ PIOLOTOO PIOL 1400 / 1/5"
BIOL3508	Microbial physiology and biotechnology (6)	Take either BIOL3508 or BIOL4402 to fulfill this 18 credits requirement, but not both. BIOL3508 and BIOL4402 are mutually exclusive.
BIOL4401	Medical microbiology and applied immunology (6)	
BIOL4402	Microbial biotechnology (6)	Take either BIOL3508 or BIOL4402 to fulfill this 18 credits requirement, but not both. BIOL3508 and BIOL4402 are mutually exclusive.
BIOL4411	Plant and food biotechnology (6)	
BIOL4415	Healthcare biotechnology (6)	
BIOL4416	Stem cells and regenerative biology (6)	
BIOL4417	'Omics' and systems biology (6)	
ENVS4110	Environmental remediation (6)	

# Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

# Remarks:

2013

Offered to students

admitted to Year 1 in

The Minor in Molecular Biology & Biotechnology aims to provide students with a fundamental understanding of molecular biology and biotechnology which are relevant to many other disciplines of study and our daily life. Students will learn the principles underlying current molecular and cell biology advances, and biotechnological applications and will become literate in biotechnology business and advancements.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: develop and apply basic technical and knowledge-based skills in molecular and cell biology, and biotechnology (by means of coursework and laboratory-based learning in the curriculum)
- PLO 2: develop and apply skills of critical inquiry, teamwork, and effective communication (by means of group projects, tutorial classes and presentation opportunities in the curriculum)
- PLO 3: understand and describe the issues and concerns fundamental to the field (by means of coursework and laboratorybased learning in the curriculum)

# Impermissible Combinations:

Major in Molecular Biology & Biotechnology

Major in Molecular Bio	logy & Biotechnology (Intensive)	
Required courses	s (36 credits)	
1. Introductory lev	el courses (12 credits)	
Disciplinary Elective	ves (12 credits)	
	's selected from the following courses:	
BIOL1110	From molecules to cells (6)	
BIOL1309	Evolutionary diversity (6)	May take either BIOL1309 or BIOL2306 to fulfill this 12 credits requirement, but not both.
BIOC2600	Basic biochemistry (6)	May take either BIOL2220 or BIOC2600 to fulfill this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.
BIOL2102	Biostatistics (6)	
BIOL2103	Biological sciences laboratory course (6)	
BIOL2220	Principles of biochemistry (6)	May take either BIOL2220 or BIOC2600 to fulfill this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.
BIOL2306	Ecology and evolution (6)	May take either BIOL1309 or BIOL2306 to fulfill this 12 credits requirement, but not both.
2. Advanced level	courses (24 credits)	, ,
Disciplinary Core	Courses (6 credits)	
BIOL3401	Molecular biology (6)	
Disciplinary Elective		
II .	's selected from the following courses:	
BIOL3402	Cell biology and cell technology (6)	
BIOL3403	Immunology (6)	
BIOL3409	Business aspects of biotechnology (6)	T   '/ PIOLOTOO PIOL 1400 / 1/5"
BIOL3508	Microbial physiology and biotechnology (6)	Take either BIOL3508 or BIOL4402 to fulfill this 18 credits requirement, but not both. BIOL3508 and BIOL4402 are mutually exclusive.
BIOL4401	Medical microbiology and applied immunology (6)	
BIOL4402	Microbial biotechnology (6)	Take either BIOL3508 or BIOL4402 to fulfill this 18 credits requirement, but not both. BIOL3508 and BIOL4402 are mutually exclusive.
BIOL4411	Plant and food biotechnology (6)	
BIOL4415	Healthcare biotechnology (6)	
BIOL4416	Stem cells and regenerative biology (6)	
BIOL4417	'Omics' and systems biology (6)	
ENVS4110	Environmental remediation (6)	

# Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

# Remarks:

Offered to students

2012

admitted to Year 1 in

### **Objectives:**

The Minor in Molecular Biology & Biotechnology aims to provide students with a fundamental understanding of molecular biology and biotechnology which are relevant to many other disciplines of study and our daily life. Students will learn the principles underlying current molecular and cell biology advances, and biotechnological applications and will become literate in biotechnology business and advancements.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: develop and apply basic technical and knowledge-based skills in molecular and cell biology, and biotechnology (by means of coursework and laboratory-based learning in the curriculum)
- PLO 2: develop and apply skills of critical inquiry, teamwork, and effective communication (by means of group projects, tutorial classes and presentation opportunities in the curriculum)
- PLO 3: understand and describe the issues and concerns fundamental to the field (by means of coursework and laboratorybased learning in the curriculum)

# Impermissible Combinations:

Major in Molecular Biology & Biotechnology

Major in Molecular Biol	logy & Biotechnology (Intensive)	
Required courses	(36 credits)	
	el courses (12 credits)	
Disciplinary Electiv	•	
BIOL1110	s selected from the following courses: From molecules to cells (6)	
BIOL110	Evolutionary diversity (6)	May take either BIOL1309 or BIOL2306 to
DIOL 1309	Evolutionary diversity (o)	fulfill this 12 credits requirement, but not both.
BIOC2600	Basic biochemistry (6)	May take either BIOL2220 or BIOC2600 to fulfill this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.
BIOL2102	Biostatistics (6)	
BIOL2103	Biological sciences laboratory course (6)	
BIOL2220	Principles of biochemistry (6)	May take either BIOL2220 or BIOC2600 to fulfill this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive.
BIOL2306	Ecology and evolution (6)	May take either BIOL1309 or BIOL2306 to fulfill this 12 credits requirement, but not both.
2. Advanced level of	courses (24 credits)	,
Disciplinary Core C	Courses (6 credits)	
BIOL3401	Molecular biology (6)	
Disciplinary Elective	ves (18 credits)	
	s selected from the following courses:	
BIOL3402	Cell biology and cell technology (6)	
BIOL3403	Immunology (6)	
BIOL3409	Business aspects of biotechnology (6)	
BIOL3508	Microbial physiology and biotechnology (6)	Take either BIOL3508 or BIOL4402 to fulfill this 18 credits requirement, but not both. BIOL3508 and BIOL4402 are mutually exclusive.
BIOL4401	Medical microbiology and applied immunology (6)	
BIOL4402	Microbial biotechnology (6)	Take either BIOL3508 or BIOL4402 to fulfill this 18 credits requirement, but not both. BIOL3508 and BIOL4402 are mutually exclusive.
BIOL4411	Plant and food biotechnology (6)	
BIOL4415	Healthcare biotechnology (6)	
BIOL4416	Stem cells and regenerative biology (6)	
BIOL4417	'Omics' and systems biology (6)	
ENVS4110	Environmental remediation (6)	

# Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

# Remarks:

Offered to students 2021

admitted to Year 1 in

### Objectives:

The Minor in Operations Research & Mathematical Programming provides students with fundamental knowledge in optimization, computational algorithm, mathematical modeling, and decision making. It is specifically designed for students who are interested in the above subjects and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving and skills to tackle novel situations and ill-defined problems. It is particularly useful for solving mathematical problems arising from decision sciences and logistic industry.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and demonstrate understanding of fundamental concepts in operations research & mathematical programming (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

### Impermissible Combinations:

Major in Mathematics

Major in Mathematics (Intensive)

Minor in Mathematics

Minor in Computational & Financial Mathematics

# Required courses (42 credits)

# 1. Introductory level courses (18 credits) (note 3)

**Disciplinary Core Course (6 credits)** 

MATH1013 University mathematics II (6)

### **Disciplinary Electives (12 credits)**

Select either List A or List B:

List A

MATH2101 Linear algebra I (6) MATH2211 Multivariable calculus (6)

List B

MATH2012 Fundamental concepts of mathematics (6)
MATH2014 Multivariable calculus and linear algebra (6)

# 2. Advanced level courses (24 credits) Disciplinary Core Courses (12 credits)

MATH3901 Operations research I (6)
MATH3904 Introduction to optimization (6)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

MATH3405 Differential equations (6)
MATH3600 Discrete mathematics (6)

MATH3905 Queueing theory and simulation (6)

MATH3906 Financial calculus (6)
MATH3911 Game theory and strategy (6)

MATH3943 Network models in operations research (6)
MATH4902 Operations research II (6)
MATH4907 Numerical methods for financial calculus (6)

MATH4907 Numerical methods for financial calculus (6) MATH7502 Topics in applied discrete mathematics (6)

MATH7503 Topics in mathematical programming and optimization (6)

### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this minor. Students who do not fulfill this requirement are required to take MATH1011 University mathematics I.
- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

### Remarks:

Offered to students 2020

admitted to Year 1 in

### **Objectives:**

The Minor in Operations Research & Mathematical Programming provides students with fundamental knowledge in optimization, computational algorithm, mathematical modeling, and decision making. It is specifically designed for students who are interested in the above subjects and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving and skills to tackle novel situations and ill-defined problems. It is particularly useful for solving mathematical problems arising from decision sciences and logistic industry.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and demonstrate understanding of fundamental concepts in operations research & mathematical programming (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and projectbased learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

### Impermissible Combinations:

Major in Mathematics

Major in Mathematics (Intensive)

Minor in Mathematics

Minor in Computational & Financial Mathematics

# Required courses (42 credits)

# 1. Introductory level courses (18 credits) (note 3)

**Disciplinary Core Course (6 credits)** 

University mathematics II (6) MATH1013

### **Disciplinary Electives (12 credits)**

Select either List A or List B:

I ist A

MATH2101 Linear algebra I (6) Multivariable calculus (6) MATH2211

List B

MATH2012

Fundamental concepts of mathematics (6) MATH2014 Multivariable calculus and linear algebra (6)

### 2. Advanced level courses (24 credits) **Disciplinary Core Courses (12 credits)**

Operations research I (6) MATH3901 MATH3904 Introduction to optimization (6)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

MATH3405 Differential equations (6) Discrete mathematics (6) MATH3600

MATH3905 Queueing theory and simulation (6)

Financial calculus (6) **MATH3906** Game theory and strategy (6) MATH3911

Network models in operations research (6) MATH3943 Operations research II (6) MATH4902 MATH4907 Numerical methods for financial calculus (6)

MATH7502 Topics in applied discrete mathematics (6) MATH7503 Topics in mathematical programming and optimization (6)

### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this minor. Students who do not fulfill this requirement are required to take MATH1011 University mathematics I.
- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

Offered to students 2019

admitted to Year 1 in

### **Objectives:**

The Minor in Operations Research & Mathematical Programming provides students with fundamental knowledge in optimization, computational algorithm, mathematical modeling, and decision making. It is specifically designed for students who are interested in the above subjects and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving and skills to tackle novel situations and ill-defined problems. It is particularly useful for solving mathematical problems arising from decision sciences and logistic industry.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and demonstrate understanding of fundamental concepts in operations research & mathematical programming (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

### Impermissible Combinations:

Major in Mathematics

Major in Mathematics (Intensive)

Minor in Mathematics

Minor in Computational & Financial Mathematics

# Required courses (42 credits)

# 1. Introductory level courses (18 credits) (note 3)

**Disciplinary Core Course (6 credits)** 

MATH1013 University mathematics II (6)

### **Disciplinary Electives (12 credits)**

Select either List A or List B:

List A

MATH2101 Linear algebra I (6) MATH2211 Multivariable calculus (6)

List B
MATH2012 Fundamental concepts of mathematics (6)

MATH2014 Multivariable calculus and linear algebra (6)

# 2. Advanced level courses (24 credits) Disciplinary Core Courses (12 credits)

MATH3901 Operations research I (6)
MATH3904 Introduction to optimization (6)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

MATH3405 Differential equations (6)
MATH3600 Discrete mathematics (6)

MATH3905 Queueing theory and simulation (6)

MATH3906 Financial calculus (6)
MATH3911 Game theory and strategy (6)

MATH3943 Network models in operations research (6)
MATH4902 Operations research II (6)
MATH4907 Numerical methods for financial calculus (6)

MATH4907 Numerical methods for financial calculus (6) MATH7502 Topics in applied discrete mathematics (6)

MATH7503 Topics in mathematical programming and optimization (6)

### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this minor. Students who do not fulfill this requirement are required to take MATH1011 University mathematics I.
- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

### Remarks:

Offered to students

admitted to Year 1 in

### **Objectives:**

The Minor in Operations Research & Mathematical Programming provides students with fundamental knowledge in optimization, computational algorithm, mathematical modeling, and decision making. It is specifically designed for students who are interested in the above subjects and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving and skills to tackle novel situations and ill-defined problems. It is particularly useful for solving mathematical problems arising from decision sciences and logistic industry.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

2018

- PLO 1: describe and demonstrate understanding of fundamental concepts in operations research & mathematical programming (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

### Impermissible Combinations:

Major in Mathematics

Major in Mathematics (Intensive)

Minor in Mathematics

Minor in Computational & Financial Mathematics

# Required courses (42 credits)

# 1. Introductory level courses (18 credits) (note 3)

**Disciplinary Core Course (6 credits)** 

MATH1013 University mathematics II (6)

### **Disciplinary Electives (12 credits)**

Select either List A or List B:

List A

MATH2101 Linear algebra I (6) MATH2211 Multivariable calculus (6)

List B
MATH2012 Fundamental concepts of mathematics (6)

MATH2014 Multivariable calculus and linear algebra (6)

# 2. Advanced level courses (24 credits) Disciplinary Core Courses (12 credits)

MATH3901 Operations research I (6)
MATH3904 Introduction to optimization (6)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

MATH3405 Differential equations (6)
MATH3600 Discrete mathematics (6)

MATH3905 Queueing theory and simulation (6)

MATH3906 Financial calculus (6)
MATH3911 Game theory and strategy (6)

MATH3943 Network models in operations research (6)
MATH4902 Operations research II (6)
MATH4907 Numerical methods for financial calculus (6)

MATH7502 Topics in applied discrete mathematics (6)

MATH7503 Topics in mathematical programming and optimization (6)

### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this minor. Students who do not fulfill this requirement are required to take MATH1011 University mathematics I.
- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

### Remarks:

Offered to students

admitted to Year 1 in

### **Objectives:**

The Minor in Operations Research & Mathematical Programming provides students with fundamental knowledge in optimization, computational algorithm, mathematical modeling, and decision making. It is specifically designed for students who are interested in the above subjects and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving and skills to tackle novel situations and ill-defined problems. It is particularly useful for solving mathematical problems arising from decision sciences and logistic industry.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

2017

- PLO 1: describe and demonstrate understanding of fundamental concepts in operations research & mathematical programming (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

### Impermissible Combinations:

Major in Mathematics

Major in Mathematics (Intensive)

Major in Mathematics/Physics

Minor in Mathematics

Minor in Computational & Financial Mathematics

### Required courses (42 credits)

# 1. Introductory level courses (18 credits) (note 3)

**Disciplinary Core Course (6 credits)** 

MATH1013 University mathematics II (6)

# **Disciplinary Electives (12 credits)**

Select either List A or List B:

List A

MATH2101 Linear algebra I (6) MATH2211 Multivariable calculus (6)

List B

MATH2012 Fundamental concepts of mathematics (6)
MATH2014 Multivariable calculus and linear algebra (6)

# 2. Advanced level courses (24 credits)

# **Disciplinary Core Courses (12 credits)**

MATH3901 Operations research I (6)
MATH3904 Introduction to optimization (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

MATH3405 Differential equations (6)
MATH3600 Discrete mathematics (6)

MATH3905 Queueing theory and simulation (6)

MATH3906 Financial calculus (6)

MATH3911 Game theory and strategy (6)

MATH4003

Network models in operations research (6)

Operations research II (6)

MATH4902 Operations research II (6)

MATH4907 Numerical methods for financial calculus (6) MATH7502 Topics in applied discrete mathematics (6)

MATH7503 Topics in mathematical programming and optimization (6)

# Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this minor. Students who do not fulfill this requirement are required to take MATH1011 University mathematics I.
- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

### Remarks:

Offered to students

admitted to Year 1 in

### **Objectives:**

The Minor in Operations Research & Mathematical Programming provides students with fundamental knowledge in optimization, computational algorithm, mathematical modeling, and decision making. It is specifically designed for students who are interested in the above subjects and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving and skills to tackle novel situations and ill-defined problems. It is particularly useful for solving mathematical problems arising from decision sciences and logistic industry.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

2016

- PLO 1: describe and demonstrate understanding of fundamental concepts in operations research & mathematical programming (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

### Impermissible Combinations:

Major in Mathematics

Major in Mathematics (Intensive)

Major in Mathematics/Physics

Minor in Mathematics

Minor in Computational & Financial Mathematics

### Required courses (42 credits)

# 1. Introductory level courses (18 credits) (note 3)

**Disciplinary Core Course (6 credits)** 

MATH1013 University mathematics II (6)

# Disciplinary Electives (12 credits)

Select either List A or List B:

List A

MATH2101 Linear algebra I (6) MATH2211 Multivariable calculus (6)

List B

MATH2012 Fundamental concepts of mathematics (6)
MATH2014 Multivariable calculus and linear algebra (6)

# 2. Advanced level courses (24 credits)

Disciplinary Core Courses (12 credits)
MATH3901 Operations research I (6)

MATH3901 Operations research (6)
MATH3904 Introduction to optimization (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

MATH3405 Differential equations (6) MATH3600 Discrete mathematics (6)

MATH3905 Queueing theory and simulation (6)

MATH3906 Financial calculus (6)

MATH3911 Game theory and strategy (6)

MATH4003

Network models in operations research (6)

Operations research II (6)

MATH4902 Operations research II (6)

MATH4907 Numerical methods for financial calculus (6) MATH7502 Topics in applied discrete mathematics (6)

MATH7503 Topics in mathematical programming and optimization (6)

# Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this minor. Students who do not fulfill this requirement are required to take MATH1011 University mathematics I.
- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

### Remarks:

Offered to students

admitted to Year 1 in

### **Objectives:**

The Minor in Operations Research & Mathematical Programming provides students with fundamental knowledge in optimization, computational algorithm, mathematical modeling, and decision making. It is specifically designed for students who are interested in the above subjects and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving and skills to tackle novel situations and ill-defined problems. It is particularly useful for solving mathematical problems arising from decision sciences and logistic industry.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

2015

- PLO 1: describe and demonstrate understanding of fundamental concepts in operations research & mathematical programming (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and projectbased learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

### Impermissible Combinations:

Major in Mathematics

Major in Mathematics/Physics

Minor in Mathematics

Minor in Computational & Financial Mathematics

### Required courses (42 credits)

1. Introductory level courses (18 credits) (note 3)

**Disciplinary Core Course (6 credits)** 

University mathematics II (6) MATH1013

### **Disciplinary Electives (12 credits)**

Select either List A or List B:

I ist A

MATH2101 Linear algebra I (6) Multivariable calculus (6) MATH2211

List B MATH2012 Fundamental concepts of mathematics (6)

MATH2014 Multivariable calculus and linear algebra (6)

### 2. Advanced level courses (24 credits) **Disciplinary Core Courses (12 credits)**

Operations research I (6) MATH3901 MATH3904 Introduction to optimization (6)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

MATH3405 Differential equations (6) Discrete mathematics (6) MATH3600

MATH3905 Queueing theory and simulation (6) Financial calculus (6) **MATH3906** 

Game theory and strategy (6) MATH3911

MATH3943 Network models in operations research (6) Operations research II (6) MATH4902 MATH4907 Numerical methods for financial calculus (6)

MATH7502 Topics in applied discrete mathematics (6) MATH7503 Topics in mathematical programming and optimization (6)

# Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this minor. Students who do not fulfill this requirement are required to take MATH1011 University mathematics I.
- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

Offered to students

admitted to Year 1 in

2014

### **Objectives:**

The Minor in Operations Research & Mathematical Programming provides students with fundamental knowledge in optimization, computational algorithm, mathematical modeling, and decision making. It is specifically designed for students who are interested in the above subjects and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving and skills to tackle novel situations and ill-defined problems. It is particularly useful for solving mathematical problems arising from decision sciences and logistic industry.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and demonstrate understanding of fundamental concepts in operations research & mathematical programming (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and projectbased learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

### Impermissible Combinations:

Major in Mathematics

Major in Mathematics/Physics

Minor in Mathematics

Minor in Computational & Financial Mathematics

# Required courses (42 credits)

# 1. Introductory level courses (18 credits) (note 3)

**Disciplinary Core Courses (18 credits)** 

MATH1013 University mathematics II (6) Linear algebra I (6) MATH2101 MATH2211 Multivariable calculus (6)

# 2. Advanced level courses (24 credits)

# **Disciplinary Core Courses (12 credits)**

Operations research I (6) MATH3901 MATH3904 Introduction to optimization (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

Differential equations (6) MATH3405 MATH3600 Discrete mathematics (6)

Queueing theory and simulation (6) **MATH3905** 

Financial calculus (6) **MATH3906** MATH3911 Game theory and strategy (6)

Network models in operations research (6) MATH3943

Operations research II (6) MATH4902

Numerical methods for financial calculus (6) MATH4907 MATH7502 Topics in applied discrete mathematics (6)

MATH7503 Topics in mathematical programming and optimization (6)

### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this minor. Students who do not fulfill this requirement are required to take MATH1011 University mathematics I.
- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

### Remarks:

Offered to students 2013

admitted to Year 1 in

### **Objectives:**

The Minor in Operations Research & Mathematical Programming provides students with fundamental knowledge in optimization, computational algorithm, mathematical modeling, and decision making. It is specifically designed for students who are interested in the above subjects and those whose majors require sophisticated mathematical skills. It aims to nurture quantitative reasoning, logical, analytical and critical thinking, innovative imagination, meticulous care to work, ability to conceptualize, skills for problem-solving and skills to tackle novel situations and ill-defined problems. It is particularly useful for solving mathematical problems arising from decision sciences and logistic industry.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: describe and demonstrate understanding of fundamental concepts in operations research & mathematical programming (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply mathematical methods and analysis to real life problems (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: communicate and discuss scientific issues related to mathematics (by means of coursework, tutorial classes and presentation opportunities in the curriculum)

### Impermissible Combinations:

Major in Mathematics

Major in Mathematics/Physics

Minor in Mathematics

Minor in Computational & Financial Mathematics

# Required courses (42 credits)

# 1. Introductory level courses (18 credits) (note 3)

**Disciplinary Core Courses (18 credits)** 

MATH1013 University mathematics II (6)
MATH2101 Linear algebra I (6)
MATH2211 Multivariable calculus (6)

# 2. Advanced level courses (24 credits)

# **Disciplinary Core Courses (12 credits)**

MATH3901 Operations research I (6)
MATH3904 Introduction to optimization (6)

# **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

MATH3405 Differential equations (6) MATH3600 Discrete mathematics (6)

MATH3905 Queueing theory and simulation (6)

MATH3906 Financial calculus (6)
MATH3911 Game theory and strategy (6)

MATH3943 Network models in operations research (6)

MATH4902 Operations research II (6)

MATH4907 Numerical methods for financial calculus (6) MATH7502 Topics in applied discrete mathematics (6)

MATH7503 Topics in mathematical programming and optimization (6)

### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent to take this minor. Students who do not fulfill this requirement are required to take MATH1011 University mathematics I.
- 3. Students taking the Mathematics related major/minor should check the exemption and replacement arrangement for the introductory level Disciplinary Core Mathematics courses at https://www.scifac.hku.hk/current/ug/academic/overlapping-course-requirements.

### Remarks:

Minor Title Minor in Physics

Offered to students 2021

admitted to Year 1 in

### **Objectives:**

The Minor in Physics is intended to provide interested students with a fundamental outlook on the subject. Students would acquire a taste of the subject through a large selection of elective courses which provides them to pursue a wide range of topics from the very small scale of nanomaterials to the large scale of astrophysics.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with fundamental knowledge in physics (by means of coursework and tutorial classes in the curriculum)
- PLO 2: analyze some physics problems qualitatively and quantitatively (by means of coursework, tutorial classes and laboratory works in the curriculum)
- PLO 3: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)

### Impermissible Combinations:

Major in Physics

Major in Physics (Intensive)

# Required courses (42 credits)

### 1. Introductory level courses (24 credits)

**Disciplinary Core Courses (6 credits)** 

PHYS1250 Fundamental physics (6)

### **Disciplinary Electives (18 credits)**

At least 18 credits selected from the following courses:

PHYS1150 Problem solving in physics (6)
PHYS2055 Introductory relativity (6)
PHYS2150 Methods in physics I (6)
PHYS2155 Methods in physics II (6)

PHYS2160 Introductory computational physics (6)

PHYS2250 Introductory mechanics (6)

PHYS2255 Introductory electricity and magnetism (6)
PHYS2261 Introductory heat and thermodynamics (6)
PHYS2265 Introductory quantum physics (6)

2. Advanced level courses (18 credits)

# **Disciplinary Electives (18 credits)**

At least 18 credits selected from the following courses: List A

PHYS3150 Theoretical physics (6)
PHYS3151 Machine learning in physics (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)

PHYS3351 Quantum mechanics (6)
PHYS3450 Electromagnetism (6)

PHYS3550 Statistical mechanics & thermodynamics (6)

PHYS3650 Observational astronomy (6) PHYS3653 Astrophysics (6)

PHYS3660 Astronomy laboratory (6)
PHYS3750 Laser and spectroscopy (6)
PHYS3760 Physics laboratory (6)
PHYS3850 Physical Optics (6)

PHYS3851 Atomic and nuclear physics (6) PHYS4150 Computational physics (6)

PHYS4151 Data analysis and modeling in physics (6)
PHYS4351 Advanced quantum mechanics (6)
PHYS4450 Advanced electromagnetism (6)
PHYS4550 Advanced statistical mechanics (6)

PHYS4551 Solid state physics (6)
PHYS4650 Stellar physics (6)
PHYS4652 Planetary science (6)
PHYS4653 Cosmology (6)
PHYS4654 General relativity (6)
PHYS4655 Interstellar medium (6)
PHYS4656 Advanced astrophysics (6)

PHYS7350 Graduate classical mechanics (6)
PHYS7351 Graduate quantum mechanics (6)
PHYS7450 Graduate electromagnetism (6)
PHYS7550 Graduate statistical mechanics (6)

Particle physics (6)

PHYS7750 Nanophysics (6)

### Notes:

PHYS4850

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course

("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses

2. Students must have level 3 or above in HKDSE Physics or equivalent to take this minor. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

### Remarks:

Minor Title Minor in Physics

Offered to students 2020

admitted to Year 1 in

### **Objectives:**

The Minor in Physics is intended to provide interested students with a fundamental outlook on the subject. Students would acquire a taste of the subject through a large selection of elective courses which provides them to pursue a wide range of topics from the very small scale of nanomaterials to the large scale of astrophysics.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with fundamental knowledge in physics (by means of coursework and tutorial classes in the curriculum)
- PLO 2: analyze some physics problems qualitatively and quantitatively (by means of coursework, tutorial classes and laboratory works in the curriculum)
- PLO 3: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)

### Impermissible Combinations:

Major in Physics

Major in Physics (Intensive)

# Required courses (42 credits)

### 1. Introductory level courses (24 credits)

**Disciplinary Core Courses (6 credits)** 

PHYS1250 Fundamental physics (6)

### **Disciplinary Electives (18 credits)**

At least 18 credits selected from the following courses:

PHYS1150 Problem solving in physics (6)
PHYS2055 Introductory relativity (6)
PHYS2150 Methods in physics I (6)
PHYS2155 Methods in physics II (6)

PHYS2160 Introductory computational physics (6)

PHYS2250 Introductory mechanics (6)

PHYS2255 Introductory electricity and magnetism (6)
PHYS2261 Introductory heat and thermodynamics (6)
PHYS2265 Introductory quantum physics (6)

2. Advanced level courses (18 credits)

# **Disciplinary Electives (18 credits)**

At least 18 credits selected from the following courses: List A

PHYS3150 Theoretical physics (6)
PHYS3151 Machine learning in physics (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)
PHYS3450 Electromagnetism (6)

PHYS3550 Statistical mechanics & thermodynamics (6)

PHYS3650 Observational astronomy (6) PHYS3653 Astrophysics (6)

PHYS3650 Astronomy laboratory (6)
PHYS3750 Laser and spectroscopy (6)
PHYS3760 Physics laboratory (6)
PHYS3850 Physical Optics (6)
PHYS3850 Atomic and puclear physics

PHYS3851 Atomic and nuclear physics (6) PHYS4150 Computational physics (6)

PHYS4151 Data analysis and modeling in physics (6)
PHYS4351 Advanced quantum mechanics (6)
PHYS4450 Advanced electromagnetism (6)
PHYS4550 Advanced statistical mechanics (6)

PHYS4551 Solid state physics (6) PHYS4650 Stellar physics (6) PHYS4652 Planetary science (6) Cosmology (6) **PHYS4653** General relativity (6) **PHYS4654** Interstellar medium (6) **PHYS4655 PHYS4656** Advanced astrophysics (6) PHYS4850 Particle physics (6)

PHYS7350 Graduate classical mechanics (6)
PHYS7351 Graduate quantum mechanics (6)
PHYS7450 Graduate electromagnetism (6)
PHYS7550 Graduate statistical mechanics (6)

PHYS7750 Nanophysics (6)

### Notes:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course

("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses

2. Students must have level 3 or above in HKDSE Physics or equivalent to take this minor. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

### Remarks:

Minor Title Minor in Physics

Offered to students 2019

admitted to Year 1 in

# Objectives:

The Minor in Physics is intended to provide interested students with a fundamental outlook on the subject. Students would acquire a taste of the subject through a large selection of elective courses which provides them to pursue a wide range of topics from the very small scale of nanomaterials to the large scale of astrophysics.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with fundamental knowledge in physics (by means of coursework and tutorial classes in the curriculum)
- PLO 2: analyze some physics problems qualitatively and quantitatively (by means of coursework, tutorial classes and laboratory works in the curriculum)
- PLO 3: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)

### Impermissible Combinations:

Major in Physics (Intensive)

Major in Physics (Intensive)		
Required courses	s (42 credits)	
II -	vel courses (24 credits)	
·	Courses (6 credits)	
PHYS1250	Fundamental physics (6)	
Disciplinary Electi	,	
	its selected from the following courses:	
PHYS1150	Problem solving in physics (6)	
PHYS2055	Introductory relativity (6)	
PHYS2150	Methods in physics I (6)	
PHYS2155	Methods in physics II (6)	
PHYS2160	Introductory computational physics (6)	
PHYS2250	Introductory mechanics (6)	
PHYS2255	Introductory electricity and magnetism (6)	
PHYS2261	Introductory heat and thermodynamics (6)	
PHYS2265	Introductory quantum physics (6)	
	courses (18 credits)	
Disciplinary Electi		
	its selected from the following courses:	
List A	to delected from the following deareds.	
PHYS3150	Theoretical physics (6)	
PHYS3151	Machine learning in physics (6)	
PHYS3350	Classical mechanics (6)	
PHYS3351	Quantum mechanics (6)	
PHYS3450	Electromagnetism (6)	
PHYS3550	Statistical mechanics & thermodynamics (6)	
PHYS3650	Observational astronomy (6)	
PHYS3653	Astrophysics (6)	
PHYS3660	Astronomy laboratory (6)	
PHYS3750	Laser and spectroscopy (6)	
PHYS3760	Physics laboratory (6)	
PHYS3850	Physical Optics (6)	[previous title: Waves and optics (6)]
PHYS3851	Atomic and nuclear physics (6)	
PHYS4150	Computational physics (6)	
PHYS4151	Data analysis and modeling in physics (6)	
PHYS4351	Advanced quantum mechanics (6)	
PHYS4450	Advanced electromagnetism (6)	
PHYS4550	Advanced statistical mechanics (6)	
PHYS4551	Solid state physics (6)	
PHYS4650	Stellar physics (6)	
PHYS4652	Planetary science (6)	
PHYS4653	Cosmology (6)	
PHYS4654	General relativity (6)	
PHYS4655	Interstellar medium (6)	
PHYS4656	Advanced astrophysics (6)	
PHYS4850	Particle physics (6)	
PHYS7350	Graduate classical mechanics (6)	
PHYS7351	Graduate quantum mechanics (6)	
PHYS7450	Graduate electromagnetism (6)	
PHYS7550	Graduate statistical mechanics (6)	
PHYS7750	Nanophysics (6)	

# Notes:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course

("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

2. Students must have level 3 or above in HKDSE Physics or equivalent to take this minor. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

#### Remarks:

Minor Title Minor in Physics

Offered to students

admitted to Year 1 in

# Objectives:

The Minor in Physics is intended to provide interested students with a fundamental outlook on the subject. Students would acquire a taste of the subject through a large selection of elective courses which provides them to pursue a wide range of topics from the very small scale of nanomaterials to the large scale of astrophysics.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

2018

- PLO 1: identify and describe physical systems with fundamental knowledge in physics (by means of coursework and tutorial classes in the curriculum)
- PLO 2: analyze some physics problems qualitatively and quantitatively (by means of coursework, tutorial classes and laboratory works in the curriculum)
- PLO 3: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)

### Impermissible Combinations:

Major in Physics

Major in Physics (Intensive)

,, (	<u>'</u>	
Required courses	s (42 credits)	
1. Introductory lev	vel courses (24 credits)	
	Courses (6 credits)	
PHYS1250	Fundamental physics (6)	
Disciplinary Electi	. , , ,	
	its selected from the following courses:	
PHYS1150	Problem solving in physics (6)	
PHYS2055	Introductory relativity (6)	[previous title: Introduction to relativity (6) ]
PHYS2150	Methods in physics I (6)	[provided this: milediation to rolativity (6)]
PHYS2155	Methods in physics II (6)	
PHYS2160	Introductory computational physics (6)	
PHYS2250	Introductory mechanics (6)	
PHYS2255	Introductory electricity and magnetism (6)	
PHYS2261	Introductory electricity and magnetism (6)	
PHYS2265	Introductory quantum physics (6)	[previous title: Modern physics (6)]
	courses (18 credits)	[previous title: Wodern physics (0)]
Disciplinary Electi		
	its selected from the following courses:	
List A	Theoretical physics (6)	
PHYS3150	Theoretical physics (6)	
PHYS3151	Machine learning in physics (6)	
PHYS3350	Classical mechanics (6)	
PHYS3351	Quantum mechanics (6)	
PHYS3450	Electromagnetism (6)	
PHYS3550	Statistical mechanics & thermodynamics (6)	
PHYS3650	Observational astronomy (6)	
PHYS3653	Astrophysics (6)	
PHYS3660	Astronomy laboratory (6)	
PHYS3750	Laser and spectroscopy (6)	
PHYS3760	Physics laboratory (6)	
PHYS3850	Physical Optics (6)	[previous title: Waves and optics (6)]
PHYS3851	Atomic and nuclear physics (6)	
PHYS4150	Computational physics (6)	
PHYS4151	Data analysis and modeling in physics (6)	
PHYS4351	Advanced quantum mechanics (6)	
PHYS4450	Advanced electromagnetism (6)	
PHYS4550	Advanced statistical mechanics (6)	
PHYS4551	Solid state physics (6)	
PHYS4650	Stellar physics (6)	
PHYS4652	Planetary science (6)	
PHYS4653	Cosmology (6)	
PHYS4654	General relativity (6)	
PHYS4655	Interstellar medium (6)	
PHYS4656	Advanced astrophysics (6)	
PHYS4850	Particle physics (6)	
PHYS7350	Graduate classical mechanics (6)	
PHYS7351	Graduate quantum mechanics (6)	
PHYS7450	Graduate electromagnetism (6)	
PHYS7550	Graduate statistical mechanics (6)	
PHYS7750	Nanophysics (6)	

# Notes:

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course

("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

2. Students must have level 3 or above in HKDSE Physics or equivalent to take this minor. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

### Remarks

[previous title: Modern physics (6)]

[previous title: Waves and optics (6)]

Minor Title Minor in Physics

Offered to students 2017

admitted to Year 1 in

### **Objectives:**

The Minor in Physics is intended to provide interested students with a fundamental outlook on the subject. Students would acquire a taste of the subject through a large selection of elective courses which provides them to pursue a wide range of topics from the very small scale of nanomaterials to the large scale of astrophysics.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with fundamental knowledge in physics (by means of coursework and tutorial classes in the curriculum)
- PLO 2: analyze some physics problems qualitatively and quantitatively (by means of coursework, tutorial classes and laboratory works in the curriculum)
- PLO 3: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)

### Impermissible Combinations:

Major in Mathematics/Physics

Major in Physics

Major in Physics (Intensive)

### Required courses (42 credits)

# 1. Introductory level courses (18 credits)

# **Disciplinary Core Courses (18 credits)**

PHYS1250 Fundamental physics (6)
PHYS2250 Introductory mechanics (6)
PHYS2265 Introductory quantum physics (6)

2. Advanced level courses (24 credits)

### **Disciplinary Electives (24 credits)**

At least 24 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to

prerequisite requirements. The current course list includes courses in List A: List A

PHYS3150 Theoretical physics (6)
PHYS3151 Machine learning in physics (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)
PHYS3450 Electromagnetism (6)

PHYS3550 Statistical mechanics & thermodynamics (6)

PHYS3551 Introductory solid state physics (6)
PHYS3650 Observational astronomy (6)
PHYS3651 The physical universe (6)
PHYS3652 Principles of astronomy (6)
PHYS3653 Astrophysics (6)
PHYS3660 Astronomy laboratory (6)

PHYS3750 Laser and spectroscopy (6)
PHYS3751 Physics of nanomaterials (6)
PHYS3760 Physics laboratory (6)
PHYS3850 Physical Optics (6)

PHYS3851 Atomic and nuclear physics (6)
PHYS3999 Directed studies in physics (6)
PHYS4150 Computational physics (6)

PHYS4151 Data analysis and modeling in physics (6)
PHYS4350 Advanced classical mechanics (6)
PHYS4351 Advanced quantum mechanics (6)
PHYS4450 Advanced electromagnetism (6)
PHYS4550 Advanced statistical mechanics (6)

PHYS4551 Solid state physics (6)
PHYS4650 Stellar physics (6)

PHYS4651 Selected topics in astrophysics (6)

Planetary science (6) PHYS4652 Cosmology (6) PHYS4653 General relativity (6) **PHYS4654** Interstellar medium (6) **PHYS4655 PHYS4656** Advanced astrophysics (6) PHYS4750 Experimental physics (6) Particle physics (6) **PHYS4850** PHYS4966 Physics internship (6) PHYS4999 Physics project (12)

PHYS7350 Graduate classical mechanics (6)
PHYS7351 Graduate quantum mechanics (6)
PHYS7450 Graduate electromagnetism (6)
PHYS7550 Graduate statistical mechanics (6)
PHYS7551 Graduate solid state physics (6)

PHYS7650	Stellar atmospheres (6)
PHYS7750	Nanophysics (6)

# Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 3 or above in HKDSE Physics or equivalent to take this minor. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

#### Remarks

[previous title: Modern physics (6)]

[previous title: Waves and optics (6)]

Minor Title Minor in Physics

Offered to students 2016

admitted to Year 1 in

### **Objectives:**

The Minor in Physics is intended to provide interested students with a fundamental outlook on the subject. Students would acquire a taste of the subject through a large selection of elective courses which provides them to pursue a wide range of topics from the very small scale of nanomaterials to the large scale of astrophysics.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with fundamental knowledge in physics (by means of coursework and tutorial classes in the curriculum)
- PLO 2: analyze some physics problems qualitatively and quantitatively (by means of coursework, tutorial classes and laboratory works in the curriculum)
- PLO 3: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)

### Impermissible Combinations:

Major in Mathematics/Physics

Major in Physics

Major in Physics (Intensive)

### Required courses (42 credits)

# 1. Introductory level courses (18 credits)

# **Disciplinary Core Courses (18 credits)**

PHYS1250 Fundamental physics (6)
PHYS2250 Introductory mechanics (6)
PHYS2265 Introductory quantum physics (6)

# 2. Advanced level courses (24 credits)

### **Disciplinary Electives (24 credits)**

At least 24 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

List A

PHYS3150 Theoretical physics (6)
PHYS3151 Machine learning in physics (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)
PHYS3450 Electromagnetism (6)

PHYS3550 Statistical mechanics & thermodynamics (6) PHYS3551 Introductory solid state physics (6)

PHYS3551 Introductory solid state physics
PHYS3650 Observational astronomy (6)
PHYS3651 The physical universe (6)
PHYS3652 Principles of astronomy (6)
PHYS3653 Astrophysics (6)
PHYS3660 Astronomy laboratory (6)
PHYS3750 Laser and spectroscopy (6)

PHYS3660 Astronomy laboratory (6)
PHYS3750 Laser and spectroscopy (6)
PHYS3751 Physics of nanomaterials (6)
PHYS3760 Physics laboratory (6)
PHYS3850 Physical Optics (6)

PHYS3851 Atomic and nuclear physics (6)
PHYS3999 Directed studies in physics (6)
PHYS4150 Computational physics (6)

PHYS4150 Computational physics (6)
PHYS4151 Data analysis and modeling in physics (6)
PHYS4350 Advanced classical mechanics (6)
PHYS4351 Advanced quantum mechanics (6)
PHYS4450 Advanced electromagnetism (6)

PHYS4550 Advanced statistical mechanics (6)
PHYS4551 Solid state physics (6)
PHYS4650 Stellar physics (6)

PHYS4651 Selected topics in astrophysics (6)

PHYS4652 Planetary science (6) Cosmology (6) PHYS4653 General relativity (6) **PHYS4654** Interstellar medium (6) PHYS4655 **PHYS4656** Advanced astrophysics (6) PHYS4750 Experimental physics (6) Particle physics (6) **PHYS4850** PHYS4966 Physics internship (6) PHYS4999 Physics project (12)

PHYS7350 Graduate classical mechanics (6)
PHYS7351 Graduate quantum mechanics (6)
PHYS7450 Graduate electromagnetism (6)
PHYS7550 Graduate statistical mechanics (6)
PHYS7551 Graduate solid state physics (6)

PHYS7650	Stellar atmospheres (6)
PHYS7750	Nanophysics (6)

# Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 3 or above in HKDSE Physics or equivalent to take this minor. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

#### Remarks

[previous title: Modern physics (6)]

Minor Title Minor in Physics

Offered to students 2015

admitted to Year 1 in

### **Objectives:**

The Minor in Physics is intended to provide interested students with a fundamental outlook on the subject. Students would acquire a taste of the subject through a large selection of elective courses which provides them to pursue a wide range of topics from the very small scale of nanomaterials to the large scale of astrophysics.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with fundamental knowledge in physics (by means of coursework and tutorial classes in the curriculum)
- PLO 2: analyze some physics problems qualitatively and quantitatively (by means of coursework, tutorial classes and laboratory works in the curriculum)
- PLO 3: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)

### Impermissible Combinations:

Major in Mathematics/Physics

Major in Physics

# Required courses (42 credits)

# 1. Introductory level courses (18 credits)

**Disciplinary Core Courses (18 credits)** 

PHYS1250 Fundamental physics (6)
PHYS2250 Introductory mechanics (6)
PHYS2265 Introductory quantum physics (6)

2. Advanced level courses (24 credits)

# **Disciplinary Electives (24 credits)**

At least 24 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

List A

PHYS3150 Theoretical physics (6)
PHYS3151 Machine learning in physics (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)
PHYS3450 Electromagnetism (6)

PHYS3550 Statistical mechanics & thermodynamics (6)

PHYS3551 Introductory solid state physics (6)
PHYS3650 Observational astronomy (6)
PHYS3651 The physical universe (6)
PHYS3652 Principles of astronomy (6)
PHYS3653 Astrophysics (6)

PHYS3660 Astronomy laboratory (6)
PHYS3750 Laser and spectroscopy (6)
PHYS3751 Physics of nanomaterials (6)
PHYS3760 Physics laboratory (6)
PHYS3760 Physical Optics (6)

PHYS3850 Physical Optics (6) [previous title: Waves and optics (6)]

PHYS3851 Atomic and nuclear physics (6)
PHYS3999 Directed studies in physics (6)
PHYS4150 Computational physics (6)

PHYS4151 Data analysis and modeling in physics (6)
PHYS4350 Advanced classical mechanics (6)
PHYS4351 Advanced quantum mechanics (6)
PHYS4450 Advanced electromagnetism (6)
PHYS4550 Advanced statistical mechanics (6)

PHYS4551 Solid state physics (6)
PHYS4650 Stellar physics (6)

PHYS4651 Selected topics in astrophysics (6)

PHYS4652 Planetary science (6) PHYS4653 Cosmology (6) **PHYS4654** General relativity (6) Interstellar medium (6) **PHYS4655** Advanced astrophysics (6) PHYS4656 PHYS4750 Experimental physics (6) PHYS4850 Particle physics (6) Physics internship (6) **PHYS4966** PHYS4999 Physics project (12)

PHYS7350 Graduate classical mechanics (6)
PHYS7351 Graduate quantum mechanics (6)
PHYS7450 Graduate electromagnetism (6)
PHYS7550 Graduate statistical mechanics (6)
PHYS7551 Graduate solid state physics (6)
PHYS7650 Stellar atmospheres (6)

PHYS7750 Nanophysics (6)

#### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students must have level 3 or above in HKDSE Physics or equivalent to take this minor. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

#### Remarks

[previous title: Modern physics (6)]

[previous title: Waves and optics (6)]

Minor Title Minor in Physics

Offered to students 2014

admitted to Year 1 in

### **Objectives:**

The Minor in Physics is intended to provide interested students with a fundamental outlook on the subject. Students would acquire a taste of the subject through a large selection of elective courses which provides them to pursue a wide range of topics from the very small scale of nanomaterials to the large scale of astrophysics.

# **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with fundamental knowledge in physics (by means of coursework and tutorial classes in the curriculum)
- PLO 2: analyze some physics problems qualitatively and quantitatively (by means of coursework, tutorial classes and laboratory works in the curriculum)
- PLO 3: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)

### Impermissible Combinations:

Major in Mathematics/Physics

Major in Physics

# Required courses (42 credits)

# 1. Introductory level courses (18 credits)

**Disciplinary Core Courses (18 credits)** 

PHYS1250 Fundamental physics (6)
PHYS2250 Introductory mechanics (6)
PHYS2265 Introductory quantum physics (6)

# 2. Advanced level courses (24 credits)

# **Disciplinary Electives (24 credits)**

At least 24 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

PHYS3150 Theoretical physics (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)
PHYS3450 Electromagnetism (6)

PHYS3550 Statistical mechanics & thermodynamics (6)

PHYS3551 Introductory solid state physics (6)
PHYS3650 Observational astronomy (6)
PHYS3651 The physical universe (6)
PHYS3652 Principles of astronomy (6)
PHYS3750 Laser and spectroscopy (6)
PHYS3751 Physics of nanomaterials (6)

PHYS3850 Physical Optics (6)
PHYS3851 Atomic and nuclear physics (6)
PHYS3850 Physical Optics (6)

PHYS3999 Directed studies in physics (6) PHYS4150 Computational physics (6)

PHYS4151 Data analysis and modeling in physics (6)
PHYS4350 Advanced classical mechanics (6)
PHYS4351 Advanced quantum mechanics (6)
PHYS4450 Advanced electromagnetism (6)
PHYS4550 Advanced statistical mechanics (6)

PHYS4551 Solid state physics (6) PHYS4650 Stellar physics (6)

PHYS4651 Selected topics in astrophysics (6)

Planetary science (6) PHYS4652 Cosmology (6) PHYS4653 General relativity (6) **PHYS4654 PHYS4655** Interstellar medium (6) PHYS4750 Experimental physics (6) PHYS4850 Particle physics (6) PHYS4966 Physics internship (6) Physics project (12) PHYS4999

PHYS4999 Physics project (12)
PHYS7350 Graduate classical mechanics (6)
PHYS7351 Graduate quantum mechanics (6)
PHYS7450 Graduate electromagnetism (6)
PHYS7550 Graduate statistical mechanics (6)
PHYS7551 Graduate solid state physics (6)
PHYS7650 Stellar atmospheres (6)
PHYS7750 Nanophysics (6)

### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For

details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc

2. Students must have level 3 or above in HKDSE Physics or equivalent to take this minor. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

[previous title: Modern physics (6)]

Minor Title Minor in Physics

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

The Minor in Physics is intended to provide interested students with a fundamental outlook on the subject. Students would acquire a taste of the subject through a large selection of elective courses which provides them to pursue a wide range of topics from the very small scale of nanomaterials to the large scale of astrophysics.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with fundamental knowledge in physics (by means of coursework and tutorial classes in the curriculum)
- PLO 2: analyze some physics problems qualitatively and quantitatively (by means of coursework, tutorial classes and laboratory works in the curriculum)
- PLO 3: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Major in Mathematics/Physics

Major in Physics

### Required courses (42 credits)

#### 1. Introductory level courses (18 credits)

### **Disciplinary Core Courses (18 credits)**

PHYS1250 Fundamental physics (6)
PHYS2250 Introductory mechanics (6)
PHYS2265 Introductory quantum physics (6)

## 2. Advanced level courses (24 credits)

### **Disciplinary Electives (24 credits)**

At least 24 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

PHYS3150 Theoretical physics (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)
PHYS3450 Electromagnetism (6)

PHYS3550 Statistical mechanics & thermodynamics (6)

PHYS3551 Introductory solid state physics (6)
PHYS3650 Observational astronomy (6)
PHYS3651 The physical universe (6)
PHYS3652 Principles of astronomy (6)
PHYS3750 Laser and spectroscopy (6)
PHYS3751 Physics of nanomaterials (6)

PHYS3850 Physical Optics (6) [previous title: Waves and optics (6)]
PHYS3851 Atomic and nuclear physics (6)

PHYS3999 Directed studies in physics (6)
PHYS4150 Computational physics (6)
PHYS4151 Data analysis and modeling in physics (6)

PHYS4350 Advanced classical mechanics (6)
PHYS4351 Advanced quantum mechanics (6)
PHYS4450 Advanced electromagnetism (6)
PHYS4550 Advanced statistical mechanics (6)

PHYS4551 Solid state physics (6) PHYS4650 Stellar physics (6)

PHYS4651 Selected topics in astrophysics (6)

Planetary science (6) PHYS4652 Cosmology (6) PHYS4653 General relativity (6) **PHYS4654 PHYS4655** Interstellar medium (6) PHYS4750 Experimental physics (6) PHYS4850 Particle physics (6) PHYS4966 Physics internship (6) Physics project (12) PHYS4999

PHYS4999 Physics project (12)
PHYS7350 Graduate classical mechanics (6)
PHYS7351 Graduate quantum mechanics (6)
PHYS7450 Graduate electromagnetism (6)
PHYS7550 Graduate statistical mechanics (6)
PHYS7551 Graduate solid state physics (6)
PHYS7650 Stellar atmospheres (6)
PHYS7750 Nanophysics (6)

### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For

details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc

2. Students must have level 3 or above in HKDSE Physics or equivalent to take this minor. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

[previous title: Modern physics (6)]

[previous title: Waves and optics (6)]

Minor Title Minor in Physics

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

The Minor in Physics is intended to provide interested students with a fundamental outlook on the subject. Students would acquire a taste of the subject through a large selection of elective courses which provides them to pursue a wide range of topics from the very small scale of nanomaterials to the large scale of astrophysics.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: identify and describe physical systems with fundamental knowledge in physics (by means of coursework and tutorial classes in the curriculum)
- PLO 2: analyze some physics problems qualitatively and quantitatively (by means of coursework, tutorial classes and laboratory works in the curriculum)
- PLO 3: communicate and collaborate with people effectively in scientific issues (by means of group projects, tutorial sessions and presentation opportunities in the curriculum)

#### Impermissible Combinations:

Major in Mathematics/Physics

Major in Physics

### Required courses (42 credits)

#### 1. Introductory level courses (18 credits)

**Disciplinary Core Courses (18 credits)** 

PHYS1250 Fundamental physics (6)
PHYS2250 Introductory mechanics (6)
PHYS2265 Introductory quantum physics (6)

## 2. Advanced level courses (24 credits)

### **Disciplinary Electives (24 credits)**

At least 24 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level), subject to prerequisite requirements. The current course list includes courses in List A:

PHYS3150 Theoretical physics (6)
PHYS3350 Classical mechanics (6)
PHYS3351 Quantum mechanics (6)
PHYS3450 Electromagnetism (6)

PHYS3550 Statistical mechanics & thermodynamics (6)

PHYS3551 Introductory solid state physics (6)
PHYS3650 Observational astronomy (6)
PHYS3651 The physical universe (6)
PHYS3652 Principles of astronomy (6)
PHYS3750 Laser and spectroscopy (6)
PHYS3751 Physics of nanomaterials (6)

PHYS3850 Physical Optics (6)
PHYS3851 Atomic and nuclear physics (6)

PHYS3999 Directed studies in physics (6) PHYS4150 Computational physics (6)

PHYS4151 Data analysis and modeling in physics (6)
PHYS4350 Advanced classical mechanics (6)
PHYS4351 Advanced quantum mechanics (6)
PHYS4450 Advanced electromagnetism (6)
PHYS4550 Advanced statistical mechanics (6)

PHYS4551 Solid state physics (6) PHYS4650 Stellar physics (6)

PHYS4651 Selected topics in astrophysics (6)

Planetary science (6) PHYS4652 Cosmology (6) PHYS4653 General relativity (6) **PHYS4654 PHYS4655** Interstellar medium (6) PHYS4750 Experimental physics (6) PHYS4850 Particle physics (6) PHYS4966 Physics internship (6) Physics project (12) PHYS4999

PHYS4999 Physics project (12)
PHYS7350 Graduate classical mechanics (6)
PHYS7351 Graduate quantum mechanics (6)
PHYS7450 Graduate electromagnetism (6)
PHYS7550 Graduate statistical mechanics (6)
PHYS7551 Graduate solid state physics (6)
PHYS7650 Stellar atmospheres (6)
PHYS7750 Nanophysics (6)

### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For

details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc

2. Students must have level 3 or above in HKDSE Physics or equivalent to take this minor. Students who do not fulfill this requirement are advised to take PHYS1240 Physics by inquiry.

Offered to students 2021

admitted to Year 1 in

#### Objectives:

The Minor in Plant Science is offered to students who are fascinated by the diversity and beauty of plants and the molecular mechanisms underlying their growth and development. Knowledge in plant science is essential for tackling daily-life issues such as the production of high-quality food, utilization of plant products as biofuels and extraction of beneficial phytochemicals. Recent advances in plant genetic engineering have also allowed scientists to manipulate plant growth and development for nutritional and environmental benefits. This minor aims to provide broad training in the biology of plants from the molecular to the organism level as well as the agricultural and nutritional applications of plants and plant-derived products.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate plants as an important part in our culture and their functions and roles in food, nutrition, and environment (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)
- PLO 2: understand and describe the fundamental concepts of plant evolution, anatomy, biochemistry, physiology and biotechnology (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)
- PLO 3: acquire necessary academic and practical skills for careers in government agencies, secondary school teaching and postgraduate research in different disciplines of plant science (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)

### Impermissible Combinations:

NIL

### Required courses (36 credits)

### 1. Introductory level courses (12 credits)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL1110 From molecules to cells (6)
BIOL1309 Evolutionary diversity (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

### 2. Advanced level courses (24 credits)

### **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

BIOL3107 Plant physiology (6)

BIOL3210 Grain production and utilization (6) BIOL3314 Plant structure and evolution (6)

BIOL3408 Genetics (6)
BIOL4209 Functional foods (6)

BIOL4411 Plant and food biotechnology (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

### Remarks:

Offered to students 2020

admitted to Year 1 in

#### **Objectives:**

The Minor in Plant Science is offered to students who are fascinated by the diversity and beauty of plants and the molecular mechanisms underlying their growth and development. Knowledge in plant science is essential for tackling daily-life issues such as the production of high-quality food, utilization of plant products as biofuels and extraction of beneficial phytochemicals. Recent advances in plant genetic engineering have also allowed scientists to manipulate plant growth and development for nutritional and environmental benefits. This minor aims to provide broad training in the biology of plants from the molecular to the organism level as well as the agricultural and nutritional applications of plants and plant-derived products.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate plants as an important part in our culture and their functions and roles in food, nutrition, and environment (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)
- PLO 2: understand and describe the fundamental concepts of plant evolution, anatomy, biochemistry, physiology and biotechnology (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)
- PLO 3: acquire necessary academic and practical skills for careers in government agencies, secondary school teaching and postgraduate research in different disciplines of plant science (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)

### Impermissible Combinations:

NII

#### Required courses (36 credits)

### 1. Introductory level courses (12 credits)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL1110 From molecules to cells (6)
BIOL1309 Evolutionary diversity (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

### 2. Advanced level courses (24 credits)

### **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

BIOL3107 Plant physiology (6)

BIOL3210 Grain production and utilization (6)
BIOL3314 Plant structure and evolution (6)

BIOL3408 Genetics (6)
BIOL4209 Functional foods (6)

BIOL4411 Plant and food biotechnology (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

### Remarks:

Offered to students 2019

admitted to Year 1 in

#### **Objectives:**

The Minor in Plant Science is offered to students who are fascinated by the diversity and beauty of plants and the molecular mechanisms underlying their growth and development. Knowledge in plant science is essential for tackling daily-life issues such as the production of high-quality food, utilization of plant products as biofuels and extraction of beneficial phytochemicals. Recent advances in plant genetic engineering have also allowed scientists to manipulate plant growth and development for nutritional and environmental benefits. This minor aims to provide broad training in the biology of plants from the molecular to the organism level as well as the agricultural and nutritional applications of plants and plant-derived products.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate plants as an important part in our culture and their functions and roles in food, nutrition, and environment (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)
- PLO 2: understand and describe the fundamental concepts of plant evolution, anatomy, biochemistry, physiology and biotechnology (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)
- PLO 3: acquire necessary academic and practical skills for careers in government agencies, secondary school teaching and postgraduate research in different disciplines of plant science (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)

### Impermissible Combinations:

NIL

#### Required courses (36 credits)

### 1. Introductory level courses (12 credits)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL1110 From molecules to cells (6)
BIOL1309 Evolutionary diversity (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

### 2. Advanced level courses (24 credits)

### **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

BIOL3107 Plant physiology (6)

BIOL3210 Grain production and utilization (6)
BIOL3314 Plant structure and evolution (6)

BIOL3408 Genetics (6)
BIOL4209 Functional foods (6)

BIOL4411 Plant and food biotechnology (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

### Remarks:

Offered to students 2018

admitted to Year 1 in

#### **Objectives:**

The Minor in Plant Science is offered to students who are fascinated by the diversity and beauty of plants and the molecular mechanisms underlying their growth and development. Knowledge in plant science is essential for tackling daily-life issues such as the production of high-quality food, utilization of plant products as biofuels and extraction of beneficial phytochemicals. Recent advances in plant genetic engineering have also allowed scientists to manipulate plant growth and development for nutritional and environmental benefits. This minor aims to provide broad training in the biology of plants from the molecular to the organism level as well as the agricultural and nutritional applications of plants and plant-derived products.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate plants as an important part in our culture and their functions and roles in food, nutrition, and environment (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)
- PLO 2: understand and describe the fundamental concepts of plant evolution, anatomy, biochemistry, physiology and biotechnology (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)
- PLO 3: acquire necessary academic and practical skills for careers in government agencies, secondary school teaching and postgraduate research in different disciplines of plant science (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)

### Impermissible Combinations:

NIL

### Required courses (36 credits)

### 1. Introductory level courses (12 credits)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL1110 From molecules to cells (6)
BIOL1309 Evolutionary diversity (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

### 2. Advanced level courses (24 credits)

### **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

BIOL3107 Plant physiology (6)

BIOL3210 Grain production and utilization (6)
BIOL3314 Plant structure and evolution (6)

BIOL3408 Genetics (6)
BIOL4209 Functional foods (6)

BIOL4411 Plant and food biotechnology (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

### Remarks:

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

The Minor in Plant Science is offered to students who are fascinated by the diversity and beauty of plants and the molecular mechanisms underlying their growth and development. Knowledge in plant science is essential for tackling daily-life issues such as the production of high-quality food, utilization of plant products as biofuels and extraction of beneficial phytochemicals. Recent advances in plant genetic engineering have also allowed scientists to manipulate plant growth and development for nutritional and environmental benefits. This minor aims to provide broad training in the biology of plants from the molecular to the organism level as well as the agricultural and nutritional applications of plants and plant-derived products.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate plants as an important part in our culture and their functions and roles in food, nutrition, and environment (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)
- PLO 2: understand and describe the fundamental concepts of plant evolution, anatomy, biochemistry, physiology and biotechnology (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)
- PLO 3: acquire necessary academic and practical skills for careers in government agencies, secondary school teaching and postgraduate research in different disciplines of plant science (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)

### Impermissible Combinations:

NIL

#### Required courses (36 credits)

### 1. Introductory level courses (12 credits)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL1110 From molecules to cells (6)
BIOL1309 Evolutionary diversity (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

### 2. Advanced level courses (24 credits)

### **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

BIOL3107 Plant physiology (6)

BIOL3210 Grain production and utilization (6)
BIOL3314 Plant structure and evolution (6)

BIOL3408 Genetics (6)
BIOL4209 Functional foods (6)

BIOL4411 Plant and food biotechnology (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

### Remarks:

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

The Minor in Plant Science is offered to students who are fascinated by the diversity and beauty of plants and the molecular mechanisms underlying their growth and development. Knowledge in plant science is essential for tackling daily-life issues such as the production of high-quality food, utilization of plant products as biofuels and extraction of beneficial phytochemicals. Recent advances in plant genetic engineering have also allowed scientists to manipulate plant growth and development for nutritional and environmental benefits. This minor aims to provide broad training in the biology of plants from the molecular to the organism level as well as the agricultural and nutritional applications of plants and plant-derived products.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate plants as an important part in our culture and their functions and roles in food, nutrition, and environment (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)
- PLO 2: understand and describe the fundamental concepts of plant evolution, anatomy, biochemistry, physiology and biotechnology (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)
- PLO 3: acquire necessary academic and practical skills for careers in government agencies, secondary school teaching and postgraduate research in different disciplines of plant science (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)

### Impermissible Combinations:

NIL

#### Required courses (36 credits)

### 1. Introductory level courses (12 credits)

## Disciplinary Electives (12 credits)

At least 12 credits selected from the following courses:

BIOL1110 From molecules to cells (6)
BIOL1309 Evolutionary diversity (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

### 2. Advanced level courses (24 credits)

### **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

BIOL3107 Plant physiology (6)

BIOL3210 Grain production and utilization (6) BIOL3314 Plant structure and evolution (6)

BIOL3408 Genetics (6)
BIOL4209 Functional foods (6)

BIOL4411 Plant and food biotechnology (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

### Remarks:

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

The Minor in Plant Science is offered to students who are fascinated by the diversity and beauty of plants and the molecular mechanisms underlying their growth and development. Knowledge in plant science is essential for tackling daily-life issues such as the production of high-quality food, utilization of plant products as biofuels and extraction of beneficial phytochemicals. Recent advances in plant genetic engineering have also allowed scientists to manipulate plant growth and development for nutritional and environmental benefits. This minor aims to provide broad training in the biology of plants from the molecular to the organism level as well as the agricultural and nutritional applications of plants and plant-derived products.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate plants as an important part in our culture and their functions and roles in food, nutrition, and environment (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)
- PLO 2: understand and describe the fundamental concepts of plant evolution, anatomy, biochemistry, physiology and biotechnology (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)
- PLO 3: acquire necessary academic and practical skills for careers in government agencies, secondary school teaching and postgraduate research in different disciplines of plant science (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)

### Impermissible Combinations:

NIL

### Required courses (36 credits)

### 1. Introductory level courses (12 credits)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL1110 From molecules to cells (6)
BIOL1309 Evolutionary diversity (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

### 2. Advanced level courses (24 credits)

### **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

BIOL3107 Plant physiology (6)

BIOL3210 Grain production and utilization (6) BIOL3314 Plant structure and evolution (6)

BIOL3408 Genetics (6)
BIOL4209 Functional foods (6)

BIOL4411 Plant and food biotechnology (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

### Remarks:

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

The Minor in Plant Science is offered to students who are fascinated by the diversity and beauty of plants and the molecular mechanisms underlying their growth and development. Knowledge in plant science is essential for tackling daily-life issues such as the production of high-quality food, utilization of plant products as biofuels and extraction of beneficial phytochemicals. Recent advances in plant genetic engineering have also allowed scientists to manipulate plant growth and development for nutritional and environmental benefits. This minor aims to provide broad training in the biology of plants from the molecular to the organism level as well as the agricultural and nutritional applications of plants and plant-derived products.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate plants as an important part in our culture and their functions and roles in food, nutrition, and environment (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)
- PLO 2: understand and describe the fundamental concepts of plant evolution, anatomy, biochemistry, physiology and biotechnology (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the
- PLO 3: acquire necessary academic and practical skills for careers in government agencies, secondary school teaching and postgraduate research in different disciplines of plant science (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)

### Impermissible Combinations:

NIL

#### Required courses (36 credits)

### 1. Introductory level courses (12 credits)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL1110 From molecules to cells (6) Evolutionary diversity (6)

BIOL1309

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

### 2. Advanced level courses (24 credits)

### **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

BIOL3107 Plant physiology (6)

Grain production and utilization (6) BIOL3210 Plant structure and evolution (6) **BIOL3314** 

BIOL3408 Genetics (6) Functional foods (6) BIOL4209

BIOL4411 Plant and food biotechnology (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc

### Remarks:

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

The Minor in Plant Science is offered to students who are fascinated by the diversity and beauty of plants and the molecular mechanisms underlying their growth and development. Knowledge in plant science is essential for tackling daily-life issues such as the production of high-quality food, utilization of plant products as biofuels and extraction of beneficial phytochemicals. Recent advances in plant genetic engineering have also allowed scientists to manipulate plant growth and development for nutritional and environmental benefits. This minor aims to provide broad training in the biology of plants from the molecular to the organism level as well as the agricultural and nutritional applications of plants and plant-derived products.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate plants as an important part in our culture and their functions and roles in food, nutrition, and environment (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)
- PLO 2: understand and describe the fundamental concepts of plant evolution, anatomy, biochemistry, physiology and biotechnology (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)
- PLO 3: acquire necessary academic and practical skills for careers in government agencies, secondary school teaching and postgraduate research in different disciplines of plant science (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)

### Impermissible Combinations:

NIL

#### Required courses (36 credits)

### 1. Introductory level courses (12 credits)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL1110 From molecules to cells (6)
BIOL1309 Evolutionary diversity (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

### 2. Advanced level courses (24 credits)

### **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

BIOL3107 Plant physiology (6)

BIOL3210 Grain production and utilization (6)
BIOL3314 Plant structure and evolution (6)

BIOL3408 Genetics (6)
BIOL4209 Functional foods (6)

BIOL4411 Plant and food biotechnology (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

### Remarks:

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

The Minor in Plant Science is offered to students who are fascinated by the diversity and beauty of plants and the molecular mechanisms underlying their growth and development. Knowledge in plant science is essential for tackling daily-life issues such as the production of high-quality food, utilization of plant products as biofuels and extraction of beneficial phytochemicals. Recent advances in plant genetic engineering have also allowed scientists to manipulate plant growth and development for nutritional and environmental benefits. This minor aims to provide broad training in the biology of plants from the molecular to the organism level as well as the agricultural and nutritional applications of plants and plant-derived products.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: appreciate plants as an important part in our culture and their functions and roles in food, nutrition, and environment (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)
- PLO 2: understand and describe the fundamental concepts of plant evolution, anatomy, biochemistry, physiology and biotechnology (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)
- PLO 3: acquire necessary academic and practical skills for careers in government agencies, secondary school teaching and postgraduate research in different disciplines of plant science (by means of coursework, labtoratory-based, and tutorial class and project-based learning in the curriculum)

### Impermissible Combinations:

NIL

#### Required courses (36 credits)

### 1. Introductory level courses (12 credits)

### **Disciplinary Electives (12 credits)**

At least 12 credits selected from the following courses:

BIOL1110 From molecules to cells (6)
BIOL1309 Evolutionary diversity (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2220 Principles of biochemistry (6)

### 2. Advanced level courses (24 credits)

### **Disciplinary Electives (24 credits)**

At least 24 credits selected from the following courses:

BIOL3107 Plant physiology (6)

BIOL3210 Grain production and utilization (6)
BIOL3314 Plant structure and evolution (6)

BIOL3408 Genetics (6)
BIOL4209 Functional foods (6)

BIOL4411 Plant and food biotechnology (6)

#### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

### Remarks:

Offered to students 2021

admitted to Year 1 in

#### **Objectives:**

The Minor in Risk Management aims to provide interested students with basic concepts of risk management and fundamental skills of employing various statistical techniques for managing risk. The minor curriculum is particularly designed for students from different majors to enhance their interests in Risk Management or to complement their major of study.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: acquire basic understanding and identify the generic risk management issues and techniques (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply elementary methods and models for risk assessment and management (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: acquire and interpret relevant data and information for risk management (by means of coursework, tutorial classes and project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Risk Management

Major in Statistics

Minor in Statistics

#### Required courses (42 credits)

### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits from List A and List B, with at least 6 credits from List B:

List A

STAT1601 Elementary statistical methods (6)
STAT1602 Business statistics (6)
STAT1603 Introductory statistics (6)
STAT2601 Probability and statistics I (6)

List B

STAT2602 Probability and statistics II (6) STAT2603 Data management with SAS (6)

STAT2604 Introduction to R programming and elementary data analysis

(6)

### 2. Advanced level courses (30 credits)

# Disciplinary Electives (30 credits) At least 30 credits selected from the following courses:

STAT3609 The statistics of investment risk (6) STAT3610 Risk management and insurance (6) Computer-aided data analysis (6) STAT3611 STAT3612 Statistical machine learning (6) Business forecasting (6) STAT3614 Practical mathematics for investment (6) STAT3615 STAT3618 Derivatives and risk management (6) Time-series analysis (6) STAT4601 STAT4603 Current topics in risk management (6) Risk management and Basel Accords in banking and finance STAT4606

(6)

STAT4607 Credit risk analysis (6) STAT4608 Market risk analysis (6)

### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Offered to students 2020

admitted to Year 1 in

#### **Objectives:**

The Minor in Risk Management aims to provide interested students with basic concepts of risk management and fundamental skills of employing various statistical techniques for managing risk. The minor curriculum is particularly designed for students from different majors to enhance their interests in Risk Management or to complement their major of study.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: acquire basic understanding and identify the generic risk management issues and techniques (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply elementary methods and models for risk assessment and management (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: acquire and interpret relevant data and information for risk management (by means of coursework, tutorial classes and project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Risk Management

Major in Statistics

Minor in Statistics

### Required courses (42 credits)

#### 1. Introductory level courses (12 credits)

### **Disciplinary Electives (12 credits)**

At least 12 credits from List A and List B, with at least 6 credits from List B:

List A

STAT1601 Elementary statistical methods (6)
STAT1602 Business statistics (6)
STAT1603 Introductory statistics (6)
STAT2601 Probability and statistics I (6)

List B

STAT2602 Probability and statistics II (6) STAT2603 Data management with SAS (6)

STAT2604 Introduction to R programming and elementary data analysis

(6)

## 2. Advanced level courses (30 credits)

## Disciplinary Electives (30 credits)

At least 30 credits selected from the following courses:
STAT3609
The statistics of investment risk (6)
STAT3610
Risk management and insurance (6)
STAT3611
Computer-aided data analysis (6)
STAT3612
Statistical machine learning (6)
STAT3614
Business forecasting (6)
STAT3615
Practical mathematics for investment (6)
STAT3618
Derivatives and risk management (6)

STAT4601 Time-series analysis (6) STAT4603 Current topics in risk management (6)

STAT4606 Risk management and Basel Accords in banking and finance

(6)

STAT4607 Credit risk analysis (6) STAT4608 Market risk analysis (6)

### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Offered to students 2019

admitted to Year 1 in

#### **Objectives:**

The Minor in Risk Management aims to provide interested students with basic concepts of risk management and fundamental skills of employing various statistical techniques for managing risk. The minor curriculum is particularly designed for students from different majors to enhance their interests in Risk Management or to complement their major of study.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: acquire basic understanding and identify the generic risk management issues and techniques (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply elementary methods and models for risk assessment and management (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: acquire and interpret relevant data and information for risk management (by means of coursework, tutorial classes and project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Risk Management

Major in Statistics

Minor in Statistics

#### Required courses (42 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits from List A and List B, with at least 6 credits from List B:

List A

STAT1601 Elementary statistical methods (6)
STAT1602 Business statistics (6)
STAT1603 Introductory statistics (6)
STAT2601 Probability and statistics I (6)

List B

STAT2602 Probability and statistics II (6) STAT2603 Data management with SAS (6)

STAT2604 Introduction to R programming and elementary data analysis

(6)

### 2. Advanced level courses (30 credits)

## Disciplinary Electives (30 credits)

At least 30 credits selected from the following courses: STAT3609 The statistics of investment risk (6) Risk management and insurance (6) STAT3610 STAT3611 Computer-aided data analysis (6) STAT3612 Statistical machine learning (6) Business forecasting (6) STAT3614 Practical mathematics for investment (6) STAT3615 STAT3618 Derivatives and risk management (6) STAT4601 Time-series analysis (6)

STAT4603 Current topics in risk management (6)

STAT4606 Risk management and Basel Accords in banking and finance

(6)

STAT4607 Credit risk analysis (6) STAT4608 Market risk analysis (6)

### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

#### Remarks:

Offered to students 2018

admitted to Year 1 in

#### **Objectives:**

The Minor in Risk Management aims to provide interested students with basic concepts of risk management and fundamental skills of employing various statistical techniques for managing risk. The minor curriculum is particularly designed for students from different majors to enhance their interests in Risk Management or to complement their major of study.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: acquire basic understanding and identify the generic risk management issues and techniques (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply elementary methods and models for risk assessment and management (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: acquire and interpret relevant data and information for risk management (by means of coursework, tutorial classes and project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Risk Management

Major in Statistics

Minor in Statistics

### Required courses (42 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits from List A and List B, with at least 6 credits from List B:

List A

STAT1601 Elementary statistical methods (6)
STAT1602 Business statistics (6)
STAT1603 Introductory statistics (6)
STAT2601 Probability and statistics I (6)

List B

STAT2602 Probability and statistics II (6) STAT2603 Data management with SAS (6)

STAT2604 Introduction to R programming and elementary data analysis

(6)

### 2. Advanced level courses (30 credits)

## Disciplinary Electives (30 credits)

At least 30 credits selected from the following courses:
STAT3609
The statistics of investment risk (6)
STAT3610
Risk management and insurance (6)
STAT3611
Computer-aided data analysis (6)
STAT3612
Statistical machine learning (6)
STAT3614
Business forecasting (6)

STAT3615 Practical mathematics for investment (6)
STAT3618 Derivatives and risk management (6)

STAT4601 Time-series analysis (6)

STAT4603 Current topics in risk management (6)

STAT4606 Risk management and Basel Accords in banking and finance

(6)

STAT4607 Credit risk analysis (6) STAT4608 Market risk analysis (6)

### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

[previous title: Data mining (6)]

#### Remarks:

Offered to students 2017

admitted to Year 1 in

#### **Objectives:**

The Minor in Risk Management aims to provide interested students with basic concepts of risk management and fundamental skills of employing various statistical techniques for managing risk. The minor curriculum is particularly designed for students from different majors to enhance their interests in Risk Management or to complement their major of study.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: acquire basic understanding and identify the generic risk management issues and techniques (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply elementary methods and models for risk assessment and management (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: acquire and interpret relevant data and information for risk management (by means of coursework, tutorial classes and project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Risk Management

Major in Statistics

Minor in Statistics

### Required courses (42 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits from List A and List B, with at least 6 credits from List B:

List A

STAT1601 Elementary statistical methods (6)
STAT1602 Business statistics (6)
STAT1603 Introductory statistics (6)
STAT2601 Probability and statistics I (6)

List B

STAT2602 Probability and statistics II (6) STAT2603 Data management with SAS (6)

STAT2604 Introduction to R programming and elementary data analysis

(6)

### 2. Advanced level courses (30 credits)

# Disciplinary Electives (30 credits) At least 30 credits selected from the following courses:

STAT3609 The statistics of investment risk (6)
STAT3610 Risk management and insurance (6)
STAT3611 Computer-aided data analysis (6)
STAT3612 Statistical machine learning (6)
STAT3614 Business forecasting (6)
STAT3645 Residual mathematics for investment (6)

STAT3615 Practical mathematics for investment (6)
STAT3618 Derivatives and risk management (6)
STAT4601 Time-series analysis (6)

STAT4603 Current topics in risk management (6)
STAT4606 Risk management and Basel Accords in banking and finance

(6)

STAT4607 Credit risk analysis (6) STAT4608 Market risk analysis (6)

### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

[previous title: Data mining (6)]

#### Remarks:

Offered to students 2016

admitted to Year 1 in

#### **Objectives:**

The Minor in Risk Management aims to provide interested students with basic concepts of risk management and fundamental skills of employing various statistical techniques for managing risk. The minor curriculum is particularly designed for students from different majors to enhance their interests in Risk Management or to complement their major of study.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: acquire basic understanding and identify the generic risk management issues and techniques (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply elementary methods and models for risk assessment and management (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: acquire and interpret relevant data and information for risk management (by means of coursework, tutorial classes and project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Risk Management

Major in Statistics

Minor in Statistics

#### Required courses (42 credits)

### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits from List A and List B, with at least 6 credits from List B:

List A

STAT1601 Elementary statistical methods (6)
STAT1602 Business statistics (6)
STAT1603 Introductory statistics (6)
STAT2601 Probability and statistics I (6)

List B

STAT3609

STAT2602 Probability and statistics II (6) STAT2603 Data management with SAS (6)

STAT2604 Introduction to R programming and elementary data analysis

The statistics of investment risk (6)

(6)

### 2. Advanced level courses (30 credits)

# Disciplinary Electives (30 credits) At least 30 credits selected from the following courses:

STAT3610 Risk management and insurance (6)
STAT3611 Computer-aided data analysis (6)
STAT3612 Statistical machine learning (6)
STAT3614 Business forecasting (6)
STAT3615 Practical mathematics for investment (6)
STAT3618 Derivatives and risk management (6)

STAT4601 Time-series analysis (6)
STAT4603 Current topics in risk management (6)

STAT4603 Current topics in risk management (6)
STAT4606 Risk management and Basel Accords in banking and finance

(6)

STAT4607 Credit risk analysis (6) STAT4608 Market risk analysis (6)

### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

[previous title: Data mining (6)]

#### Remarks:

Offered to students 2015

admitted to Year 1 in

#### **Objectives:**

The Minor in Risk Management aims to provide interested students with basic concepts of risk management and fundamental skills of employing various statistical techniques for managing risk. The minor curriculum is particularly designed for students from different majors to enhance their interests in Risk Management or to complement their major of study.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: acquire basic understanding and identify the generic risk management issues and techniques (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply elementary methods and models for risk assessment and management (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: acquire and interpret relevant data and information for risk management (by means of coursework, tutorial classes and project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Risk Management

Major in Statistics

Minor in Statistics

#### Required courses (42 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits from List A and List B, with at least 6 credits from List B:

List A

STAT1601 Elementary statistical methods (6) STAT1602 Business statistics (6) Introductory statistics (6) STAT1603 STAT2601 Probability and statistics I (6)

List B

STAT4601

Probability and statistics II (6) STAT2602 Data management with SAS (6) STAT2603

Introduction to R programming and elementary data analysis STAT2604

### 2. Advanced level courses (30 credits)

### **Disciplinary Electives (30 credits)** At least 30 credits selected from the following courses:

STAT3609 The statistics of investment risk (6) Risk management and insurance (6) STAT3610 Computer-aided data analysis (6) STAT3611 STAT3612 Statistical machine learning (6) Business forecasting (6) STAT3614 Practical mathematics for investment (6) STAT3615 STAT3618

Derivatives and risk management (6) Time-series analysis (6)

STAT4603 Current topics in risk management (6)

Risk management and Basel Accords in banking and finance STAT4606

Credit risk analysis (6) STAT4607 STAT4608 Market risk analysis (6)

### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

[previous title: Data mining (6)]

#### Remarks:

Offered to students 2014

admitted to Year 1 in

#### **Objectives:**

The Minor in Risk Management aims to provide interested students with basic concepts of risk management and fundamental skills of employing various statistical techniques for managing risk. The minor curriculum is particularly designed for students from different majors to enhance their interests in Risk Management or to complement their major of study.

#### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: acquire basic understanding and identify the generic risk management issues and techniques (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply elementary methods and models for risk assessment and management (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: acquire and interpret relevant data and information for risk management (by means of coursework, tutorial classes and project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Risk Management

Major in Statistics

Minor in Statistics

### Required courses (42 credits)

### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits from List A and List B, with at least 6 credits from List B:

List A

STAT1601 Elementary statistical methods (6)
STAT1602 Business statistics (6)
STAT1603 Introductory statistics (6)
STAT2601 Probability and statistics I (6)

List B

STAT2602 Probability and statistics II (6) STAT2603 Data management with SAS (6)

STAT2604 Introduction to R programming and elementary data analysis

(6)

### 2. Advanced level courses (30 credits)

# Disciplinary Electives (30 credits) At least 30 credits selected from the following courses:

STAT3609 The statistics of investment risk (6)
STAT3610 Risk management and insurance (6)
STAT3611 Computer-aided data analysis (6)
STAT3612 Statistical machine learning (6)
STAT3614 Business forecasting (6)

STAT3615 Practical mathematics for investment (6)
STAT3618 Derivatives and risk management (6)

STAT4601 Time-series analysis (6)

STAT4603 Current topics in risk management (6)

STAT4606 Risk management and Basel Accords in banking and finance

(6)

STAT4607 Credit risk analysis (6) STAT4608 Market risk analysis (6)

### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

[previous title: Data mining (6)]

#### Remarks:

Offered to students 2013

admitted to Year 1 in

#### **Objectives:**

The Minor in Risk Management aims to provide interested students with basic concepts of risk management and fundamental skills of employing various statistical techniques for managing risk. The minor curriculum is particularly designed for students from different majors to enhance their interests in Risk Management or to complement their major of study.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: acquire basic understanding and identify the generic risk management issues and techniques (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply elementary methods and models for risk assessment and management (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: acquire and interpret relevant data and information for risk management (by means of coursework, tutorial classes and project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Risk Management

Major in Statistics

Minor in Statistics

#### Required courses (42 credits)

#### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits from List A and List B, with at least 6 credits from List B:

List A

STAT1601 Elementary statistical methods (6)

STAT1602 Business statistics (6)
STAT1603 Introductory statistics (6)
STAT2601 Probability and statistics I (6)

List B

STAT2602 Probability and statistics II (6) STAT2603 Data management with SAS (6)

STAT2604 Introduction to R programming and elementary data analysis

(6)

### 2. Advanced level courses (30 credits)

## Disciplinary Electives (30 credits)

At least 30 credits selected from the following courses:
STAT3609 The statistics of investment risk (6)
STAT3610 Risk management and insurance (6)
STAT3611 Computer-aided data analysis (6)
STAT3612 Statistical machine learning (6)

STAT3614 Business forecasting (6)
STAT3615 Practical mathematics for investment (6)
STAT3618 Derivatives and risk management (6)

STAT4601 Time-series analysis (6)

STAT4603 Current topics in risk management (6)

STAT4606 Risk management and Basel Accords in banking and finance

(6

STAT4607 Credit risk analysis (6) STAT4608 Market risk analysis (6)

### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

[previous title: Data mining (6)]

#### Remarks:

Offered to students 2012

admitted to Year 1 in

#### **Objectives:**

The Minor in Risk Management aims to provide interested students with basic concepts of risk management and fundamental skills of employing various statistical techniques for managing risk. The minor curriculum is particularly designed for students from different majors to enhance their interests in Risk Management or to complement their major of study.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: acquire basic understanding and identify the generic risk management issues and techniques (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: apply elementary methods and models for risk assessment and management (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 3: acquire and interpret relevant data and information for risk management (by means of coursework, tutorial classes and project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Risk Management

Major in Statistics

Minor in Statistics

#### Required courses (42 credits)

### 1. Introductory level courses (12 credits)

#### **Disciplinary Electives (12 credits)**

At least 12 credits from List A and List B, with at least 6 credits from List B:

List A

STAT1601 Elementary statistical methods (6)

STAT1602 Business statistics (6)
STAT1603 Introductory statistics (6)
STAT2601 Probability and statistics I (6)

List B

STAT2602 Probability and statistics II (6) STAT2603 Data management with SAS (6)

STAT2604 Introduction to R programming and elementary data analysis

(6

### 2. Advanced level courses (30 credits)

# Disciplinary Electives (30 credits) At least 30 credits selected from the following courses:

STAT3609 The statistics of investment risk (6)
STAT3610 Risk management and insurance (6)
STAT3611 Computer-aided data analysis (6)
STAT3612 Statistical machine learning (6)

STAT3614 Business forecasting (6)
STAT3615 Practical mathematics for investment (6)
STAT3618 Derivatives and risk management (6)

STAT4601 Time-series analysis (6)

STAT4603 Current topics in risk management (6)

STAT4606 Risk management and Basel Accords in banking and finance

(6)

STAT4607 Credit risk analysis (6) STAT4608 Market risk analysis (6)

### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

[previous title: Data mining (6)]

#### Remarks:

Minor Title Minor in Science Entrepreneurship

Offered to students 2021

admitted to Year 1 in

#### Objectives:

This Minor aims at broadening the horizon of our undergraduate students with respect to entrepreneurship, so as to arouse their interest in this aspect and better equip them. It is also important for our students to visualize how their training in science (a) is relevant to the real world and (b) can bring about huge insights via critical analysis of the operation of existing enterprises. With the vivid commercial environment and a growing atmosphere for start-ups both locally and globally, this Minor also serves to offer more competitive edge to our students via connecting their academic knowledge with the real world, even though they may not initiate their own start-ups in the short run.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: apprehend the entrepreneurial process and the principles/models relevant to its different key stages (by means of coursework and tutorial classes in the curriculum)
- PLO 2: gain insights into how a broad range of disciplines contribute to the success of the entrepreneurial process (by means of coursework and tutorial classes in the curriculum)
- PLO 3: evaluate how scientific knowledge can cause impact to the society via entrepreneurship (by means of coursework and tutorial classes in the curriculum)
- PLO 4: develop appropriate action plans for transforming ideas into start-up companies (by means of coursework, tutorial classes and training in his/her internship in the curriculum)
- PLO 5: effectively collaborate with team members with different expertise and communicate their ideas to a range of audiences during the entrepreneurial process (by means of coursework, tutorial classes and training in his/her internship in the curriculum)

### Impermissible Combinations:

NII

### Required courses (36 credits)

#### 1. Introductory level courses (12 credits)

Disciplinary Core Courses (12 credits)

(Resource, Management and Basic Entrepreneurship)
ENTR2001 Professional and leadership development (6)
IIMT1611 Principles of Technology Entrepreneurship (6)

2. Advanced level courses (24 credits) Disciplinary Core Courses (24 credits)

(Creativity and Innovation)

ENTR3001 Science-based innovation development (6)
ENTR3002 Customer analysis and strategic marketing (6)

(Practical Experience)

ENTR4966 Entrepreneurship internship (6)
ENTR4999 Entrepreneurship project (6)

### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students may consider taking the following courses if they wish to pursue a more focused study in topics related to entrepreneurship:BUSI38011 Business Law, BUSI3803 Company Law, STRA3706 China Business Environment.
- 3. Courses with the prefix ENTR are subjected to minor changes.
- 4. Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected primary science major in order to satisfy the degree graduation requirements.

#### Remarks:

Minor Title Minor in Science Entrepreneurship

Offered to students 2020

admitted to Year 1 in

#### Objectives:

This Minor aims at broadening the horizon of our undergraduate students with respect to entrepreneurship, so as to arouse their interest in this aspect and better equip them. It is also important for our students to visualize how their training in science (a) is relevant to the real world and (b) can bring about huge insights via critical analysis of the operation of existing enterprises. With the vivid commercial environment and a growing atmosphere for start-ups both locally and globally, this Minor also serves to offer more competitive edge to our students via connecting their academic knowledge with the real world, even though they may not initiate their own start-ups in the short run.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: apprehend the entrepreneurial process and the principles/models relevant to its different key stages (by means of coursework and tutorial classes in the curriculum)
- PLO 2: gain insights into how a broad range of disciplines contribute to the success of the entrepreneurial process (by means of coursework and tutorial classes in the curriculum)
- PLO 3: evaluate how scientific knowledge can cause impact to the society via entrepreneurship (by means of coursework and tutorial classes in the curriculum)
- PLO 4: develop appropriate action plans for transforming ideas into start-up companies (by means of coursework, tutorial classes and training in his/her internship in the curriculum)
- PLO 5: effectively collaborate with team members with different expertise and communicate their ideas to a range of audiences during the entrepreneurial process (by means of coursework, tutorial classes and training in his/her internship in the curriculum)

### Impermissible Combinations:

### Required courses (36 credits)

### 1. Introductory level courses (12 credits)

### Disciplinary Core Courses (12 credits)

(Resource, Management and Basic Entrepreneurship) Professional and leadership development (6) ENTR2001

Principles of Technology Entrepreneurship (6) **IIMT1611** 

### 2. Advanced level courses (24 credits) **Disciplinary Core Courses (24 credits)**

(Creativity and Innovation)

ENTR3001 Science-based innovation development (6) Customer analysis and strategic marketing (6) FNTR3002

(Practical Experience)

Entrepreneurship internship (6) **ENTR4966** ENTR4999 Entrepreneurship project (6)

### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses
- 2. Students may consider taking the following courses if they wish to pursue a more focused study in topics related to entrepreneurship:BUSI38011 Business Law, BUSI3803 Company Law, STRA3706 China Business Environment.
- 3. Courses with the prefix ENTR are subjected to minor changes.
- 4. Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected primary science major in order to satisfy the degree graduation requirements.

#### Remarks:

Minor Title Minor in Science Entrepreneurship

Offered to students 2019

admitted to Year 1 in

#### **Objectives:**

This Minor aims at broadening the horizon of our undergraduate students with respect to entrepreneurship, so as to arouse their interest in this aspect and better equip them. It is also important for our students to visualize how their training in science (a) is relevant to the real world and (b) can bring about huge insights via critical analysis of the operation of existing enterprises. With the vivid commercial environment and a growing atmosphere for start-ups both locally and globally, this Minor also serves to offer more competitive edge to our students via connecting their academic knowledge with the real world, even though they may not initiate their own start-ups in the short run.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: apprehend the entrepreneurial process and the principles/models relevant to its different key stages (by means of coursework and tutorial classes in the curriculum)
- PLO 2: gain insights into how a broad range of disciplines contribute to the success of the entrepreneurial process (by means of coursework and tutorial classes in the curriculum)
- PLO 3: evaluate how scientific knowledge can cause impact to the society via entrepreneurship (by means of coursework and tutorial classes in the curriculum)
- PLO 4: develop appropriate action plans for transforming ideas into start-up companies (by means of coursework, tutorial classes and training in his/her internship in the curriculum)
- PLO 5: effectively collaborate with team members with different expertise and communicate their ideas to a range of audiences during the entrepreneurial process (by means of coursework, tutorial classes and training in his/her internship in the curriculum)

### Impermissible Combinations:

NII

### Required courses (36 credits)

#### 1. Introductory level courses (12 credits)

### Disciplinary Core Courses (12 credits)

(Resource, Management and Basic Entrepreneurship)
ENTR2001 Professional and leadership development (6)
IIMT1611 Principles of Technology Entrepreneurship (6)

2. Advanced level courses (24 credits) Disciplinary Core Courses (24 credits)

(Creativity and Innovation)

ENTR3001 Science-based innovation development (6)
ENTR3002 Customer analysis and strategic marketing (6)

(Practical Experience)

ENTR4966 Entrepreneurship internship (6)
ENTR4999 Entrepreneurship project (6)

### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students may consider taking the following courses if they wish to pursue a more focused study in topics related to entrepreneurship:BUSI38011 Business Law, BUSI3803 Company Law, STRA3706 China Business Environment.
- 3. Courses with the prefix ENTR are subjected to minor changes.
- 4. Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected primary science major in order to satisfy the degree graduation requirements.

### Remarks:

Minor Title Minor in Science Entrepreneurship

Offered to students 2018

admitted to Year 1 in

#### Objectives:

This Minor aims at broadening the horizon of our undergraduate students with respect to entrepreneurship, so as to arouse their interest in this aspect and better equip them. It is also important for our students to visualize how their training in science (a) is relevant to the real world and (b) can bring about huge insights via critical analysis of the operation of existing enterprises. With the vivid commercial environment and a growing atmosphere for start-ups both locally and globally, this Minor also serves to offer more competitive edge to our students via connecting their academic knowledge with the real world, even though they may not initiate their own start-ups in the short run.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: apprehend the entrepreneurial process and the principles/models relevant to its different key stages (by means of coursework and tutorial classes in the curriculum)
- PLO 2: gain insights into how a broad range of disciplines contribute to the success of the entrepreneurial process (by means of coursework and tutorial classes in the curriculum)
- PLO 3: evaluate how scientific knowledge can cause impact to the society via entrepreneurship (by means of coursework and tutorial classes in the curriculum)
- PLO 4: develop appropriate action plans for transforming ideas into start-up companies (by means of coursework, tutorial classes and training in his/her internship in the curriculum)
- PLO 5: effectively collaborate with team members with different expertise and communicate their ideas to a range of audiences during the entrepreneurial process (by means of coursework, tutorial classes and training in his/her internship in the curriculum)

### Impermissible Combinations:

NII

### Required courses (36 credits)

### 1. Introductory level courses (12 credits)

### Disciplinary Core Courses (12 credits)

(Resource, Management and Basic Entrepreneurship)
ENTR2001 Professional and leadership development (6)
IIMT1611 Principles of Technology Entrepreneurship (6)

2. Advanced level courses (24 credits) Disciplinary Core Courses (24 credits)

(Creativity and Innovation)

ENTR3001 Science-based innovation development (6)
ENTR3002 Customer analysis and strategic marketing (6)

(Practical Experience)

ENTR4966 Entrepreneurship internship (6)
ENTR4999 Entrepreneurship project (6)

### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.
- 2. Students may consider taking the following courses if they wish to pursue a more focused study in topics related to entrepreneurship:BUSI38011 Business Law, BUSI3803 Company Law, STRA3706 China Business Environment.
- 3. Courses with the prefix ENTR are subjected to minor changes.
- 4. Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected primary science major in order to satisfy the degree graduation requirements.

#### Remarks:

Minor Title Minor in Science Entrepreneurship 2017

Offered to students

admitted to Year 1 in

#### Objectives:

This Minor aims at broadening the horizon of our undergraduate students with respect to entrepreneurship, so as to arouse their interest in this aspect and better equip them. It is also important for our students to visualize how their training in science (a) is relevant to the real world and (b) can bring about huge insights via critical analysis of the operation of existing enterprises. With the vivid commercial environment and a growing atmosphere for start-ups both locally and globally, this Minor also serves to offer more competitive edge to our students via connecting their academic knowledge with the real world, even though they may not initiate their own start-ups in the short run.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: apprehend the entrepreneurial process and the principles/models relevant to its different key stages (by means of coursework and tutorial classes in the curriculum)
- PLO 2: gain insights into how a broad range of disciplines contribute to the success of the entrepreneurial process (by means of coursework and tutorial classes in the curriculum)
- PLO 3: evaluate how scientific knowledge can cause impact to the society via entrepreneurship (by means of coursework and tutorial classes in the curriculum)
- PLO 4: develop appropriate action plans for transforming ideas into start-up companies (by means of coursework, tutorial classes and training in his/her internship in the curriculum)
- PLO 5: effectively collaborate with team members with different expertise and communicate their ideas to a range of audiences during the entrepreneurial process (by means of coursework, tutorial classes and training in his/her internship in the curriculum)

### Impermissible Combinations:

### Required courses (36 credits)

### 1. Introductory level courses (12 credits)

### Disciplinary Core Courses (12 credits)

(Resource, Management and Basic Entrepreneurship) Professional and leadership development (6) ENTR2001 Principles of Technology Entrepreneurship (6) **IIMT1611** 

2. Advanced level courses (24 credits) **Disciplinary Core Courses (24 credits)** 

(Creativity and Innovation)

ENTR3001 Science-based innovation development (6) Customer analysis and strategic marketing (6) FNTR3002

(Practical Experience)

Entrepreneurship internship (6) ENTR4966 ENTR4999 Entrepreneurship project (6)

### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses
- 2. Students may consider taking the following courses if they wish to pursue a more focused study in topics related to entrepreneurship: BUSI38011 Business Law, BUSI3803 Company Law, STRA3706 China Business Environment.
- 3. Courses with the prefix ENTR are subjected to minor changes.
- 4. Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected primary science major in order to satisfy the degree graduation requirements.

#### Remarks:

Minor Title Minor in Science Entrepreneurship 2016

Offered to students

admitted to Year 1 in

#### Objectives:

This Minor aims at broadening the horizon of our undergraduate students with respect to entrepreneurship, so as to arouse their interest in this aspect and better equip them. It is also important for our students to visualize how their training in science (a) is relevant to the real world and (b) can bring about huge insights via critical analysis of the operation of existing enterprises. With the vivid commercial environment and a growing atmosphere for start-ups both locally and globally, this Minor also serves to offer more competitive edge to our students via connecting their academic knowledge with the real world, even though they may not initiate their own start-ups in the short run.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: apprehend the entrepreneurial process and the principles/models relevant to its different key stages (by means of coursework and tutorial classes in the curriculum)
- PLO 2: gain insights into how a broad range of disciplines contribute to the success of the entrepreneurial process (by means of coursework and tutorial classes in the curriculum)
- PLO 3: evaluate how scientific knowledge can cause impact to the society via entrepreneurship (by means of coursework and tutorial classes in the curriculum)
- PLO 4: develop appropriate action plans for transforming ideas into start-up companies (by means of coursework, tutorial classes and training in his/her internship in the curriculum)
- PLO 5: effectively collaborate with team members with different expertise and communicate their ideas to a range of audiences during the entrepreneurial process (by means of coursework, tutorial classes and training in his/her internship in the curriculum)

### Impermissible Combinations:

### Required courses (36 credits)

#### 1. Introductory level courses (12 credits)

Disciplinary Core Courses (12 credits)

(Resource, Management and Basic Entrepreneurship) Professional and leadership development (6) ENTR2001 Principles of Technology Entrepreneurship (6) **IIMT1611** 

2. Advanced level courses (24 credits) **Disciplinary Core Courses (24 credits)** 

(Creativity and Innovation)

ENTR3001 Science-based innovation development (6) Customer analysis and strategic marketing (6) FNTR3002

(Practical Experience)

Entrepreneurship internship (6) ENTR4966 ENTR4999 Entrepreneurship project (6)

### Notes:

- 1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses
- 2. Students may consider taking the following courses if they wish to pursue a more focused study in topics related to entrepreneurship: BUSI38011 Business Law, BUSI3803 Company Law, STRA3706 China Business Environment.
- 3. Courses with the prefix ENTR are subjected to minor changes.
- 4. Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected primary science major in order to satisfy the degree graduation requirements.

#### Remarks:

Minor Title Minor in Statistics

Offered to students 2021

admitted to Year 1 in

#### Objectives:

The curriculum of the Minor in Statistics is structured specifically to cater for the general need of non-statistical disciplines and provide basic training in statistical methodologies and their applications to practical problems. It aims to provide students with a strong and rigorous sense of quantitative reasoning that has become an indispensable skill in nearly all disciplines.

### Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: acquire basic statistical knowledge alongside their major disciplines, with emphases on correct applications of statistical methods and insightful interpretations of statistical findings (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: equip with computational skills essential to conducting complete data analyses (by means of coursework, tutorial classes, project-based learning and presentation opportunities in the curriculum)
- PLO 3: participate proactively in large-scale, multi-disciplinary studies, determine objective findings, and provide guidance on all aspects of data collection and analyses (by means of coursework, tutorial classes and project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Risk Management

Major in Statistics

Minor in Risk Management

### Required courses (42 credits)

### 1. Introductory level courses (12 credits)

### **Disciplinary Electives (12 credits)**

At least 12 credits from List A and List B, with at least 6 credits from List B:

List A STAT1601 Elementary statistical methods (6) STAT1602 Business statistics (6) STAT1603 Introductory statistics (6) Probability and statistics I (6) STAT2601 List B STAT2602 Probability and statistics II (6)

Data management with SAS (6) STAT2603

Introduction to R programming and elementary data analysis STAT2604

STAT2605 Demographic and socio-economic statistics (6)

### 2. Advanced level courses (30 credits)

### **Disciplinary Electives (30 credits)**

At least 30 credits selected from the following courses:

STAT3600 Linear statistical analysis (6) Statistical inference (6) STAT3602 STAT3603 Stochastic processes (6) STAT3604

Design and analysis of experiments (6) STAT3605 Quality control and management (6) Business logistics (6) STAT3606

Statistics in clinical medicine and bio-medical research (6) STAT3607

STAT3608 Statistical genetics (6)

Computer-aided data analysis (6) STAT3611 Statistical machine learning (6) STAT3612 Marketing analytics (6) STAT3613 Business forecasting (6) STAT3614 STAT3617 Sample survey methods (6) Modern nonparametric statistics (6) STAT3620 STAT3621 Statistical data analysis (6) Survival analysis (6) STAT3655 Time-series analysis (6) STAT4601 STAT4602 Multivariate data analysis (6)

Bayesian learning (6)

STAT4610

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

### Remarks:

Minor Title Minor in Statistics

Offered to students

admitted to Year 1 in

#### **Objectives:**

The curriculum of the Minor in Statistics is structured specifically to cater for the general need of non-statistical disciplines and provide basic training in statistical methodologies and their applications to practical problems. It aims to provide students with a strong and rigorous sense of quantitative reasoning that has become an indispensable skill in nearly all disciplines.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

2020

- PLO 1: acquire basic statistical knowledge alongside their major disciplines, with emphases on correct applications of statistical methods and insightful interpretations of statistical findings (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: equip with computational skills essential to conducting complete data analyses (by means of coursework, tutorial classes, project-based learning and presentation opportunities in the curriculum)
- PLO 3: participate proactively in large-scale, multi-disciplinary studies, determine objective findings, and provide guidance on all aspects of data collection and analyses (by means of coursework, tutorial classes and project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Risk Management

Major in Statistics

List A

Minor in Risk Management

### Required courses (42 credits)

### 1. Introductory level courses (12 credits)

### **Disciplinary Electives (12 credits)**

At least 12 credits from List A and List B, with at least 6 credits from List B:

STAT1601 Elementary statistical methods (6)
STAT1602 Business statistics (6)
STAT1603 Introductory statistics (6)
STAT2601 Probability and statistics I (6)
List B
STAT2602 Probability and statistics II (6)

STAT2603 Data management with SAS (6)

STAT2604 Introduction to R programming and elementary data analysis

(6)

STAT2605 Demographic and socio-economic statistics (6)

### 2. Advanced level courses (30 credits)

### Disciplinary Electives (30 credits)

At least 30 credits selected from the following courses: STAT3600 Linear statistical analysis (6)

STAT3602 Statistical inference (6)
STAT3603 Stochastic processes (6)
STAT3604 Design and analysis of experiments (6)
STAT3605 Quality control and management (6)

STAT3605 Quality control and management (6) STAT3606 Business logistics (6)

STAT3607 Statistics in clinical medicine and bio-medical research (6)

STAT3608 Statistical genetics (6)

Computer-aided data analysis (6) STAT3611 Statistical machine learning (6) STAT3612 Marketing analytics (6) STAT3613 Business forecasting (6) STAT3614 STAT3617 Sample survey methods (6) Modern nonparametric statistics (6) STAT3620 Statistical data analysis (6) STAT3621 Survival analysis (6) STAT3655 Time-series analysis (6) STAT4601 STAT4602 Multivariate data analysis (6)

Bayesian learning (6)

#### Notes:

STAT4610

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

### Remarks:

Minor Title Minor in Statistics

Offered to students

2019

admitted to Year 1 in

### **Objectives:**

The curriculum of the Minor in Statistics is structured specifically to cater for the general need of non-statistical disciplines and provide basic training in statistical methodologies and their applications to practical problems. It aims to provide students with a strong and rigorous sense of quantitative reasoning that has become an indispensable skill in nearly all disciplines.

### Learning Outcomes:

By the end of this programme, students should be able to:

- PLO 1: acquire basic statistical knowledge alongside their major disciplines, with emphases on correct applications of statistical methods and insightful interpretations of statistical findings (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: equip with computational skills essential to conducting complete data analyses (by means of coursework, tutorial classes, project-based learning and presentation opportunities in the curriculum)
- PLO 3: participate proactively in large-scale, multi-disciplinary studies, determine objective findings, and provide guidance on all aspects of data collection and analyses (by means of coursework, tutorial classes and project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Risk Management

Major in Statistics

List A

Minor in Risk Management

### Required courses (42 credits)

### 1. Introductory level courses (12 credits)

### **Disciplinary Electives (12 credits)**

At least 12 credits from List A and List B, with at least 6 credits from List B:

STAT1601 Elementary statistical methods (6) STAT1602 Business statistics (6) STAT1603 Introductory statistics (6) Probability and statistics I (6) STAT2601 List B

STAT2602

Probability and statistics II (6) STAT2603 Data management with SAS (6)

Introduction to R programming and elementary data analysis STAT2604

STAT2605 Demographic and socio-economic statistics (6)

### 2. Advanced level courses (30 credits)

### **Disciplinary Electives (30 credits)**

At least 30 credits selected from the following courses:

Linear statistical analysis (6) STAT3600 Statistical inference (6) STAT3602 STAT3603 Stochastic processes (6)

Design and analysis of experiments (6) STAT3604 STAT3605 Quality control and management (6)

STAT3606 Business logistics (6)

Statistics in clinical medicine and bio-medical research (6) STAT3607

STAT3608 Statistical genetics (6)

Computer-aided data analysis (6) STAT3611 Statistical machine learning (6) STAT3612 Marketing analytics (6) STAT3613 Business forecasting (6) STAT3614 STAT3617 Sample survey methods (6) Modern nonparametric statistics (6) STAT3620 STAT3621 Statistical data analysis (6) Survival analysis (6) STAT3655

STAT3955 Survival analysis (6)

> Time-series analysis (6) Multivariate data analysis (6) Bayesian learning (6)

Take either STAT3655 or STAT3955 to fulfill the requirement; but not both. STAT3655 and STAT3955 are mutually exclusive. Take either STAT3655 or STAT3955 to fulfill

the requirement; but not both. STAT3655 and STAT3955 are mutually exclusive.

STAT4601

STAT4602 STAT4610

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Minor Title Minor in Statistics

Offered to students

admitted to Year 1 in

#### Objectives:

The curriculum of the Minor in Statistics is structured specifically to cater for the general need of non-statistical disciplines and provide basic training in statistical methodologies and their applications to practical problems. It aims to provide students with a strong and rigorous sense of quantitative reasoning that has become an indispensable skill in nearly all disciplines.

### Learning Outcomes:

By the end of this programme, students should be able to:

2018

- PLO 1: acquire basic statistical knowledge alongside their major disciplines, with emphases on correct applications of statistical methods and insightful interpretations of statistical findings (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: equip with computational skills essential to conducting complete data analyses (by means of coursework, tutorial classes, project-based learning and presentation opportunities in the curriculum)
- PLO 3: participate proactively in large-scale, multi-disciplinary studies, determine objective findings, and provide guidance on all aspects of data collection and analyses (by means of coursework, tutorial classes and project-based learning in the curriculum)

#### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Risk Management

Major in Statistics

List A

Minor in Risk Management

### Required courses (42 credits)

### 1. Introductory level courses (12 credits)

### **Disciplinary Electives (12 credits)**

At least 12 credits from List A and List B, with at least 6 credits from List B:

STAT1601 Elementary statistical methods (6) STAT1602 Business statistics (6) STAT1603 Introductory statistics (6) Probability and statistics I (6) STAT2601 List B

STAT2602 Probability and statistics II (6) Data management with SAS (6) STAT2603

Introduction to R programming and elementary data analysis STAT2604

STAT2605 Demographic and socio-economic statistics (6)

### 2. Advanced level courses (30 credits)

### **Disciplinary Electives (30 credits)**

At least 30 credits selected from the following courses: STAT3600 Linear statistical analysis (6)

Statistical inference (6) STAT3602 STAT3603 Stochastic processes (6) Design and analysis of experiments (6) STAT3604

STAT3605 Quality control and management (6)

STAT3606 Business logistics (6)

Statistics in clinical medicine and bio-medical research (6) STAT3607

STAT3608 Statistical genetics (6)

Computer-aided data analysis (6) STAT3611 Statistical machine learning (6) STAT3612 Marketing analytics (6) STAT3613

Business forecasting (6) STAT3614 STAT3617 Sample survey methods (6) STAT3620 Modern nonparametric statistics (6)

STAT3621 Statistical data analysis (6) Survival analysis (6) STAT3655

STAT3955

Survival analysis (6)

STAT4601 Time-series analysis (6) Multivariate data analysis (6) STAT4602 STAT4610 Bayesian learning (6)

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

[previous title: Data mining (6)]

STAT3955 are mutually exclusive. Take either STAT3655 or STAT3955 to fulfill

STAT3955 are mutually exclusive.

[previous title: Marketing engineering (6)]

Take either STAT3655 or STAT3955 to fulfill

the requirement; but not both. STAT3655 and

the requirement; but not both. STAT3655 and

Offered to students

2017

admitted to Year 1 in

### **Objectives:**

The curriculum of the Minor in Statistics is structured specifically to cater for the general need of non-statistical disciplines and provide basic training in statistical methodologies and their applications to practical problems. It aims to provide students with a strong and rigorous sense of quantitative reasoning that has become an indispensable skill in nearly all disciplines.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: acquire basic statistical knowledge alongside their major disciplines, with emphases on correct applications of statistical methods and insightful interpretations of statistical findings (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: equip with computational skills essential to conducting complete data analyses (by means of coursework, tutorial classes, project-based learning and presentation opportunities in the curriculum)
- PLO 3: participate proactively in large-scale, multi-disciplinary studies, determine objective findings, and provide guidance on all aspects of data collection and analyses (by means of coursework, tutorial classes and project-based learning in the curriculum)

### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Risk Management

Major in Statistics

List A

Minor in Risk Management

### Required courses (42 credits)

### 1. Introductory level courses (12 credits)

### **Disciplinary Electives (12 credits)**

At least 12 credits from List A and List B, with at least 6 credits from List B:

STAT1601 Elementary statistical methods (6)
STAT1602 Business statistics (6)
STAT1603 Introductory statistics (6)
STAT2601 Probability and statistics I (6)
List B

STAT2602 Probability and statistics II (6) STAT2603 Data management with SAS (6)

STAT2604 Introduction to R programming and elementary data analysis

(6)

STAT2605 Demographic and socio-economic statistics (6)

### 2. Advanced level courses (30 credits)

### **Disciplinary Electives (30 credits)**

At least 30 credits selected from the following courses: STAT3600 Linear statistical analysis (6)

STAT3602 Statistical inference (6)
STAT3603 Stochastic processes (6)

STAT3604 Design and analysis of experiments (6) STAT3605 Quality control and management (6)

STAT3606 Business logistics (6)

STAT3607 Statistics in clinical medicine and bio-medical research (6)

STAT3608 Statistical genetics (6)

STAT3611 Computer-aided data analysis (6)
STAT3612 Statistical machine learning (6)
STAT3613 Marketing analytics (6)

STAT3614 Business forecasting (6)
STAT3616 Advanced SAS programming (6)
STAT3617 Sample survey methods (6)

STAT3620 Medicin propagation statistics (6)

STAT3620 Modern nonparametric statistics (6) STAT3621 Statistical data analysis (6) STAT3655 Survival analysis (6)

STAT3955 Survival analysis (6)

STAT4601 Time-series analysis (6)
STAT4602 Multivariate data analysis (6)
STAT4610 Bayesian learning (6)

[previous title: Data mining (6)]

[previous title: Marketing engineering (6) ]

Take either STAT3655 or STAT3955 to fulfill the requirement; but not both. STAT3655 and STAT3955 are mutually exclusive. Take either STAT3655 or STAT3955 to fulfill the requirement; but not both. STAT3655 and

STAT3955 are mutually exclusive.

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Offered to students

admitted to Year 1 in

## Objectives:

The curriculum of the Minor in Statistics is structured specifically to cater for the general need of non-statistical disciplines and provide basic training in statistical methodologies and their applications to practical problems. It aims to provide students with a strong and rigorous sense of quantitative reasoning that has become an indispensable skill in nearly all disciplines.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

2016

- PLO 1: acquire basic statistical knowledge alongside their major disciplines, with emphases on correct applications of statistical methods and insightful interpretations of statistical findings (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: equip with computational skills essential to conducting complete data analyses (by means of coursework, tutorial classes, project-based learning and presentation opportunities in the curriculum)
- PLO 3: participate proactively in large-scale, multi-disciplinary studies, determine objective findings, and provide guidance on all aspects of data collection and analyses (by means of coursework, tutorial classes and project-based learning in the curriculum)

### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Risk Management

Major in Statistics

List A

Minor in Risk Management

### Required courses (42 credits)

### 1. Introductory level courses (12 credits)

### **Disciplinary Electives (12 credits)**

At least 12 credits from List A and List B, with at least 6 credits from List B:

STAT1601 Elementary statistical methods (6)
STAT1602 Business statistics (6)
STAT1603 Introductory statistics (6)
STAT2601 Probability and statistics I (6)
List B

STAT2602 Probability and statistics II (6) STAT2603 Data management with SAS (6)

STAT2604 Introduction to R programming and elementary data analysis

(6)

STAT2605 Demographic and socio-economic statistics (6)

### 2. Advanced level courses (30 credits)

### **Disciplinary Electives (30 credits)**

At least 30 credits selected from the following courses: STAT3600 Linear statistical analysis (6)

STAT3602 Statistical inference (6)
STAT3603 Stochastic processes (6)

STAT3604 Design and analysis of experiments (6) STAT3605 Quality control and management (6)

STAT3606 Business logistics (6)

STAT3607 Statistics in clinical medicine and bio-medical research (6)

STAT3608 Statistical genetics (6)

STAT3611 Computer-aided data analysis (6)
STAT3612 Statistical machine learning (6)
STAT3613 Marketing analytics (6)

STAT3614 Business forecasting (6)
STAT3616 Advanced SAS programming (6)
STAT3617 Sample survey methods (6)
STAT3620 Modern nonparametric statistics (6)

STAT3621 Statistical data analysis (6)
STAT3655 Survival analysis (6)

STAT3955 Survival analysis (6)

STAT4601 Time-series analysis (6)
STAT4602 Multivariate data analysis (6)
STAT4610 Bayesian learning (6)

[previous title: Marketing engineering (6)]

[previous title: Data mining (6)]

Take either STAT3655 or STAT3955 to fulfill the requirement; but not both. STAT3655 and STAT3955 are mutually exclusive.

Take either STAT3655 or STAT3955 to fulfill the requirement; but not both. STAT3655 and

STAT3955 are mutually exclusive.

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Offered to students

2015

admitted to Year 1 in

### **Objectives:**

The curriculum of the Minor in Statistics is structured specifically to cater for the general need of non-statistical disciplines and provide basic training in statistical methodologies and their applications to practical problems. It aims to provide students with a strong and rigorous sense of quantitative reasoning that has become an indispensable skill in nearly all disciplines.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: acquire basic statistical knowledge alongside their major disciplines, with emphases on correct applications of statistical methods and insightful interpretations of statistical findings (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: equip with computational skills essential to conducting complete data analyses (by means of coursework, tutorial classes, project-based learning and presentation opportunities in the curriculum)
- PLO 3: participate proactively in large-scale, multi-disciplinary studies, determine objective findings, and provide guidance on all aspects of data collection and analyses (by means of coursework, tutorial classes and project-based learning in the curriculum)

### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Risk Management

Major in Statistics

List A

Minor in Risk Management

### Required courses (42 credits)

### 1. Introductory level courses (12 credits)

### **Disciplinary Electives (12 credits)**

At least 12 credits from List A and List B, with at least 6 credits from List B:

STAT1601 Elementary statistical methods (6)
STAT1602 Business statistics (6)
STAT1603 Introductory statistics (6)
STAT2601 Probability and statistics I (6)
List B

STAT2602 Probability and statistics II (6) STAT2603 Data management with SAS (6)

STAT2604 Introduction to R programming and elementary data analysis

(6)

STAT2605 Demographic and socio-economic statistics (6)

### 2. Advanced level courses (30 credits)

### Disciplinary Electives (30 credits)

At least 30 credits selected from the following courses:

STAT3600 Linear statistical analysis (6)
STAT3602 Statistical inference (6)
STAT3603 Stochastic processes (6)

STAT3604 Design and analysis of experiments (6) STAT3605 Quality control and management (6)

STAT3606 Business logistics (6)

STAT3607 Statistics in clinical medicine and bio-medical research (6)

STAT3608 Statistical genetics (6)

STAT3611 Computer-aided data analysis (6)
STAT3612 Statistical machine learning (6)
STAT3613 Marketing analytics (6)

STAT3613 Business forecasting (6)
STAT3616 Advanced SAS programming (6)
STAT3617 Sample survey methods (6)

STAT3620 Modern nonparametric statistics (6) STAT3621 Statistical data analysis (6)

STAT3655 Survival analysis (6)

STAT3955 Survival analysis (6)

STAT4601 Time-series analysis (6)
STAT4602 Multivariate data analysis (6)

Take either STAT3655 or STAT3955 to fulfill the requirement; but not both. STAT3655 and STAT3955 are mutually exclusive. Take either STAT3655 or STAT3955 to fulfill the requirement: but not both. STAT3655 and

STAT3955 are mutually exclusive.

[previous title: Data mining (6)]

[previous title: Marketing engineering (6)]

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Offered to students

2014

admitted to Year 1 in

### **Objectives:**

The curriculum of the Minor in Statistics is structured specifically to cater for the general need of non-statistical disciplines and provide basic training in statistical methodologies and their applications to practical problems. It aims to provide students with a strong and rigorous sense of quantitative reasoning that has become an indispensable skill in nearly all disciplines.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: acquire basic statistical knowledge alongside their major disciplines, with emphases on correct applications of statistical methods and insightful interpretations of statistical findings (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: equip with computational skills essential to conducting complete data analyses (by means of coursework, tutorial classes, project-based learning and presentation opportunities in the curriculum)
- PLO 3: participate proactively in large-scale, multi-disciplinary studies, determine objective findings, and provide guidance on all aspects of data collection and analyses (by means of coursework, tutorial classes and project-based learning in the curriculum)

### Impermissible Combinations:

Major in Computing and Data Analytics

Major in Decision Analytics

Major in Risk Management

Major in Statistics

List A

Minor in Risk Management

### Required courses (42 credits)

### 1. Introductory level courses (12 credits)

### **Disciplinary Electives (12 credits)**

At least 12 credits from List A and List B, with at least 6 credits from List B:

STAT1601 Elementary statistical methods (6)
STAT1602 Business statistics (6)
STAT1603 Introductory statistics (6)
STAT2601 Probability and statistics I (6)
List B
STAT2602 Probability and statistics II (6)

STAT2602 Probability and statistics if (6)
STAT2603 Data management with SAS (6)

STAT2604 Introduction to R programming and elementary data analysis

(6)

STAT2605 Demographic and socio-economic statistics (6)

### 2. Advanced level courses (30 credits)

### Disciplinary Electives (30 credits)

At least 30 credits selected from the following courses: STAT3600 Linear statistical analysis (6)

STAT3602 Statistical inference (6) STAT3603 Stochastic processes (6)

STAT3604 Design and analysis of experiments (6) STAT3605 Quality control and management (6)

STAT3606 Business logistics (6)

STAT3607 Statistics in clinical medicine and bio-medical research (6)

STAT3608 Statistical genetics (6)

STAT3608 Statistical genetics (6)
STAT3611 Computer-aided data analysis (6)
STAT3612 Statistical machine learning (6)

STAT3613 Marketing analytics (6)
STAT3614 Business forecasting (6)
STAT3616 Advanced SAS programming (6)
STAT3617 Sample survey methods (6)

STAT3620 Modern nonparametric statistics (6) STAT3621 Statistical data analysis (6)

STAT3655 Survival analysis (6)

STAT3955 Survival analysis (6)

STAT4601 Time-series analysis (6)
STAT4602 Multivariate data analysis (6)

Take either STAT3655 or STAT3955 to fulfill the requirement; but not both. STAT3655 and STAT3955 are mutually exclusive.
Take either STAT3655 or STAT3955 to fulfill the requirement; but not both. STAT3655 and STAT3955 are mutually exclusive.

[previous title: Data mining (6)]

[previous title: Marketing engineering (6)]

<sup>1.</sup> Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

Offered to students

2013

admitted to Year 1 in

### **Objectives:**

The curriculum of the Minor in Statistics is structured specifically to cater for the general need of non-statistical disciplines and provide basic training in statistical methodologies and their applications to practical problems. It aims to provide students with a strong and rigorous sense of quantitative reasoning that has become an indispensable skill in nearly all disciplines.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

- PLO 1: acquire basic statistical knowledge alongside their major disciplines, with emphases on correct applications of statistical methods and insightful interpretations of statistical findings (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: equip with computational skills essential to conducting complete data analyses (by means of coursework, tutorial classes, project-based learning and presentation opportunities in the curriculum)
- PLO 3: participate proactively in large-scale, multi-disciplinary studies, determine objective findings, and provide guidance on all aspects of data collection and analyses (by means of coursework, tutorial classes and project-based learning in the curriculum)

### Impermissible Combinations:

Major in Decision Analytics

Major in Risk Management

Major in Statistics

Minor in Risk Management

### Required courses (42 credits)

### 1. Introductory level courses (12 credits)

### Disciplinary Electives (12 credits)

At least 12 credits from List A and List B, with at least 6 credits from List B:

List A

STAT1601 Elementary statistical methods (6)
STAT1602 Business statistics (6)
STAT1603 Introductory statistics (6)
STAT2601 Probability and statistics I (6)

List B

STAT2602 Probability and statistics II (6) STAT2603 Data management with SAS (6)

STAT2604 Introduction to R programming and elementary data analysis

(6)

STAT2605 Demographic and socio-economic statistics (6)

# 2. Advanced level courses (30 credits)

### Disciplinary Electives (30 credits)

At least 30 credits selected from the following courses:

STAT3600 Linear statistical analysis (6) STAT3602 Statistical inference (6) STAT3603 Stochastic processes (6)

STAT3604 Design and analysis of experiments (6) STAT3605 Quality control and management (6)

STAT3606 Business logistics (6)

STAT3607 Statistics in clinical medicine and bio-medical research (6)

STAT3608 Statistical genetics (6)

STAT3611 Computer-aided data analysis (6)
STAT3612 Statistical machine learning (6)
STAT3613 Marketing analytics (6)

STAT3614 Business forecasting (6)
STAT3616 Advanced SAS programming (6)
STAT3617 Sample survey methods (6)
STAT3620 Modern nonparametric statistics (6)

STAT3620 Modern nonparametric stat STAT3621 Statistical data analysis (6) STAT3655 Survival analysis (6)

STAT3955 Survival analysis (6)

STAT4601 Time-series analysis (6) STAT4602 Multivariate data analysis (6) [previous title: Data mining (6) ]
[previous title: Marketing engineering (6) ]

Take either STAT3655 or STAT3955 to fulfill

the requirement; but not both. STAT3655 and STAT3955 are mutually exclusive. Take either STAT3655 or STAT3955 to fulfill

the requirement; but not both. STAT3655 and STAT3955 are mutually exclusive.

### Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc syllabuses.

### Remarks:

Offered to students

admitted to Year 1 in

### **Objectives:**

The curriculum of the Minor in Statistics is structured specifically to cater for the general need of non-statistical disciplines and provide basic training in statistical methodologies and their applications to practical problems. It aims to provide students with a strong and rigorous sense of quantitative reasoning that has become an indispensable skill in nearly all disciplines.

### **Learning Outcomes:**

By the end of this programme, students should be able to:

2012

- PLO 1: acquire basic statistical knowledge alongside their major disciplines, with emphases on correct applications of statistical methods and insightful interpretations of statistical findings (by means of coursework, tutorial classes and project-based learning in the curriculum)
- PLO 2: equip with computational skills essential to conducting complete data analyses (by means of coursework, tutorial classes, project-based learning and presentation opportunities in the curriculum)
- PLO 3: participate proactively in large-scale, multi-disciplinary studies, determine objective findings, and provide guidance on all aspects of data collection and analyses (by means of coursework, tutorial classes and project-based learning in the curriculum)

### Impermissible Combinations:

Major in Decision Analytics

Major in Risk Management

Major in Statistics

Minor in Risk Management

### Required courses (42 credits)

### 1. Introductory level courses (12 credits)

### **Disciplinary Electives (12 credits)**

At least 12 credits from List A and List B, with at least 6 credits from List B:

List A

Elementary statistical methods (6) STAT1601 STAT1602 Business statistics (6) STAT1603 Introductory statistics (6) Probability and statistics I (6) STAT2601

List B

Probability and statistics II (6) STAT2602 STAT2603 Data management with SAS (6)

STAT2604 Introduction to R programming and elementary data analysis

Demographic and socio-economic statistics (6) STAT2605

### 2. Advanced level courses (30 credits)

### **Disciplinary Electives (30 credits)**

At least 30 credits selected from the following courses:

STAT3600 Linear statistical analysis (6) Statistical inference (6) STAT3602 Stochastic processes (6) STAT3603

Design and analysis of experiments (6) STAT3604 STAT3605 Quality control and management (6)

STAT3606 Business logistics (6)

Statistics in clinical medicine and bio-medical research (6) STAT3607

Statistical genetics (6) STAT3608

STAT3611 Computer-aided data analysis (6) STAT3612 Statistical machine learning (6) STAT3613 Marketing analytics (6)

Business forecasting (6) STAT3614 Advanced SAS programming (6) STAT3616 STAT3617 Sample survey methods (6) Modern nonparametric statistics (6) STAT3620

STAT3621 Statistical data analysis (6) Survival analysis (6)

STAT3655

STAT3955 Survival analysis (6)

STAT4601 Time-series analysis (6) STAT4602 Multivariate data analysis (6) [previous title: Data mining (6) ] [previous title: Marketing engineering (6)]

Take either STAT3655 or STAT3955 to fulfill the requirement; but not both. STAT3655 and STAT3955 are mutually exclusive.

Take either STAT3655 or STAT3955 to fulfill the requirement; but not both. STAT3655 and

STAT3955 are mutually exclusive.

## Notes:

1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("disciplinary core") in the major-minor or double-minors, students have to make up the credits by taking replacement course in the minor. For details, please refer to "Students taking double Majors, Major-Minor or double Minors with overlapping course requirements" in the BSc svllabuses.

### Remarks:

Students taking double Majors,

Major-Minor or double Minors with overlapping course requirements

# SCIENCE

# SECTION VIII Students taking double Majors, Major-Minor or double Minors with overlapping course requirements

- 1. Double-counting of courses up to a maximum of 24 credits is permissible with double majors. The double-counted courses in both Science majors must include SCNC1111 and SCNC1112. Additional credits to be double-counted must be for courses required ('disciplinary core') by both majors. For cases with 24 or less double-counted credits, the student must make up an equivalent number of credits by taking other courses offered by any Faculty.
- 2. The following list shows the major-major combinations that have more than 24 credits of the same 'disciplinary core' courses that appear in both majors and is subject to the rule of double counting:

Major-Major combination	Admission Year (Year 1)	No. of common 'disciplinary core' courses (credits) appear in both majors including SCNC1111 and SCNC1112	No. of replacement courses (credits) to be taken in the 2 <sup>nd</sup> major ('Major 2')
Major in Astronomy Major in Physics	2016, 2017	5 (30 credits)	1 (6 credits)
Major in Biochemistry Major in Chemistry	All years	5 (30 credits)	1 (6 credits)
Major in Biochemistry Major in Molecular Biology & Biotechnology	2014	5 (30 credits)	1 (6 credits)
Major in Biological Sciences Major in Ecology & Biodiversity	All years	7 (42 credits)	3 (18 credits)
Major in Biological Sciences Major in Food & Nutritional Science	2017, 2018, 2019, 2020, 2021	6 (36 credits)	2 (12 credits)
Wajor in Food & Nutritional Science	2016	7 (42 credits)	3 (18 credits)
Major in Biological Sciences Major in Molecular Biology & Biotechnology	All years	6 (36 credits)	2 (12 credits)
Major in Earth System Science Major in Geology	2016	5 (30 credits)	1 (6 credits)
Major in Ecology & Biodiversity Major in Food & Nutritional Science	2017, 2018, 2019, 2020, 2021	5 (30 credits)	1 (6 credits)
Major in Food & Nutritional Science	2016	6 (36 credits)	2 (12 credits)
Major in Ecology & Biodiversity Major in Molecular Biology & Biotechnology	All years	5 (30 credits)	1 (6 credits)
Major in Food & Nutritional Science Major in Molecular Biology & Biotechnology	All years	6 (36 credits)	2 (12 credits)

If more than 24 credits (including SCNC1111 & SCNC1112) are listed as 'disciplinary core' courses required in both the first ('Major 1') and second ('Major 2') majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) in the second major ('Major 2'). The replacement course(s) must be the disciplinary elective course in the second major ('Major 2') and have the same prefix and at the same or higher level as the double-counted course(s). The double counted credits should count the following courses in this order: (1) SCNC1111 and SCNC1112, (2) introductory level (levels 1 and 2) courses, and (3) advanced level (level 3 or above) courses. For example, if a student takes a first major in Ecology & Biodiversity ('Major 1') and the 2<sup>nd</sup> major in Molecular Biology & Biotechnology ('Major 2'), SCNC1111, SCNC1112, BIOL1110, BIOL2102 and BIOL2103 are the common 'disciplinary core' courses that appear in both majors. The first 3 courses SCNC1111, SCNC1112, and BIOL1110 would first be counted plus either BIOL2102 or BIOL2103 for the major in Molecular Biology & Biotechnology. The student has to take a replacement 'disciplinary elective' course (with a prefix of BIOL at level 2 or above) in the 2<sup>nd</sup> major in Molecular Biology & Biotechnology to make up for BIOL2102 or BIOL2103.

- 3. Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111:
  - Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)
  - Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)

- Grade B or above in Mathematics and Further Mathematics in General Certificate of Education
   Advanced Level (GCEAL)
- Mathematics qualification in Gao Kao will be considered on a case-by-case basis

It is optional for them to take the course SCNC1111. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.

Candidates who have been admitted to Year 1 in 2021-22 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1112:

- Level 4 or above in Biology, Chemistry, and Physics in the Hong Kong Diploma of Secondary Education (HKDSE)
- Level 5 or above in Biology, Chemistry, and Physics Higher Level in International Baccalaureate (IB)
- Grade B or above in Biology, Chemistry, and Physics in General Certificate of Education Advanced Level (GCEAL)
- Biology, Chemistry, and Physics qualification in Gao Kao will be considered on a case-by-case basis

It is optional for them to take the course SCNC1112. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.

The eligible students will be informed by the Faculty, via email, of the granting of an exemption from taking SCNC1111 and/or SCNC1112 in late August (before the start of your first year of study). You (as an eligible student) can try out courses that suit your academic interest before you commit to a particular major and submit your application form for taking a replacement course(s) for SCNC1111 and/or SCNC1112 via the <a href="Science Online Application Submission System (OASS)">Science Online Application Submission System (OASS)</a> during the courses add/drop periods in your second/third year of study. The replacement course must be the disciplinary elective in your declared Science major. If you wish to take double Science majors, you should take the disciplinary elective in each of your declared Science majors to replace the exempted SCNC course(s).

Under these circumstances, the following list shows the major-major combinations that have 24 credits (or more) of the same 'disciplinary core' courses that appear in both Science majors and is subject to the rule of double counting:

### Scenario #1

(a) Admission Year (Year 1): 2020, 2021 Exemption granted: SCNC1111

OR

(b) Admission Year (Year 1): 2021 Exemption granted: SCNC1112

Major-Major combination	Admission Year (Year 1)	Exemption granted	No. of replacement courses (credits) to be taken in the 1 <sup>st</sup> major ('Major 1')	No. of common  'disciplinary core' courses (credits) appear in both Science majors including SCNC1111 and SCNC1112	No. of replacement courses (credits) to be taken in the 2 <sup>nd</sup> major ('Major 2')
Major in Biochemistry Major in Chemistry	2020, 2021 2021	SCNC1111 or SCNC1112	1 (6 credits)	5 (30 credits)	1 (6 credits)
Major in Biochemistry Major in Molecular Biology & Biotechnology	2020, 2021 2021	SCNC1111 or SCNC1112	1 (6 credits)	4 (24 credits)	1 (6 credits) - to replace SCNC1111 or SCNC1112
Major in Biological Sciences Major in Ecology & Biodiversity	2020, 2021 2021	SCNC1111 or SCNC1112	1 (6 credits)	7 (42 credits)	3 (18 credits)
Major in Biological Sciences Major in Food & Nutritional Science	2020, 2021 2021	SCNC1111 or SCNC1112	1 (6 credits)	6 (36 credits)	2 (12 credits)
Major in Biological Sciences Major in Molecular Biology & Biotechnology	2020, 2021 2021	SCNC1111 or SCNC1112	1 (6 credits)	6 (36 credits)	2 (12 credits)
Major in Earth System Science Major in Geology	2020, 2021 2021	SCNC1111 or SCNC1112	1 (6 credits)	4 (24 credits)	1 (6 credits) - to replace SCNC1111 or SCNC1112

Double Counting of Courses in Double Majors,

Major-Minor or Double Minors

Major in Ecology & Biodiversity Major in Food & Nutritional Science	2020, 2021 2021	SCNC1111 or SCNC1112	1 (6 credits)	5 (30 credits)	1 (6 credits)
Major in Etology & Biodiversity Major in Molecular Biology & Biotechnology	2020, 2021 2021	SCNC1111 or SCNC1112	1 (6 credits)	5 (30 credits)	1 (6 credits)
Major in Food & Nutritional Science Major in Molecular Biology & Biotechnology	2020, 2021 2021	SCNC1111 or SCNC1112	1 (6 credits)	6 (36 credits)	2 (12 credits)

If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ('disciplinary core') in both the first ('Major 1') and second ('Major 2') majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) in the second major ('Major 2'). The replacement course(s) must be the disciplinary elective course(s) in the second major ('Major 2') and have the same prefix and at the same or higher level as the double-counted course(s). For example, if a student takes a first major in Ecology & Biodiversity ('Major 1') and a second major in Molecular Biology & Biotechnology ('Major 2'), SCNC1111, SCNC1112, BIOL1110, BIOL2102 and BIOL2103 are the common 'disciplinary core' courses that appear in both majors.

- (a) In light of the exempted course SCNC1111, the double counted credits should count the following courses in this order: (1) SCNC1112, (2) introductory level (levels 1 and 2) courses, and (3) advanced level (level 3 or above) courses. The 4 courses (SCNC1112, BIOL1110, BIOL2102, and BIOL2103) would be counted for the major in Molecular Biology & Biotechnology. The student has to take a replacement 'disciplinary elective' course in the second major in Molecular Biology & Biotechnology to make up for SCNC1111.
- (b) In light of the exempted course SCNC1112, the double counted credits should count the following courses in this order: (1) SCNC1111, (2) introductory level (levels 1 and 2) courses, and (3) advanced level (level 3 or above) courses. The 4 courses (SCNC1111, BIOL1110, BIOL2102, and BIOL2103) would be counted for the major in Molecular Biology & Biotechnology. The student has to take a replacement 'disciplinary elective' course in the second major in Molecular Biology & Biotechnology to make up for SCNC1112.

### Scenario #2

(a) Admission Year (Year 1): 2021

Exemption granted: SCNC1111 & SCNC1112

Major-Major combination	Admission Year (Year 1)	Exemption granted	No. of replacement courses (credits) to be taken in the 1 <sup>st</sup> major ('Major 1')	No. of common  'disciplinary core' courses (credits) appear in both Science majors including SCNC1111 and SCNC1112	No. of replacement courses (credits) to be taken in the 2 <sup>nd</sup> major ('Major 2')
Major in Biochemistry Major in Chemistry	2021	SCNC1111 & SCNC1112	2 (12 credits)	5 (30 credits)	2 (12 credits) - to replace SCNC1111 & SCNC1112
Major in Biochemistry Major in Molecular Biology & Biotechnology	2021	SCNC1111 & SCNC1112	2 (12 credits)	4 (24 credits)	2 (12 credits) - to replace SCNC1111 & SCNC1112
Major in Biological Sciences Major in Ecology & Biodiversity	2021	SCNC1111 & SCNC1112	2 (12 credits)	7 (42 credits)	3 (18 credits)
Major in Biological Sciences Major in Food & Nutritional Science	2021	SCNC1111 & SCNC1112	2 (12 credits)	6 (36 credits)	2 (12 credits)
Major in Biological Sciences Major in Molecular Biology & Biotechnology	2021	SCNC1111 & SCNC1112	2 (12 credits)	6 (36 credits)	2 (12 credits)
Major in Earth System Science Major in Geology	2021	SCNC1111 & SCNC1112	2 (12 credits)	4 (24 credits)	2 (12 credits) - to replace SCNC1111 & SCNC1112
Major in Ecology & Biodiversity Major in Food & Nutritional Science	2021	SCNC1111 & SCNC1112	2 (12 credits)	5 (30 credits)	2 (12 credits) - to replace SCNC1111 & SCNC1112

Major in Ecology & Biodiversity Major in Molecular Biology & Biotechnology	2021	SCNC1111 & SCNC1112	2 (12 credits)	5 (30 credits)	2 (12 credits) - to replace SCNC1111 & SCNC1112
Major in Food & Nutritional Science Major in Molecular Biology & Biotechnology	2021	SCNC1111 & SCNC1112	2 (12 credits)	6 (36 credits)	2 (12 credits)

If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ('disciplinary core') in both the first ('Major 1') and second ('Major 2') majors undertaken by a student, the student must make up the number of credits above the 24 permissible by taking replacement course(s) in the second major ('Major 2'). The replacement course(s) must be the disciplinary elective course(s) in the second major ('Major 2') and have the same prefix and at the same or higher level as the double-counted course(s). In light of the exempted course SCNC1111 & SCNC1112, the double counted credits should count the following courses in this order: (1) introductory level (levels 1 and 2) courses, and (2) advanced level (level 3 or above) courses. For example, if a student takes a first major in Ecology & Biodiversity ('Major 1') and a second major in Molecular Biology & Biotechnology ('Major 2'), SCNC1111, SCNC1112, BIOL1110, BIOL2102 and BIOL2103 are the common 'disciplinary core' courses that appear in both majors. The 3 courses (BIOL1110, BIOL2102, and BIOL2103) would be counted for the major in Molecular Biology & Biotechnology. The student has to take 2 replacement 'disciplinary elective' courses in the second major in Molecular Biology & Biotechnology & Biotechnology to make up for SCNC1111 & SCNC1112.

- 4. Double counting of credits is not permissible for major-minor or double-minors combinations. When a course is required ('disciplinary core') both by the major and minor or by both minors, the student must take a replacement course for the minor. The replacement course must be the disciplinary elective in the minor and have the same prefix and at the same or higher level as the course to be replaced.
- 5. For students taking the Mathematics related majors/minors should note the following exemption and replacement arrangement:

Students who fall into the following exemption situation for the introductory level Disciplinary Core Mathematics courses in Science Majors/Minors are required to take the specified replacement course(s) as prescribed in the table:

Exempted Course	Exemption granted under the following circumstances	Specified Replacement Course
	For students taking Minor with an overlap of Disciplinary Core Course :	
	MATH1013	Select <b>6 credits</b> from the following to replace MATH1013:
	For students taking Programme / Major / Minor with Disciplinary Core Courses :	Any 6-credit level 2 or above Mathematics Disciplinary Elective chosen from the Programme/Major/Minor structure in which MATH1013 is the disciplinary core course
MATH1013 University mathematics II	MATH1851 and MATH1853 (which are together deemed equivalent to MATH1013)	MATH2012 Fundamental concepts of mathematics (6) (if not the disciplinary core course in the structure)
	For students taking Professional Core in Bachelor of Science in Actuarial Science with Disciplinary Core Course :	MATH2241 Introduction to mathematical analysis (6) (if not the disciplinary core course in the structure)
	MATH1821 (which is equivalent to MATH1013)	
	For students taking Programme/Major with Disciplinary Core Course :	Select <b>6 credits</b> from the following to replace MATH2014:  • Any 6-credit level 2 or above Mathematics Disciplinary
MATH2014	MATH2101 and MATH2211 (which are together deemed equivalent to MATH2014)	Elective chosen from the Programme/Major/Minor structure in which MATH2014 is the disciplinary core course
Multivariable calculus and linear algebra	For students taking Professional Core in Bachelor of Science in Actuarial Science with Disciplinary Core Course:	MATH2012 Fundamental concepts of mathematics (6)     (if not the disciplinary core course in the structure)      MATH2241 Introduction to mathematical analysis (6)
	MATH2822 (which is equivalent to MATH2014)	(if not the disciplinary core course in the structure)

6. For the situations of 2, 3, 4 and 5 above, students have to complete and submit the online application form to the Faculty Office via the <u>Science Online Application Submission System (OASS)</u> by the deadline of course selection or add/drop periods. The application will then be forwarded to the relevant Course Selection Adviser (CSA) for endorsement and comment (if any).

# **Course Descriptions**

# SCIENCE

# SECTION IX Course Descriptions

BIOC1600		tives in biochem	nistry (6 credits)	Academic Yea	r 2021		
Offering Department		al Sciences		Quota			
Course Co-ordinator			ences (jatanner@hku.hk)				
eachers Involved		oon,Biomedical Scie					
	\ \	Wong,Biomedical S	,				
	(Dr. J W Y	' Ho,Biomedical Scie	ences)				
		' Huen,Biomedical S					
			Paediatrics and Adolescent Medicine)				
		nner,Biomedical Sci	,				
Course Objectives			cal perspective on each of the Basic S	sciences focusing on conce	pts fundamental to		
		ng of Biochemistry.					
			urse material through an integrated pro		llaborative tasks.		
			of the great discoveries and future chal				
			insition from school to university by d		inaepenaent stuay		
			nunicate within a Biochemistry learning	environment.			
Course Contents	A Biochem	lical Perspective on	the Basic Sciences				
k Topics	A Chamia	tm r for Dio abousiatm					
		stry for Biochemistry		as and arbital theory (a face	io on the electron		
			om carbon to Coenzyme A); Resonand				
			(thinking in 3 dimensions); Isomerism				
	universal b	nochemical solvent	& buffer; Quantitation in chemistry (wh	io was Avogadio ariyway?).			
	P. Piology	for Diochomiotry					
		for Biochemistry	life (proteins, DNA, lipids, carbohydrat	to): The Central Dogma of	Molocular Piology		
			illar evolution); Origins of life (the chicke				
	Evolution (	considering molecu	nai evolution), Origins of the (the chicke	en-egg paradox or proteins a	and DINA)		
	C Physics	s and Mathematics f	or Riochemistry				
			or blochemistry ogical Perspective; Introduction to mol	ecular recognition and hind	ing (DNA melting)		
			oplied statistics for what you really nee				
		he limits of life).	phied statistics for what you really flee	ed to know), Thinking humi	bers (exponentials		
	logs and ti	ie iii iiis oi iiie).					
	D Inspiring	g Biochemistry					
			nins and disease; Synthetic biology; T	he challenges of modern-d	ay genetics Drug		
		and failures.	inio and dioddos, cyntholio biology, i	no chancinges of modern o	ay gononee brag		
Course Learning			his course, students should be able to:				
Outcomes		•	of biomolecular structure from a chen	nical perspective using tex	te and diagrams		
	thereby integrating the basic sciences of biology, chemistry and physics into a biochemical perspective CLO 2 apply knowledge of biomolecular structure to review major discoveries and contemporary issues in						
		olecular biology	biomolecular structure to review maj	or discoveries and conten	iporary issues in		
			a and discuss major issues in biochemi	stry using the scientific liter	ature		
		•	nication skills and the ability to colla				
			fic ideas via written and oral proficienci		practicals and in		
			try intersects with the three basic scie		and physics and		
			n from school to university level study	ences of biology, chemistry	and physics, and		
Pre-requisites		•	Biology, Chemistry, or Combined Scie	nce with Riology or Chemis	etry component or		
and Co-requisites	equivalent		biology, Chemistry, or Combined Scie	rice with biology of Chemis	stry component, or		
and Impermissible	equivalent						
combinations)	Not for stu	dents who have na	ssed in BIOL1110, or have already enro	alled in this course			
Offer in 2021 - 2022		sem Offer in 2022		Examination	Dec		
Grade Descriptors	A		rformance demonstrating comprehensive unders				
(A+ to F)	A		scientific literature; superior presentation and gro		lical maight into dac of		
(A. 101)	В	Good performance der	monstrating full understanding of the subject ma		scientific data and the		
	_		d presentation and group collaboration skills.				
	С		ce demonstrating adequate understanding of th ture; some presentation and group collaboration;		o use of scientific data		
	D		lemonstrating some understanding of basic sul		scientific data and the		
		scientific literature; limit	ted presentation and group collaboration skills.				
	Fail		subject matter; with little to no insight into use of	scientific data; no understanding of	f the scientific literature		
		and unable to present of	or collaborate.				
Communication-	Υ						
ntensive Course	1 4						
Course Type		ased course					
ourse Teaching	Activities	;	Details		No. of Hours		
Learning Activities	Lectures		or workshops		36		
	Group wo	rk	Practical classess		12		
	Reading /	Self study			50		
	Assessme	ent	Tasks and preparation		30		
Assessment Methods	Methods		Details	Weighting in final	Assessment		
				course grade (%)	Methods		
and Weighting				] , , ,	to CLO Mapping		
and Weighting			1	00			
and Weighting	Assignme	nts	including practical writeups	20	CLO 1,2,3,4,5		
nd Weighting	Assignme Examinati		including practical writeups	50			
and Weighting	Examinati	ion			CLO 1,2,3		
	Examinati Project rep	ion	group communication project	50			
and Weighting  Required/recommender  eading and	Examinati Project rep	ion		50	CLO 1,2,3		

BIOC2600	Basic biochemistry (6 credits)	Academic Year	2021
Offering Department	Biomedical Sciences	Quota	300
Course Co-ordinator	Dr. M Kotaka, Biomedical Sciences (masayo@hku.hk)		
Teachers Involved	(Dr A S L Wong, Biomedical Sciences)		

	students t	to progress into the	eir areas of specialization. St	stry as a common ground for scien audents intending to pursue further st						
Course Contents			nd this course particularly hel	lpful. eic acids, amino acids and protein						
& Topics	enzymes;			in a living cell; signaling across cell	, ,					
Course Learning Outcomes			this course, students should	be able to: ecules including carbohydrates, amino	a acida and linida					
Outcomes				ecules including carbonydrates, amino energetics, metabolism and intracellul						
			ntals and importance of the f		ar orginaling					
	CLO 4 ex	xplain the molecul nd/or lipids	ar mechanisms of disorders	s related to metabolism of carbohyo	,					
				ogether with colleagues in group assig	gnments					
Pre-requisites			110 or ENGG1207 or BMED							
(and Co-requisites and Impermissible combinations)	Not for st courses.	tudents who have	passed in BIOL2220 or MEL	DE2301 or BMED2301, or have alrea	ady enrolled in these					
Offer in 2021 - 2022	Y 1st	t sem Offer in 202	22 - 2023 : Y	Examination	Dec					
Grade Descriptors	Α	Demonstrates thorou	ugh and complete mastery of the e	entire range of knowledge and analytical skills	as required for maximal					
(A+ to F)		attainment in all the contexts.	course learning outcomes; excellen	ce in critical thinking towards application of the	e knowledge in a range of					
	B Demonstrates substantial command of a broad range of knowledge and analytical skills as required for attainment of the majority									
					of course learning outcomes; good evidence of critical thinking towards application of the knowledge in a range of contexts.					
	C	Demonstrates general but incomplete command of knowledge and analytical skills as required for attainment of adequate course learning outcomes; some evidence critical thinking towards application of the knowledge in a range of contexts.								
		learning outcomes; s								
	D	Demonstrates partial	ome evidence critical thinking toward but limited command of knowledge	ds application of the knowledge in a range of c e and analytical skills as required for attainme	contexts.  ent of some of the course					
		Demonstrates partial learning outcomes; li	ome evidence critical thinking toward but limited command of knowledge mited evidence of critical thinking to	ds application of the knowledge in a range of c	contexts. ent of some of the course of contexts.					
	Fail	Demonstrates partial learning outcomes; li Demonstrates little of	ome evidence critical thinking toward I but limited command of knowledge mited evidence of critical thinking to or no evidence of command of knowledge.	ds application of the knowledge in a range of c e and analytical skills as required for attainme wards application of the knowledge in a range	contexts.  ent of some of the course of contexts.  attainment of the course					
		Demonstrates partial learning outcomes; li Demonstrates little of	ome evidence critical thinking toward I but limited command of knowledge mited evidence of critical thinking to or no evidence of command of knowledge.	ds application of the knowledge in a range of c e and analytical skills as required for attainme wards application of the knowledge in a range owledge and analytical skills as required for	contexts.  ent of some of the course of contexts.  attainment of the course					
intensive Course	Fail N	Demonstrates partial learning outcomes; li Demonstrates little learning outcomes; la	ome evidence critical thinking toward I but limited command of knowledge mited evidence of critical thinking to or no evidence of command of knowledge.	ds application of the knowledge in a range of c e and analytical skills as required for attainme wards application of the knowledge in a range owledge and analytical skills as required for	contexts.  ent of some of the course of contexts.  attainment of the course					
intensive Course Course Type	Fail N	Demonstrates partial learning outcomes; li Demonstrates little o learning outcomes; la pased course	ome evidence critical thinking toward I but limited command of knowledge mited evidence of critical thinking to or no evidence of command of knowledge.	ds application of the knowledge in a range of c e and analytical skills as required for attainme wards application of the knowledge in a range owledge and analytical skills as required for	contexts.  ent of some of the course of contexts.  attainment of the course ts.					
intensive Course Course Type Course Teaching	Fail N Lecture-b	Demonstrates partial learning outcomes; li Demonstrates little of learning outcomes; la passed course	ome evidence critical thinking towar I but limited command of knowledge mited evidence of critical thinking to or no evidence of command of kno acking in critical thinking towards ap	ds application of the knowledge in a range of c e and analytical skills as required for attainme wards application of the knowledge in a range owledge and analytical skills as required for	contexts.  ent of some of the course of contexts.  attainment of the course					
intensive Course Course Type Course Teaching	Fail N Lecture-b Activities	Demonstrates partial learning outcomes; li Demonstrates little of learning outcomes; la passed course	ome evidence critical thinking towar I but limited command of knowledge mited evidence of critical thinking to or no evidence of command of kno acking in critical thinking towards ap	ds application of the knowledge in a range of c e and analytical skills as required for attainme wards application of the knowledge in a range owledge and analytical skills as required for	contexts. ent of some of the course of contexts. attainment of the course ts.  No. of Hours					
intensive Course Course Type Course Teaching	Fail  N  Lecture-b  Activities Lectures Tutorials	Demonstrates partial learning outcomes; li Demonstrates little of learning outcomes; la passed course	ome evidence critical thinking towar I but limited command of knowledge mited evidence of critical thinking to or no evidence of command of kno acking in critical thinking towards ap	ds application of the knowledge in a range of c e and analytical skills as required for attainme wards application of the knowledge in a range owledge and analytical skills as required for	contexts. ent of some of the course of contexts. attainment of the course ts.  No. of Hours 36					
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail  N  Lecture-b  Activities Lectures Tutorials	Demonstrates partial learning outcomes; li Demonstrates little c learning outcomes; la based course s	ome evidence critical thinking towar I but limited command of knowledge mited evidence of critical thinking to or no evidence of command of kno acking in critical thinking towards ap	ds application of the knowledge in a range of c e and analytical skills as required for attainme wards application of the knowledge in a range owledge and analytical skills as required for	contexts. ent of some of the course of contexts. attainment of the course ts.  No. of Hours  36  12					
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail N Lecture-b Activities Lectures Tutorials Reading	Demonstrates partial learning outcomes; la Demonstrates little of learning outcomes; la passed course s	ome evidence critical thinking toward but limited command of knowledg mited evidence of critical thinking to or no evidence of command of knoacking in critical thinking towards applications of the command of knoacking in critical thinking towards application.	ds application of the knowledge in a range of ce and analytical skills as required for attainme wards application of the knowledge in a range owledge and analytical skills as required for plication of the knowledge in a range of context.  Weighting in final	No. of Hours  36  12  100  Assessment Methods					
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail  N  Lecture-b  Activities Lectures Tutorials Reading  Methods  Assignme Examinat	Demonstrates partial learning outcomes; le Demonstrates little clearning outcomes; le learning outcomes; le vased course s	ome evidence critical thinking toward but limited command of knowledge mited evidence of critical thinking towards on no evidence of command of knowledge in critical thinking towards application of the command of knowledge in critical thinking towards application.    Details   Details	ds application of the knowledge in a range of ce and analytical skills as required for attainme wards application of the knowledge in a range owledge and analytical skills as required for plication of the knowledge in a range of context.  Weighting in final course grade (%)  40 60	No. of Hours  No. of Hours  36  12  100  Assessment Methods to CLO Mapping CLO 1,2,3,4,5 CLO 1,2,3,4					
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Fail  N  Lecture-b  Activities Lectures Tutorials Reading  Methods  Assignme Examinat Nelson Di Any other	Demonstrates partial learning outcomes; li Demonstrates little celearning outcomes; le learning outcomes; le l	ome evidence critical thinking toward but limited command of knowledge mited evidence of critical thinking towards on no evidence of command of knowledge in critical thinking towards application of the command of knowledge in critical thinking towards application of the command of knowledge in critical thinking towards application of the command of	ds application of the knowledge in a range of ce and analytical skills as required for attainme wards application of the knowledge in a range owledge and analytical skills as required for plication of the knowledge in a range of context.  Weighting in final course grade (%)	No. of Hours  36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5 CLO 1,2,3,4					
Communication- intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials Additional Course	Fail  N  Lecture-b  Activities Lectures Tutorials Reading  Methods  Assignme Examinat Nelson Di Any other W.H. Free	Demonstrates partial learning outcomes; li Demonstrates little of learning outcomes; le	Details  Details  Details  Details  Details  Details	ds application of the knowledge in a range of ce and analytical skills as required for attainme wards application of the knowledge in a range owledge and analytical skills as required for plication of the knowledge in a range of context.  Weighting in final course grade (%)  40 60 nemistry, 7th ed. W.H. Freeman, New	No. of Hours  No. of Hours  36  12  100  Assessment Methods to CLO Mapping CLO 1,2,3,4,5 CLO 1,2,3,4 York. Biochemistry, 9th ed.					

BIOC3601	Basic m	netabol	ism (6 cre	dits)					Academic Year	2021
Offering Department	Biomedica	al Scien	ces						Quota	80
Course Co-ordinator	Dr N S W	long, Bio	medical Sci	ences (ns	swong@h	ku.hk)				
Teachers Involved	(Dr N S W (Dr. L W I	Vong,Bio Lim,Bior	Biomedical Somedical Scienedical Scienedic	ences) nces)						
Course Objectives	some of applied to energy. T	the bas o explai The cour	ic concepts n one of the se will lay th	in bioche e most im he founda	emistry (s nportant a ation for t	specifically and cardir he more a	those learr	ned in BIC f biologica urses offe	students of this c DC1600 and BIO I life: the acquisi red in the Bioche	C2600) could b
Course Contents & Topics	organisms breakdow also be o	ıs. Major vn of glu consider	metabolic p cose, glycog ed. Emphas	oathways gen, triacy sis is on	covered (lglycerol, the unde	in this cou , and amir rstanding	urse include no acids. Th of the meta	those that le metabol abolic read	rision of energy t are involved in the ism of purines are ctions involved a of diseases will al	the synthesis ar nd pyrimidines w nd how they ar
Course Learning Outcomes	CLO 1 ac ne CLO 2 id re	chieve a etworks dentify o esources	ne's own g through eff	ntellectua aps of ba ective me	l appreci asic knov ans or ap	ation of by wledge in opproaches	pasic princip	and to f	ctional organizat ill up those gap and disseminatio	s from literatur
Pre-requisites (and Co-requisites and Impermissible combinations)			0 or BIOL22					•		Ĵ
Offer in 2021 - 2022	Y 1st	t sem	Offer in 2022	2 - 2023 :	Υ				Examination	Dec
Grade Descriptors (A+ to F)	A	strong		y and logica	l thinking a	nd is able to	apply knowled		the course learning e range of complex si	

	В	analytical ability and logical complex ideas clearly.	thinking and is sometimes able to	ining most of the course learning outco b apply knowledge to complex situation	ns. Often communicates
	С		ability and logical thinking and is s	uired for attaining most of the course lead ometimes able to apply knowledge to fa	
	D			g some of the course learning outcomes to solve problems. Has difficulty in expre	
	Fail			ired for attaining the course learning ou olve problems. Ineffective at communica	
Communication- intensive Course	N				
Course Type	Lecture-b	ased course			
Course Teaching	Activities		Details		No. of Hours
Course Teaching & Learning Activities	Lectures		glycolysis; gluconeogenesis glycogen metabolis; lipid me metabolism; regulation ar pathways	36	
	Tutorials		working on problems relating	g to the lecture topics	12
	Reading	/ Self study			100
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignme	ents		40	CLO 1,2,3
	Examinat	tion	2.5 hrs examination	60	CLO 1,2,3
Required/recommended reading and online materials	Devlin TN	1 (2011) Textbook of Biod	chemistry: with Clinical Corre	try, 8th ed. W.H. Freeman, New lations, 7th ed. John Wiley & So ry, 7th ed. W.H. Freeman, New `	ns Inc, New York.

BIOC3604	Essenti	al techniques in biochemistry and molecular	r biology	Academic Year	2021
	(6 credi	ts)			2021
Offering Department	Biomedic	al Sciences		Quota	70
Course Co-ordinator	Dr K M Ya	ao, Biomedical Sciences (kmyao@hku.hk)			
Teachers Involved	(Dr B C V	V Wong,Biomedical Sciences)			
	(Dr K M Y	'ao,Biomedical Sciences)			
		Vong,Biomedical Sciences)			
	`	en,Biomedical Sciences)			
		C Chang, Biomedical Sciences)			
	`	Y Shum, Biomedical Sciences)			
		Zhou,Biomedical Sciences)			
Course Objectives	students	students a general overview of different experimenta with hands-on experience in basic biochemical and mo	olecular techniq	ues.	•
Course Contents		ncepts in experimental science; writing of lab notebook			
& Topics		r, genomic and others; methods for isolation and ana			
		ocellular fractionation; enzyme assays and spectropho			ulation - PCR, si
		nutagenesis, blotting and hybridization, cloning strateg		napping.	
Course Learning		ssful completion of this course, students should be abl			
Outcomes		escribe and explain the principles underlying various b			
		pply different techniques to isolate and characterize o	carbonydrates, i	ipids, proteins an	d nucleic acids
		ands-on laboratory sessions	aiamtifia lamaua		
		terpret and discuss scientific data using appropriate so		e	
		ollaborate effectively with team members in laboratory	sessions		
•	Pass in B	IOC2600 or BIOL2220 or BMED2301 or MEDE2301			
and Co-requisites	Pass in B	IOC2600 or BIOL2220 or BMED2301 or MEDE2301			
and Co-requisites and Impermissible	Pass in B	IOC2600 or BIOL2220 or BMED2301 or MEDE2301			
and Co-requisites and Impermissible combinations)				Examination	May
and Co-requisites and Impermissible combinations) Offer in 2021 - 2022	Y 2nd	d sem Offer in 2022 - 2023 : Y	equired for attaining	Examination	May
Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)	Y 2nd	d sem Offer in 2022 - 2023 : Y  Demonstrates thorough and extensive knowledge and skills restrong analytical ability and logical thinking, with evidence of techniques with confidence and can critically appraise data to dra	original thought. On a sppropriate and its	g all the course learn Competently conducts insightful conclusions.	ing outcomes. Show laboratory skills ar
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 2nd	d sem Offer in 2022 - 2023 : Y  Demonstrates thorough and extensive knowledge and skills restrong analytical ability and logical thinking, with evidence of techniques with confidence and can critically appraise data to dra Demonstrates substantial knowledge and skills required for attai	original thought. On we appropriate and in ining most of the co	g all the course learn Competently conducts insightful conclusions. ourse learning outcome	ing outcomes. Show laboratory skills ar es. Shows evidence
and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 2nd	d sem Offer in 2022 - 2023 : Y  Demonstrates thorough and extensive knowledge and skills restrong analytical ability and logical thinking, with evidence of techniques with confidence and can critically appraise data to dra Demonstrates substantial knowledge and skills required for attail critical thinking and analytical skills. Conducts laboratory skills a	original thought. On a control or a control	g all the course learn Competently conducts insightful conclusions. ourse learning outcome	ing outcomes. Show laboratory skills ar es. Shows evidence
and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 2nd	d sem Offer in 2022 - 2023 : Y  Demonstrates thorough and extensive knowledge and skills restrong analytical ability and logical thinking, with evidence of techniques with confidence and can critically appraise data to dra Demonstrates substantial knowledge and skills required for attai critical thinking and analytical skills. Conducts laboratory skills appropriate conclusions.  Demonstrates general but incomplete knowledge and skills requ	original thought. One original thought. One or appropriate and in ing most of the control of the	g all the course learn competently conducts insightful conclusions. surse learning outcome a confidence and can ost of the course learn	ing outcomes. Show laboratory skills ar es. Shows evidence appraise data to dra ning outcomes. Show
and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 2nd	d sem Offer in 2022 - 2023 : Y  Demonstrates thorough and extensive knowledge and skills restrong analytical ability and logical thinking, with evidence of techniques with confidence and can critically appraise data to drain Demonstrates substantial knowledge and skills required for attaic critical thinking and analytical skills. Conducts laboratory skills appropriate conclusions.  Demonstrates general but incomplete knowledge and skills required for critical thinking and analytical skills. Conducts conducts appropriate conclusions.	original thought. One original thought. One or and it is a constant of the constant techniques with the original for attaining motes laboratory skills	g all the course learn competently conducts insightful conclusions. surse learning outcome a confidence and can ost of the course learns and techniques to	ing outcomes. Show laboratory skills and es. Shows evidence appraise data to dra ning outcomes. Show
and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 2nd A B C	Demonstrates thorough and extensive knowledge and skills restrong analytical ability and logical thinking, with evidence of techniques with confidence and can critically appraise data to dra Demonstrates substantial knowledge and skills required for attaic critical thinking and analytical skills. Conducts laboratory skills appropriate conclusions.  Demonstrates general but incomplete knowledge and skills required some evidence of critical thinking and analytical skills. Conductompetence and can sometimes correctly appraise data and draw	original thought. Caw appropriate and ining most of the coand techniques with tired for attaining most of laboratory skills w appropriate conclinations.	g all the course learn competently conducts insightful conclusions. jurise learning outcome a confidence and can ost of the course learn is and techniques to jusions.	ing outcomes. Show laboratory skills ares. Shows evidence appraise data to dra ning outcomes. Show a satisfactory level
and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 2nd	d sem Offer in 2022 - 2023 : Y  Demonstrates thorough and extensive knowledge and skills restrong analytical ability and logical thinking, with evidence of techniques with confidence and can critically appraise data to dra Demonstrates substantial knowledge and skills required for attaicritical thinking and analytical skills. Conducts laboratory skills appropriate conclusions.  Demonstrates general but incomplete knowledge and skills required some evidence of critical thinking and analytical skills. Conducts or competence and can sometimes correctly appraise data and draw Demonstrates partial but limited knowledge and skills required for critical thinking and analytical skills. Displays poor laboratory	original thought. On a paper and it in ining most of the country and techniques with a citizen and techniques with a paper attaining macus laboratory skills we appropriate concluder attaining some of a training some of	g all the course learn competently conducts insightful conclusions. surse learning outcome a confidence and can ost of the course learn is and techniques to usions.	ing outcomes. Show laboratory skills ares. Shows evidence appraise data to dra ning outcomes. Show a satisfactory level tcomes. Shows limit
and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 2nd A B C	Demonstrates thorough and extensive knowledge and skills restrong analytical ability and logical thinking, with evidence of techniques with confidence and can critically appraise data to dra Demonstrates substantial knowledge and skills required for attail critical thinking and analytical skills. Conducts laboratory skills appropriate conclusions.  Demonstrates general but incomplete knowledge and skills required some evidence of critical thinking and analytical skills. Conductompetence and can sometimes correctly appraise data and draw Demonstrates partial but limited knowledge and skills required for critical thinking and analytical skills. Displays poor laboratory appropriate conclusions.	original thought. It was appropriate and ining most of the coand techniques with the coand techniques with the coand techniques with the coand techniques was appropriate conclusive appropriate conclusive appropriate conclusive skills and techniques.	g all the course learn competently conducts in sightful conclusions. It is confidence and can cost of the course learns and techniques to usions. It is course learning oues and is rarely able	ing outcomes. Show laboratory skills and as. Shows evidence appraise data to drawning outcomes. Show a satisfactory level tcomes. Shows limit to use data to drawning outcomes.
and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 2nd A B C	d sem Offer in 2022 - 2023 : Y  Demonstrates thorough and extensive knowledge and skills restrong analytical ability and logical thinking, with evidence of techniques with confidence and can critically appraise data to dra Demonstrates substantial knowledge and skills required for attain critical thinking and analytical skills. Conducts laboratory skills a appropriate conclusions.  Demonstrates general but incomplete knowledge and skills required some evidence of critical thinking and analytical skills. Conduct competence and can sometimes correctly appraise data and draw Demonstrates partial but limited knowledge and skills required for critical thinking and analytical skills. Displays poor laboratory appropriate conclusions.  Demonstrates little or no evidence of knowledge and skills required.	original thought. Community and techniques with a control techniques with a control techniques with a control technique with a control technique was a control technique and technique red for attaining the conditions and technique red for attaining the	g all the course learn competently conducts insightful conclusions. wurse learning outcome confidence and can ost of the course learn s and techniques to usions. the course learning oues and is rarely able to course learning outcourse learning outcourse learning outcourse learning outcourse.	ing outcomes. Show laboratory skills are ses. Shows evidence appraise data to draming outcomes. Show a satisfactory level toomes. Shows limit to use data to drames. Lacks analyticomes. Lacks analytic
and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 2nd A B C	Demonstrates thorough and extensive knowledge and skills restrong analytical ability and logical thinking, with evidence of techniques with confidence and can critically appraise data to dra Demonstrates substantial knowledge and skills required for attail critical thinking and analytical skills. Conducts laboratory skills appropriate conclusions.  Demonstrates general but incomplete knowledge and skills required some evidence of critical thinking and analytical skills. Conductompetence and can sometimes correctly appraise data and draw Demonstrates partial but limited knowledge and skills required for critical thinking and analytical skills. Displays poor laboratory appropriate conclusions.	original thought. Community and techniques with a control techniques with a control techniques with a control technique with a control technique was a control technique and technique red for attaining the conditions and technique red for attaining the	g all the course learn competently conducts insightful conclusions. wurse learning outcome confidence and can ost of the course learn s and techniques to usions. the course learning oues and is rarely able to course learning outcourse learning outcourse learning outcourse learning outcourse.	ing outcomes. Show laboratory skills are ses. Shows evidence appraise data to draming outcomes. Show a satisfactory level toomes. Shows limit to use data to drames. Lacks analyticomes. Lacks analytic
and Co-requisites and Impermissible combinations)  Offer in 2021 - 2022  Grade Descriptors (A+ to F)	Y 2nd A B C	d sem Offer in 2022 - 2023 : Y  Demonstrates thorough and extensive knowledge and skills restrong analytical ability and logical thinking, with evidence of techniques with confidence and can critically appraise data to dra Demonstrates substantial knowledge and skills required for attaic critical thinking and analytical skills. Conducts laboratory skills appropriate conclusions.  Demonstrates general but incomplete knowledge and skills required some evidence of critical thinking and analytical skills. Conducts of critical thinking and analytical skills. Conducts of critical thinking and analytical skills. Displays poor laboratory appropriate conclusions.  Demonstrates little or no evidence of knowledge and skills required for critical thinking and analytical skills. Displays poor laboratory appropriate conclusions.  Demonstrates little or no evidence of knowledge and skills required for ability and logical thinking. Displays ineffective lab skills and	original thought. Community and techniques with a control techniques with a control techniques with a control technique with a control technique was a control technique and technique red for attaining the conditions and technique red for attaining the	g all the course learn competently conducts insightful conclusions. wurse learning outcome confidence and can ost of the course learn s and techniques to usions. the course learning oues and is rarely able to course learning outcourse learning outcourse learning outcourse learning outcourse.	ing outcomes. Show laboratory skills are ses. Shows evidence appraise data to draming outcomes. Show a satisfactory level toomes. Shows limit to use data to drames. Lacks analyticomes. Lacks analytic
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and Co-requisites and Impermissible combinations)  Offer in 2021 - 2022  Grade Descriptors (A+ to F)  Communication-intensive Course  Course Type	Y 2nd A B C D Fail	Demonstrates thorough and extensive knowledge and skills restrong analytical ability and logical thinking, with evidence of techniques with confidence and can critically appraise data to dra Demonstrates substantial knowledge and skills required for attaic critical thinking and analytical skills. Conducts laboratory skills a appropriate conclusions.  Demonstrates general but incomplete knowledge and skills required for critical thinking and analytical skills. Conduct competence and can sometimes correctly appraise data and draw Demonstrates partial but limited knowledge and skills required for critical thinking and analytical skills. Displays poor laboratory appropriate conclusions.  Demonstrates little or no evidence of knowledge and skills required for critical thinking and logical thinking. Displays ineffective lab skills and conclusions.	original thought. Community and techniques with a control techniques with a control techniques with a control technique with a control technique was a control technique and technique red for attaining the conditions and technique red for attaining the	g all the course learn competently conducts insightful conclusions. wurse learning outcome confidence and can ost of the course learn s and techniques to usions. the course learning oues and is rarely able to course learning outcourse learning outcourse learning outcourse learning outcourse.	ing outcomes. Show laboratory skills ares. Shows evidence appraise data to draming outcomes. Show a satisfactory level tcomes. Shows limit to use data to drames. Lacks analytic
and Co-requisites and Impermissible combinations)  Offer in 2021 - 2022  Grade Descriptors (A+ to F)  Communication- Intensive Course Course Type Course Teaching	Y 2nd A B C D Fail N Lecture w	Demonstrates thorough and extensive knowledge and skills restrong analytical ability and logical thinking, with evidence of techniques with confidence and can critically appraise data to dra Demonstrates substantial knowledge and skills required for attain critical thinking and analytical skills. Conducts laboratory skills appropriate conclusions.  Demonstrates general but incomplete knowledge and skills required some evidence of critical thinking and analytical skills. Conductompetence and can sometimes correctly appraise data and draw Demonstrates partial but limited knowledge and skills required for critical thinking and analytical skills. Displays poor laboratory appropriate conclusions.  Demonstrates little or no evidence of knowledge and skills required for critical thinking. Displays ineffective lab skills and conclusions.	original thought. Community and techniques with a control techniques with a control techniques with a control technique with a control technique was a control technique and technique red for attaining the conditions and technique red for attaining the	g all the course learn competently conducts insightful conclusions. wurse learning outcome confidence and can ost of the course learn s and techniques to usions. the course learning oues and is rarely able to course learning outcourse learning outcourse learning outcourse learning outcourse.	ing outcomes. Show laboratory skills are as. Shows evidence appraise data to drawing outcomes. Show a satisfactory level tcomes. Shows limit to use data to drawomes. Lacks analytic to draw appropria
and Co-requisites and Impermissible combinations)  Offer in 2021 - 2022  Grade Descriptors (A+ to F)  Communication- ntensive Course Course Type Course Teaching	Y 2nd A B C D Fail N Lecture w Activities	Demonstrates thorough and extensive knowledge and skills restrong analytical ability and logical thinking, with evidence of techniques with confidence and can critically appraise data to dra Demonstrates substantial knowledge and skills required for attain critical thinking and analytical skills. Conducts laboratory skills appropriate conclusions.  Demonstrates general but incomplete knowledge and skills required some evidence of critical thinking and analytical skills. Displays and constrates partial but limited knowledge and skills required for critical thinking and analytical skills. Displays poor laboratory appropriate conclusions.  Demonstrates little or no evidence of knowledge and skills required for critical thinking. Displays ineffective lab skills and conclusions.	original thought. Community and techniques with a control techniques with a control techniques with a control technique with a control technique was a control technique and technique red for attaining the conditions and technique red for attaining the	g all the course learn competently conducts insightful conclusions. wurse learning outcome confidence and can ost of the course learn s and techniques to usions. the course learning oues and is rarely able to course learning outcourse learning outcourse learning outcourse learning outcourse.	ing outcomes. Show laboratory skills are as. Shows evidence appraise data to drawing outcomes. Show a satisfactory level to use data to drawomes. Lacks analytic to draw appropriation.
and Co-requisites and Impermissible combinations)  Offer in 2021 - 2022  Grade Descriptors (A+ to F)  Communication- Intensive Course Course Type Course Teaching	Y 2nd A B C D Fail N Lecture w Activitie: Lectures	Demonstrates thorough and extensive knowledge and skills restrong analytical ability and logical thinking, with evidence of techniques with confidence and can critically appraise data to dra Demonstrates substantial knowledge and skills required for attaic critical thinking and analytical skills. Conducts laboratory skills a appropriate conclusions.  Demonstrates general but incomplete knowledge and skills required some evidence of critical thinking and analytical skills. Conduct competence and can sometimes correctly appraise data and draw Demonstrates partial but limited knowledge and skills required for critical thinking and analytical skills. Displays poor laboratory appropriate conclusions.  Demonstrates little or no evidence of knowledge and skills required for critical thinking and logical thinking. Displays ineffective lab skills and conclusions.  Petalis  Type Demonstrates little or no evidence of knowledge and skills required for critical thinking. Displays ineffective lab skills and conclusions.	original thought. Community and techniques with a control techniques with a control techniques with a control technique with a control technique was a control technique and technique red for attaining the conditions and technique red for attaining the	g all the course learn competently conducts insightful conclusions. wurse learning outcome confidence and can ost of the course learn s and techniques to usions. the course learning oues and is rarely able to course learning outcourse learning outcourse learning outcourse learning outcourse.	ing outcomes. Show laboratory skills are as. Shows evidence appraise data to drawing outcomes. Show a satisfactory level at toomes. Shows limit to use data to drawomes. Lacks analytic to draw appropriation.  No. of Hours
and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 2nd A B C D Fail N Lecture w Activities Lectures Laborato Tutorials	Demonstrates thorough and extensive knowledge and skills restrong analytical ability and logical thinking, with evidence of techniques with confidence and can critically appraise data to dra Demonstrates substantial knowledge and skills required for attaic critical thinking and analytical skills. Conducts laboratory skills a appropriate conclusions.  Demonstrates general but incomplete knowledge and skills required some evidence of critical thinking and analytical skills. Conduct competence and can sometimes correctly appraise data and draw Demonstrates partial but limited knowledge and skills required for critical thinking and analytical skills. Displays poor laboratory appropriate conclusions.  Demonstrates little or no evidence of knowledge and skills required for critical thinking and logical thinking. Displays ineffective lab skills and conclusions.  Petalis  Type Demonstrates little or no evidence of knowledge and skills required for critical thinking. Displays ineffective lab skills and conclusions.	original thought. Community and techniques with a control techniques with a control techniques with a control technique with a control technique was a control technique and technique red for attaining the conditions and technique red for attaining the	g all the course learn competently conducts insightful conclusions. wurse learning outcome confidence and can ost of the course learning s and techniques to usions. The course learning out es and is rarely able to course learning outcourse learning outcourse learning outcourse learning outcourse.	ing outcomes. Show laboratory skills are as. Shows evidence appraise data to drawing outcomes. Show a satisfactory level toomes. Shows limit to use data to drawomes. Lacks analytic to draw appropria  No. of Hours 12 72
and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)  Communication- ntensive Course Course Type Course Teaching	Y 2nd A B C D Fail N Lecture w Activities Lectures Laborato Tutorials	Demonstrates thorough and extensive knowledge and skills restrong analytical ability and logical thinking, with evidence of techniques with confidence and can critically appraise data to dra Demonstrates substantial knowledge and skills required for attaic critical thinking and analytical skills. Conducts laboratory skills a appropriate conclusions.  Demonstrates general but incomplete knowledge and skills required some evidence of critical thinking and analytical skills. Conduct competence and can sometimes correctly appraise data and draw Demonstrates partial but limited knowledge and skills required for critical thinking and analytical skills. Displays poor laboratory appropriate conclusions.  Demonstrates little or no evidence of knowledge and skills required for critical thinking and logical thinking. Displays ineffective lab skills and conclusions.  Vith laboratory component course  S Details  Ty  / Self study	original thought. Caw appropriate and ining most of the coand techniques with the coand techniques with the coand techniques with the coand technique wappropriate concion attaining some of skills and technique red for attaining the techniques and is	g all the course learn competently conducts insightful conclusions. iruse learning outcome a confidence and can ost of the course learn is and techniques to usions. the course learning outes and is rarely able to course learning outes a unable to use data	ing outcomes. Show laboratory skills are as. Shows evidence appraise data to drawing outcomes. Show a satisfactory level toomes. Shows limit to use data to draw omes. Lacks analytic to draw appropria  No. of Hours  12  72  6
and Co-requisites and Impermissible combinations)  Offer in 2021 - 2022  Grade Descriptors (A+ to F)  Communication-intensive Course Course Type Course Teaching & Learning Activities	Y 2nd A B C D Fail N Lecture w Activitie Lectures Laborato Tutorials Reading	Demonstrates thorough and extensive knowledge and skills restrong analytical ability and logical thinking, with evidence of techniques with confidence and can critically appraise data to dra Demonstrates substantial knowledge and skills required for attaic critical thinking and analytical skills. Conducts laboratory skills a appropriate conclusions.  Demonstrates general but incomplete knowledge and skills required some evidence of critical thinking and analytical skills. Conduct competence and can sometimes correctly appraise data and draw Demonstrates partial but limited knowledge and skills required for critical thinking and analytical skills. Displays poor laboratory appropriate conclusions.  Demonstrates little or no evidence of knowledge and skills required for critical thinking and logical thinking. Displays ineffective lab skills and conclusions.  Vith laboratory component course  S Details  Ty  / Self study	original thought. diverginal thought. diverginal thought. diverging the control of the control o	g all the course learn competently conducts insightful conclusions. iruse learning outcom a confidence and can ost of the course learn s and techniques to usions. the course learning ou es and is rarely able e course learning outce s unable to use data	ing outcomes. Show laboratory skills are as. Shows evidence appraise data to drawing outcomes. Show a satisfactory level toomes. Shows limit to use data to drawomes. Lacks analytic to draw appropria  No. of Hours  12  72  6  76
and Co-requisites and Impermissible combinations)  Offer in 2021 - 2022  Grade Descriptors (A+ to F)  Communication- ntensive Course Course Type Course Teaching & Learning Activities	Y 2nd A B C D Fail N Lecture w Activitie Lectures Laborato Tutorials Reading	Demonstrates thorough and extensive knowledge and skills restrong analytical ability and logical thinking, with evidence of techniques with confidence and can critically appraise data to dra Demonstrates substantial knowledge and skills required for attaic critical thinking and analytical skills. Conducts laboratory skills a appropriate conclusions.  Demonstrates general but incomplete knowledge and skills required some evidence of critical thinking and analytical skills. Conduct competence and can sometimes correctly appraise data and draw Demonstrates partial but limited knowledge and skills required for critical thinking and analytical skills. Displays poor laboratory appropriate conclusions.  Demonstrates little or no evidence of knowledge and skills required for critical thinking and logical thinking. Displays ineffective lab skills and conclusions.  Vith laboratory component course  S Details  Ty  / Self study	original thought. diverginal thought. diverginal thought. diverging the control of the control o	g all the course learn competently conducts insightful conclusions. iruse learning outcome a confidence and can ost of the course learn is and techniques to usions. the course learning outes and is rarely able to course learning outes a unable to use data	ing outcomes. Show laboratory skills are as. Shows evidence appraise data to drawing outcomes. Show a satisfactory level toomes. Shows limit to use data to drawing outcomes. Shows limit to use data to drawing outcomes. Lacks analytic to draw appropria  No. of Hours 12 72 6 76 Assessment

	Examination		50	CLO 1,2,3
Required/recommended	Cox MM, Doudna JA and O'Donne	II M (2015) Molecular Biology: Prince	ciples and Practice, 2nd ed	d. Macmillan.
reading and	Scopes RK (1994) Protein Purific	ation: Principles and Practice. 3rd	ed, Springer Advanced 1	exts in Chemistry,
	Springer-Verlag, New York.			
	Wilson K, Walker KM (2010) Princi	ples and Techniques of Biochemis	try and Molecular Biology.	7th ed. Cambridge
	University Press, Cambridge.			

BIOC3605	Sequen	ce bioinformatic	s (6 credits)	Academic Ye	ar 2021	
Offering Department		al Sciences		Quota	80	
Course Co-ordinator	Dr B C W	/ Wong, Biomedical S	Sciences (bcwwong@hku.hk)			
Teachers Involved	(Dr B C V	V Wong,Biomedical \$	Sciences)			
		K Ho,Biomedical Scie				
Course Objectives	underlyin analyze,	g principles of these and compare protei	analysis programs and servicent and DNA sequences using	NA and protein sequence analysis. es will be presented. Students will l bioinformatics tools available on t ext generation sequencing data will	earn how to retrieve he internet. A basi	
Course Contents & Topics	This cour	se will introduce and	discuss the following topics:	·		
	sequence sequence	e analysis; sequence e database searching	e alignment: pair-wise alignme	ntabases; information searching ar ent, multiple sequence alignment, s sequence patterns and motifs, and p encing data	ubstitution matrices	
Course Learning	On succe	essful completion of t	his course, students should b	e able to:		
Outcomes	CLO 1 s	earch and retrieve se	equence data from biological	databases		
	S	earch, phylogenetic t	trees construction, and gene p		ts, BLAST database	
			of sequence analysis in variou			
	CLO 4 interpret results from sequence alignments, BLAST database searches, and phylogenetic trees construction					
	CLO 5 carry out basic analysis of next generation sequencing data  Pass in BIOC2600 or BIOL2220 or BBMS2003 or BBMS2007 or MEDE2301 or BMED2301					
Pre-requisites (and Co-requisites and Impermissible combinations)						
Offer in 2021 - 2022	Y 2n	d sem Offer in 202	2 - 2023 : Y	Examination	May	
Grade Descriptors (A+ to F)	A Demonstrates thorough and complete mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes; strong critical thinking; excellent ability to apply bioinformatics skills in a range of context.  B Demonstrates substantial command of a broad range of knowledge and skills required for attaining at least most of the course					
	learning outcomes; evidence of critical thinking; good ability to apply bioinformatics skills in a range of context.  Demonstrates general but incomplete command of knowledge and skills required for attaining most of the course learning outcome; some critical thinking; adequate ability to apply bioinformatics skills in a range of context.					
	D Demonstrates partial but limited command of knowledge and skills required for attaining some of the course learning outcomes; limited critical thinking; limited ability to apply bioinformatics skills in a range of context.					
	Fail  Demonstrates little or no evidence of command of knowledge and skills required for attaining the course learning outcomes; lack of critical thinking; little or no ability to apply bioinformatics skills in a range of context.					
Communication- intensive Course	N					
Course Type	Lecture-b	ased course				
Course Teaching	Activitie	s	Details	Details		
& Learning Activities	Lectures				36	
	Tutorials					
	Reading	/ Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignments			40	CLO 1,2,3,4,5	
	Examina			60	CLO 2,3,4	
Required/recommended reading and	Higgs, P.	G. & Attwood, T.K., 2		ecular evolution, Malden, MA ; Oxforme analysis 2nd ed., Cold Spring	d: Blackwell.	
online materials	Spring Ha	arbor Laboratory Pre	SS.			

BIOC3606	Molecular medicine (6 credits)	Academic Year	2021				
Offering Department	Biomedical Sciences	Quota	50				
Course Co-ordinator	Prof D Y Jin, Biomedical Sciences (dyjin@hku.hk)	Prof D Y Jin, Biomedical Sciences (dyjin@hku.hk)					
Teachers Involved	(Dr B Gao,Biomedical Sciences) (Dr. YQ Song,Biomedical Sciences) (Prof D Y Jin,Biomedical Sciences) (Prof K S E Cheah,Biomedical Sciences)						
Course Objectives		To provide up-to-date knowledge of the molecular and cellular basis of selected human diseases including cancer and infection with HIV and influenza viruses, thereby preparing the students for a career in biomedical, biotechnological pharmaceutical and genomic research					
Course Contents & Topics	molecular therapeutics. Specific topics may include cell signaling, mouse mod and tumour suppressor genes, genome instability, HIV science, genetics and molecular approaches to vaccine development, immune checkpoint therapy,	This course covers cell signaling in relation to human diseases, molecular basis of cancer and viral diseases, and molecular therapeutics. Specific topics may include cell signaling, mouse model of human diseases, oncogenes and tumour suppressor genes, genome instability, HIV science, genetics and pathogenesis of influenza viruses, molecular approaches to vaccine development, immune checkpoint therapy, stem cells and stem cell therapy, gene therapy, and nucleic acid therapeutics. Basic knowledge of biochemistry and molecular cell biology is					
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 explain the molecular mechanisms underlying selected human diseases including cancer and emerging infections						

		illustrate the application cell biological, genetic, medical problems				
		interpret and communic audience in the commur		t molecular aspects of	medicine in the	literature to a wider
		CLO 4 integrate and translate knowledge in molecular biology to new approaches in disease prevention				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in	Pass in BIOC2600 or BIOL2220 or MEDE2301 or BMED2301				
Offer in 2021 - 2022	Y 2	nd sem Offer in 2022 -	- 2023 : Y		Examination	May
Grade Descriptors (A+ to F)	A Displays a comprehensive grasp of the key concepts underlying the molecular basis of human dis errors. Able to articulate clearly with examples how knowledge in molecular biology can lead prevention and intervention. Evidence of strong analytical and critical thinking when dealing with a evidence for additional information beyond what is given in the lectures.				iology can lead to no	ew strategies in disease
	В	· •				
	С	Displays a general understanding of the key concepts underlying the molecular basis of human disease and is sometimes able to relate knowledge in molecular biology to new strategies in disease prevention and intervention. Sometimes able to apply analytical and critical thinking skills when dealing with scientific data.				
	D	Displays a limited understanding of the key concepts underlying the molecular basis of human disease and is rarely able to relate knowledge in molecular biology to new strategies in disease prevention and intervention. Evidence of weak analytical and critical thinking skills when dealing with scientific data.				
	Fail	Fail Displays an incorrect or incomplete understanding of the key concepts underlying the molecular basis of human disease and is unable to relate this knowledge to effective treatment strategies. No evidence of analytical or critical thinking skills when dealing with scientific data.				
Communication- intensive Course	N					
Course Type	Lecture-	-based course				
Course Teaching	Activiti	es	Details			No. of Hours
& Learning Activities	Lecture	S				36
	Tutorial	S				12
	Reading	g / Self study			100	
Assessment Methods and Weighting	Method	ls	Details		ighting in final urse grade (%)	Assessment Methods to CLO Mapping
	Examin	ation			60	CLO 1,2,3,4
	Test				40	CLO 1,2,3,4
Required/recommended reading and online materials	Alberts	lest 40 CLO 1,2, odish et al: Molecular Cell Biology 7th ed., 2013 (4th ed. is available at NCBI Books) Alberts et al: Molecular Biology of the Cell 6th ed., 2015 (4th ed. is available at NCBI Books) Cassimeris et al: Lewin's Cells, 2nd ed., 2011				

BIOC3999	Directed studies in biochemistry (6 credits)	Academic Year 2021			
Offering Department	Biomedical Sciences	Quota 36			
Course Co-ordinator	Dr A C Koon (Sem 1); Dr B H B Yuen (Sem 2 & Summer), Bion yuenbbh@hku.hk)	medical Sciences (alexkoon@hku.hk;			
Teachers Involved	(All academic staff in Biochemistry Major,Biomedical Sciences) (Dr A C Koon,Biomedical Sciences) (Dr B H B Yuen,Biomedical Sciences) (Dr B H B Yuen,Biomedical Sciences)				
Course Objectives	To enhance students knowledge of a particular topic and the students se skills.	lf-directed learning and critical thinking			
Course Contents & Topics	The student undertakes a self-managed study on a topic in biochemistry under the supervision of a staff member. The topic is preferably one not sufficiently covered in the regular curriculum. The directed study can be a critical review or a synthesis of published work on the subject. A laboratory or field study may also be involved that would enhance the student's understanding of the subject.				
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 critically appraise research literature in a specific area of biochemisi CLO 2 examine the theoretical or experimental basis for existing concepts CLO 3 identify questions and evaluate issues for further research developm CLO 4 interpret scientific data in original research articles and communicat	nent			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core including BIOC2600 or BIOL2220 and BIOL3401.  This capstone course is for Biochemistry Major students only.  The earliest that a student is allowed to take this capstone course is their year.				
Offer in 2021 - 2022	Y 1st sem 2nd sem Summer Offer in 2022 - 2023 : Y	Examination No Exam			
Grade Descriptors (A+ to F)	A Produces a sophisticated and detailed appraisal of the biochemical litera understanding of the selected topic. Able to contextualize all the ideas within a relevant issues emerging from the study. Works proactively with a supervisor skills. Communicates the findings to a broader audience in an effective way and time-management skills and able to reflect honestly on one's own learning.	n personal framework of knowledge and evaluate to enhance understanding and scientific writing I responds knowledgeably to questions. Excellent			
	Produces a coherent appraisal of the biochemical literature, displaying a sound understanding of the selected topic. Able to contextualize many of the ideas within a personal framework of knowledge and identify some relevant issues emerging from the study. Works constructively with a supervisor to enhance understanding and scientific writing skills. Clearly communicates the findings to a broader audience and responds knowledgeably to most questions. Able to time-manage effectively and reflect on one's own learning.				
	Produces a reasonable appraisal of the biochemical literature, displaying an adequate understanding of the selected topic. Able to contextualize a few of the ideas within a personal framework of knowledge and makes some attempt to identify some relevant issues emerging from the study. Works with a supervisor and other co-workers to improve understanding and scientific writing skills. Communicates the findings to a broader audience with reasonable clarity and responds to most questions. Acceptable time-management and self-reflection skills.				
	Produces a superficial appraisal of the biochemical literature, displaying a limicontextualize a few of the ideas within a personal framework of knowledge but				

		Displays weak com reflection skills.	ks reluctantly with a supervisor and other co- munication skills when presenting the findir	ngs to a broader audience. Poor tin	ne-management and self-		
	Fail	contextualize the ide in isolation, thus fail	Fails to appraise the biochemical literature and thus unable to display any understanding of the sel contextualize the ideas within a personal framework of knowledge or identify any relevant issues emergin i isolation, thus failing to make progress in understanding and scientific writing skills. Unable to community of the findings to a broader audience. No time-management skills or ability to self-reflect.				
Communication- intensive Course	N						
Course Type	Project-ba	sed course					
Course Teaching	Activities	3	Details	No. of Hours			
& Learning Activities	Reading / Self study		at least 120 hours on the proj	120			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Dissertati	on	including mind map (10%)	60	CLO 1,2,3,4		
	Oral pres	entation		25	CLO 1,2,3,4		
	Research	report	Supervisor comments	15	CLO 1,2,3,4		
Required/recommended reading and online materials	as sugges	ted by project sup	pervisors				

BIOC4610	Advance	ed biochemistry	/ (6 credits)	Academic Ye	ar 2021		
Offering Department	Biomedica	al Sciences		Quota	70		
Course Co-ordinator	Dr K M Ya	ao, Biomedical Scie	ences (kmyao@hku.hk)				
eachers Involved	,	Ti,Biomedical Scie	,				
		ao,Biomedical Scie					
	١,	rvas Millan,Biomed	,				
		nan,Biomedical Sci					
Course Objectives	organisms		g students an in-depth understand articularly useful for students inter	· ·	•		
Course Contents & Topics	Cell-surface	ce receptors and spathways that con	al transduction mechanisms signal transduction proteins; G-P trol gene expression: receptors t sitide signaling pathways and rece	that activate protein tyrosine kin	ases, the Ras/MA		
	The micro	tubule cytoskeleto	signal transduction n; kinesin and dynein motor; the a lor; cytoskeleton and intracellular		termediate filamer		
	Transloca		ting pathways vroteins - insertion into the ER; n the ER; molecular mechanism of				
	D. Cell-cell and cell-matrix adhesion Cell-cell and cell-extracellular matrix (ECM) junctions and their adhesion molecules; cadherins and integrins; collagens and proteoglycans; when cell meets the matrix; regulation of signaling molecules by ECM						
ourse Learning	On succes	ssful completion of	this course, students should be a	ble to:			
Outcomes	CLO 1 describe and explain the molecular and cellular signal transduction mechanisms that mediate cellular communication to achieve a plethora of cellular responses in multicellular organisms						
	CLO 2 apply knowledge in molecular cell biology to analyze new findings and to design further experiments						
	CLO 3 interpret data in research articles/problem-solving questions and communicate using appropriate scientific						
	language						
			classmates in tutorial classes				
Pre-requisites and Co-requisites and Impermissible combinations)	Pass in Bi	IOC3601 or BIOL34	401 or BIOL3402 or BIOL3404				
Offer in 2021 - 2022	Y 1st	sem Offer in 202	2 2022 · V	Examination	Dec		
Grade Descriptors							
(A+ to F)	A Demonstrate thorough and complete mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong critical thinking and analytical skills, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations.						
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of critical thinking and analytical skills, and ability to apply knowledge to familiar and some unfamiliar situations.						
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some critical thinking and analytical skills, and ability to apply knowledge to most familiar situations.						
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some critical thinking, but with limited analytical skills. Show limited ability to apply knowledge to solve						
	Fail	Fail Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of critical thinking and analytical skills. Show very little or no ability to apply knowledge to solve problems.					
Communication- ntensive Course	N	-	·				
ourse Type	Lecture-ba	ased course					
ourse Teaching	Activities	3	Details		No. of Hours		
Learning Activities	Lectures				36		
	Tutorials				12		
	Reading /	Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin		

	Assignments		40	CLO 1,2,3,4		
	Examination		60	CLO 1,2,3		
Required/recommended	Lodish H et al (2016) Molecular Cell Biology, 8th ed. Freeman (New York) & Macmillan (England).					
reading and	Alberts B et al (2014) Molecular Biology of the Cell, 6th ed. Garland Science, New York.					
online materials						

BIOC4611	Advanc	ed biochemistry II	(6 credits)	Academic Yea	r 2021		
Offering Department	Biomedic	al Sciences		Quota	50		
Course Co-ordinator	Prof D Ch	han, Biomedical Science	ces (chand@hku.hk)				
Teachers Involved	(Dr C M (	Qian,Biomedical Scien	ces)				
	(Dr J Tanner,Biomedical Sciences)						
		taka,Physiology)					
		Vong,Biomedical Scier					
		Chan,Biomedical Science					
Course Objectives	structure	and disease; realizir		knowledge of protein biochemistry cs in cellular function and an a cules.			
Course Contents & Topics	changes	in protein function; ca	atalytic mechanisms of enzyr	onformation of proteins and the rol mes and enzyme kinetics; biomolo ography, nuclear magnetic reso	ecular interactions		
	spectroso	copy methods; protein	engineering and therapeutic a	pproaches targeting protein function	n.		
Course Learning			s course, students should be a	able to:			
Outcomes			ructures inform functions				
		•	nzyme kinetics in cellular func				
			ation of macromolecules from	•			
		pply their knowledge opplied research	on protein engineering and the	erapeutics, and on experimental de	esigns in basic and		
Pre-requisites	Pass in B	BIOC3601; and BIOL34	104 or CHEM2441; and				
(and Co-requisites and Impermissible combinations)	Pass in B	BIOC4610, or already e	enrolled in this course				
Offer in 2021 - 2022	N Of	fer in 2022 - 2023 : N		Examination			
Grade Descriptors (A+ to F)	A Clear and insightful description of how protein structure informs function; clear evidence of ability to recognize mechanisms of enzyme function and interpretation of data; effectual demonstration of applying knowledge to the design of scientific methodologies and cohesive, systematic and creative organization of information for presentation and communication.						
	B Clear description of how protein structure informs function; evidence of ability to recognize mechanisms of enzyme function and interpretation of data; capable demonstration of applying knowledge to the design of scientific methodologies; and cohesive and systematic organization of information for presentation and communication.						
	Awareness of how protein structure informs function; some evidence of ability to recognize mechanisms of enzyme function and interpretation of data; some capable demonstration of applying knowledge to the design of scientific methodologies and systematic organization of information for presentation and communication.						
	D Superficial awareness of how protein structure informs function; limited evidence of ability to recognize mechanisms of enzyme function and interpretation of data; superficial demonstration of applying knowledge to the design of scientific methodologies and						
	Fail Lack of awareness of how protein structure informs function; lack of ability to recognize mechanisms of enzyme function and interpretation of data; superficial demonstration of applying knowledge to the design of scientific methodologies; insufficient organizational skill of information for presentation and communication.						
Communication- intensive Course	N						
Course Type	Lecture-b	pased course					
Course Teaching	Activitie		Details		No. of Hours		
& Learning Activities	Lectures				36		
-	Tutorials				12		
		/ Self study			100		
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments			30	CLO 1,2,3,4		
	Examina	ition		70	CLO 1,2,3,4		
Required/recommended reading and online materials		èman, New York.	Mechanism in Protein Science	e: A Guide to Enzyme Catalysis a	nd Protein Folding		

BIOC4612	Molecular biology of the gene (6 credits)	Academic Year	2021				
Offering Department	Biomedical Sciences	Quota	50				
Course Co-ordinator	Prof K S E Cheah, Biomedical Sciences (hrmbdkc@hku.hk)	Prof K S E Cheah, Biomedical Sciences (hrmbdkc@hku.hk)					
Teachers Involved	(Dr K M Yao,Biomedical Sciences) (Prof K S E Cheah,Biomedical Sciences) (Prof. PT Liu,Biomedical Sciences) (Prof. ZJ Zhou,Biomedical Sciences)						
Course Objectives	To provide an up-to-date knowledge of molecular biology, especially w gene expression.	ith respect to the regulat	ion of eukaryotic				
Course Contents & Topics	This is a comprehensive course covering many detailed molecular function. Through this course an understanding of how gene expression and post transcription will be gained.						
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 describe the mechanisms for regulation of transcription, RNA processing and translation in eukaryotes						
	CLO 2 explain how cellular homeostasis can be maintained by a combination of controls of gene expression at multiple levels						
	CLO 3 illustrate the hierarchy of gene expression regulation in stem cells and developmental processes						
	CLO 4 interpret experimental results in gene regulation studies						

	CLO 5 work effectively with classmates in tutorial classes				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BIOC3601 or BIOL3401 or BIOL3402 or BIOL3404 or BBMS2007				
Offer in 2021 - 2022	Y 2nd	sem Offer in 2022	- 2023 : Y	Examination	n May
Grade Descriptors (A+ to F)	Α		relates the knowledge to develo	of the regulation of eukaryotic gene expr pmental processes. Uses skill and insigh	
	В			n the regulation of eukaryotic gene expre il processes. Correctly analyses and interp	
	С		e the knowledge to developmen	of eukaryotic gene expression and its relatal processes. Displays a limited capacit	
	D Demonstrates a simplistic knowledge of the regulation of eukaryotic gene expression and rarely relates the information to developmental processes. Displays weak analytical skills and is rarely able to interpret experimental data from gene regulation studies.				
	Fail			regulation of gene expression and is una experimental data from gene regulation stud	
Communication- intensive Course	N				
Course Type	Lecture-ba	ased course			
Course Teaching	Activities	;	Details		No. of Hours
& Learning Activities	Lectures				36
	Tutorials				12
	Reading /	Self study			100
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignme	nts		30	CLO 1,2,3,4,5
	Examinati			70	CLO 1,2,3,4
Required/recommended reading and online materials				l. Garland Science, New York. n ed. Pearson/Benjamin Cumming	s, San Francisco.

BIOC4613	Advance credits)	ed techniques in biochemistry & molecular biology (6	Academic Year	2021	
Offering Department		al Sciences	Quota	70	
Course Co-ordinator	Prof D Ch	an, Biomedical Sciences (chand@hku.hk)			
Teachers Involved	(Dr J A Ta (Dr. J W F (Dr. M C F	Wong,Biomedical Sciences) Inner,Biomedical Sciences) Wong,Biomedical Sciences) Cheung,Biomedical Sciences) Innan,Biomedical Sciences)			
Course Objectives	aim is to	advanced experimental-based course for students majoring in Bioch provide the necessary training for students to pursuit postgradual ent in a scientific laboratory/industry environment.			
Course Contents & Topics		experiments using advanced techniques in biochemistry, natics. Students will also have the opportunity to familiarize themselves.			
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 explain the basic principles of current advanced techniques commonly used in biochemistry and molecular biology				
	CLO 2 apply and perform these techniques in other novel experimental settings CLO 3 critically evaluate experimental data and design alternative approaches to test or validate hypotheses CLO 4 collaborate with team members to complete laboratory experiments CLO 5 document laboratory work and data using a laboratory notebook following standard practices in research laboratories				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Bl	OC3604			
Offer in 2021 - 2022	Y 1st	sem Offer in 2022 - 2023 : Y	Examination	Dec	
Grade Descriptors (A+ to F)	A	Comprehensive and in-depth understanding of the principles and applications of ad effective ability to identify problems and generate solutions relating to applications is to evaluate experimental data; cohesive and systematic planning and organization experimental data.  Comprehensive understanding of the principles and applications of advance technic	n a laboratory setting; cle n of experimental design	ear evidence of ability and presentation of	
	problems and generate solutions relating to applications in a laboratory setting; evidence of ability to evaluate experimental data; systematic planning and organization of experimental design and presentation of experimental data.				
	C	Sound understanding of the principles and applications of advance technologies		nd ability to identify	
	С	problems and generate solutions relating to applications in a laboratory setting; son data; satisfactory planning and organization of experimental design and presentatio	es in biochemistry; sou ne evidence of ability to e n of experimental data.	valuate experimental	
	D	problems and generate solutions relating to applications in a laboratory setting; son data; satisfactory planning and organization of experimental design and presentatio Superficial understanding of the principles and applications of advance technolog problems and generate solutions relating to applications in a laboratory settin experimental data; some evidence of planning and organization of experimental des	es in biochemistry; sou ne evidence of ability to e n of experimental data. gies in biochemistry; lim ng; some awareness o sign and presentation of	evaluate experimental ited ability to identify f ability to evaluate experimental data.	
		problems and generate solutions relating to applications in a laboratory setting; son data; satisfactory planning and organization of experimental design and presentatio Superficial understanding of the principles and applications of advance technolog problems and generate solutions relating to applications in a laboratory setting	es in biochemistry; sou ne evidence of ability to e n of experimental data, gies in biochemistry; lim ng; some awareness o sign and presentation of es in biochemistry; lack ng; lack of evidence o	evaluate experimental ted ability to identify fability to evaluate experimental data. of ability to identify fability to evaluate	
Communication- intensive Course	D	problems and generate solutions relating to applications in a laboratory setting; son data; satisfactory planning and organization of experimental design and presentatio Superficial understanding of the principles and applications of advance technology problems and generate solutions relating to applications in a laboratory settire experimental data; some evidence of planning and organization of experimental destack of understanding of the principles and applications of advance technologic problems and generate solutions relating to applications in a laboratory settire experimental data; insufficient evidence of planning and organization of experimental data;	es in biochemistry; sou ne evidence of ability to e n of experimental data, gies in biochemistry; lim ng; some awareness o sign and presentation of es in biochemistry; lack ng; lack of evidence o	evaluate experimental ted ability to identify fability to evaluate experimental data. of ability to identify fability to evaluate	
	D Fail	problems and generate solutions relating to applications in a laboratory setting; son data; satisfactory planning and organization of experimental design and presentatio Superficial understanding of the principles and applications of advance technology problems and generate solutions relating to applications in a laboratory settire experimental data; some evidence of planning and organization of experimental destack of understanding of the principles and applications of advance technologic problems and generate solutions relating to applications in a laboratory settire experimental data; insufficient evidence of planning and organization of experimental data;	es in biochemistry; sou ne evidence of ability to e n of experimental data, gies in biochemistry; lim ng; some awareness o sign and presentation of es in biochemistry; lack ng; lack of evidence o	evaluate experimental ted ability to identify fability to evaluate experimental data. of ability to identify fability to evaluate	

& Learning Activities	Lectures			12		
	Laboratory			72		
	Tutorials			6		
	Reading / Self study			76		
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments		50	CLO 1,2,3,4,5		
	Examination	One 3-hour written examination	50	CLO 1,2,3,4		
Required/recommended reading and online materials	Wilson K, Walker KM (2010) Princ University Press, Cambridge.	son K, Walker KM (2010) Principles and Techniques of Biochemistry and Molecular Biology. 7th ed. Camb				

BIOC4966	Biochemi	stry internship (6	credits)	Academic Ye	ear 2021			
Offering Department	Biomedical	Sciences		Quota	20			
Course Co-ordinator		Dr A C Koon (Sem 1); Dr Dr B H B Yuen (Sem 2 & Summer), Biomedical Sciences (alexkoon@hku.hk; yuenbbh@hku.hk)						
Teachers Involved	(All academic staff in Biochemistry Major,Biomedical Sciences) (Dr A C Koon,Biomedical Sciences) (Dr B H B Yuen,Biomedical Sciences)							
Course Objectives	study. The gained in th	This course aims to offer students the opportunities to gain work experience in the industry related to their major of study. The workplace learning experience would be of great benefit to the students to apply their knowledge gained in the study to the real work environments. Students have to take on at least 160 hours of internship work either within the University or outside the University arranged by the School/Departments.						
Course Contents & Topics		1. Within the university: The student will be supervised by a staff member (Supervisor), working on a proje various tasks as instructed by the Supervisor.						
	be supervis	ed under a staff me		al agency related to the major of st y (the External Supervisor) and a				
Course Learning			course, students should be					
Outcomes			s and limitations of their are	<b>V</b> 1				
			ng skills to solve novel and il					
			•	other real world environments				
		xamine the role of so	•					
Pre-requisites			vanced level (level 3 or 4) d	lisciplinary core/elective courses in	n Biochemistry Major			
(and Co-requisites	including Bl							
and Impermissible			hemistry Major students only					
combinations)			wed to take this capstone co		N - F			
Offer in 2021 - 2022	Y 1st se		nmer Offer in 2022 - 2023 :					
Grade Descriptors Distinction/Pass/Fail	Distincti on	performance in handlin effective collaboration requirements set out in and excellent evaluation	ng and carrying out the work requested and communication with supervision the Course Description regarding was by supervisor(s), etc.	to solve problems in the workplace. luired in the job or assigned by supervisi- or(s), colleagues, and clients in the job. working hours, with excellent performance	or(s). Establishes highly Successfully fulfills the in written and oral report,			
	Pass	Able to apply knowledge to solve problems in the workplace. Successfully handles and carries out the work required in the job or assigned by supervisor(s). Establishes effective collaboration and communication with supervisor(s), colleagues, and clients in the job. Successfully fulfills the requirements set out in the Course Description regarding working hours, written and oral report, and evaluation by supervisor(s), etc. Students demonstrating excellent performance in the above would be awarded a grade of "Distinction".						
	Fail	Very limited or no abil assigned by supervisor	ity to solve problems in the workpr(s). Fails to establish effective collato satisfy the requirements set out	place. Fails to handle or carry out the wo aboration or communication with superviso in the Course Description regarding workin	r(s), other colleagues, or			
Communication- intensive Course	N	•						
Course Type	Internship							
Course Teaching	Activities		Details		No. of Hours			
& Learning Activities	Internship v	vork	it is expected that studen (or the equivalent of 4 we	ets are to work at least 160 hours eks full-time)	160			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Oral presen	ntation		30	CLO 1,2,4			
	Supervisor's	s feedback		30	CLO 1,2,3,4			
	Written repo	ort		40	CLO 1,2,3,4			
Additional Course Information	be recorded interested to Enrolment of	d on the student's to enrol in this course of this course is not c	ranscript. This course will be should contact the Departme conducted via the online cou	ds the Capstone requirement. Del be assessed on "Pass/Fail" basis ent to obtain the approval. Irse selection system and should b btained from the course coordinato	Students who are be made through the			

BIOC4999	Biochemistry project (12 credits)  Academic Year 2021				
Offering Department	Biomedical Sciences	Quota	25		
Course Co-ordinator	Dr N S Wong, Biomedical Sciences (nswong@hku.hk)				
Teachers Involved	(All academic staff in Biochemistry Major,Biomedical Sciences) (Dr N S Wong,Biomedical Sciences)				
Course Objectives	To enable students to acquire the basic skills in scientific research emph reasoning, free and creative thinking, scholarly communication (both orally a teamwork and time management. The course is particularly useful for those career in life science either in research or industry.	and in writing), re	esearch integrity,		

Course Contents & Topics  Course Learning	Project-related topics in biochemistry, cell, molecular and developmental biology.  Experimental methods in protein and nucleic acid biochemistry; bioinformatics and cell biology.  Critical appraisal of current science literature  Formulation of research questions  Design of experiments.  Data analysis and interpretation.  Scientific writing  On successful completion of this course, students should be able to:						
Outcomes	CLO 2 f	CLO 1 describe recent research development in a defined area of biochemistry and molecular biology CLO 2 formulate research questions and design experiments to address these questions CLO 3 apply appropriate experimental techniques to solve research problems CLO 4 manage and interpret experimental results					
			skills and logically report their re	esearch findings			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in a including BIOC461 This caps	t least 24 credits of adve 4 of the following 5 cour 0 and BIOC4613 can be tone course is for Bioch	anced level (level 3 or 4) discipl ses: BIOL3401, BIOC3601, BIO taken concurrently with this cou emistry Major students only. ened to students who are in yea	inary core/elective courses i C3604, BIOC4610 and BIOC rse.	C4613.		
Offer in 2021 - 2022		ar long Offer in 2022 -	•	Examination			
Grade Descriptors (A+ to F)	A	knowledge. Displays tenad comprehensively evaluated workers to enhance practic	phisticated and creative experimental is city and commitment, generating a m in the context of the original research al and scientific writing skills. Communi k knowledgeably to guestions. Excellent	eaningful body of data that is a question. Works proactively with cates the findings to a broader au	nalysed with insight and a supervisor and other co-		
	В	scholarly way and responds knowledgeably to questions. Excellent time-management skills.  Plans and executes a detailed experimental investigation, framing the research question within existing knowledge. Works with commitment, generating a sufficient body of data that is analysed and evaluated in the context of the original research question with skill and understanding. Works constructively with a supervisor and other co-workers to enhance practical and scientific writing skills. Clearly communicates the findings to a broader audience and responds knowledgeably to most questions. Able to time-manage effectively.					
	С	Plans and executes an experimental investigation, attempting to contextualize the research question. Works with adequate commitment in order to generate sufficient data for a reasonable analysis and evaluation in the context of the original research question. Works with a supervisor and other co-workers to improve practical and scientific writing skills. Communicates the findings to a broader audience with reasonable clarity and responds to most questions. Acceptable time-management skills.					
	D	Plans and executes a rudimentary experimental investigation, showing a limited ability to contextualize the research question. Displays minimal commitment when collecting data and is only able to undertake a superficial analysis and evaluation. Works reluctantly with a supervisor and other co-workers to develop practical and scientific writing skills. Displays weak communication skills when presenting the findings to a broader audience. Poor time-management skills.					
	Fail  Plans and executes an experimental investigation that is flawed, ineffective or overly simplistic, that is lacking a valid scientific context. Shows no commitment when collecting data and produces an incoherent analysis and evaluation. Works in isolation, thus failing to improve practical and scientific writing skills. Displays weak communication skills when presenting the findings to a broader audience. No time-management skills.						
Communication- intensive Course	N						
Course Type	-	ased course					
Course Teaching	Activitie	-	Details		No. of Hours		
& Learning Activities		/ Self study			240		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Dissertat	ion		60	CLO 1,2,3,4,5		
	Oral pres	entation	including continuous assessment (15%)	40	CLO 1,2,3,4,5		
Required/recommended reading and online materials	None pre	scribed					

		olecules to cells	(o credits)		<b>ar</b> 2021	
Offering Department		Sciences		Quota	382	
Course Co-ordinator			ciences (gywchan@hku.hk)			
Teachers Involved	,	Lo,Biological Scien	,			
	(Dr G Y W Chan,Biological Sciences)  This course aims to provide basic conceptual understanding of the biology of molecules and cells to underpin late					
Course Objectives						
			genetics, biochemistry, nutrition	i, biotechnology, microbiology,	plant and anima	
Course Contents		y and developmenta	be adopted to enable students to	intograto basis concents in male	oculos and colls ar	
& Topics		• • •	through the exploration of conte			
x Topics			list of some of the questions to be		ourse is divided in	
			do children resemble their paren		of biology? What a	
			ce? What determines gender an	•	0,	
			nat happen if some genes are non			
			are diets related to good health?	Do all humans have the same di	etary requirements	
		t we live without plan		110 1.1 11		
			t are the common features in a nd organs? What is a cell cycle			
			How newly formed cells commit th		iappens ii ceii-cyci	
			dern biology: To what extent car		herapy the future of	
			dified food safe for consumption?			
	been impo	T	•	,	,	
Course Learning	On succe	ssful completion of t	his course, students should be ab	ole to:		
Outcomes	CLO 1 ur	nderstand the relation	onships between genes in a gen	ome and the inherited phenotyp	pes expressed in a	
		ing organism				
	CLO 2 le	arn the underlying p	rinciple on how mutation of a gen	e can lead to the development o	f a genetic disease	
		· · · · · · · · · · · · · · · · · · ·	tance of dietary intake of biomole			
			ges in a cell division and that	disturbance of this process ma	ay result in cance	
		evelopment				
			ed in genetic engineering			
			ns of genetic engineering in gene	- · · · · · · - · ·	tically modified too	
Pre-requisites	Not for sti	udents who have pa	ssed in BIOC1600, or have alread	dy enrolled in this course.		
and Co-requisites	Studente	who wish to take	this course are expected to b	nava takan UKDSE Biology ar	adlar Chamiatry a	
and Impermissible combinations)			this course are expected to h	iave taken HNDSE blology ar	na/or Chemistry o	
		t For etudente with	nout HKDSE Chamietry thay ar	a ancouraged to take CHEM10	141 concurrently o	
ombinations,		t. For students with	nout HKDSE Chemistry, they ar	e encouraged to take CHEM10	041 concurrently of	
oomomatione,	before.	t. For students with	nout HKDSE Chemistry, they ar	e encouraged to take CHEM10	041 concurrently o	
	before.			-	·	
osino manono,	before.	tudents having take	nout HKDSE Chemistry, they ar an any level 2 (or above) Biome chelor of Surgery (MBBS) course	dical Sciences (BBMS) or Bioc	chemistry (BIOC) o	
	Not for si Bachelor	tudents having take of Medicine and Bad	en any level 2 (or above) Biome	dical Sciences (BBMS) or Bioc Students having taken level 2	chemistry (BIOC) o BBMS/BIOC/MBB	
·	Not for si Bachelor course sh Sciences.	tudents having take of Medicine and Bar rould take the replace	en any level 2 (or above) Biome chelor of Surgery (MBBS) course cement course for BIOL1110 in a	dical Sciences (BBMS) or Bioc Students having taken level 2	chemistry (BIOC) o BBMS/BIOC/MBB	
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BIOL1111	Introductory microbiology (6 credits) Academic Year 2021				
Offering Department	Biological Sciences	Quota	80		
Course Co-ordinator	, Biological Sciences ()				
Teachers Involved	(,Biological Sciences)				
Course Objectives	To introduce students to the diversity and function of microorganisms; and relate this to their importance in the				

Course Contents & Topics	natural environment, disease and public health, food production and spoilage and the biotechnology industry. Evolutionary diversity of bacteria, archaea, eukarya and viruses; Metabolic strategies, cell biology and genetics; Microbial ecology, marine microbiology, terrestrial microbiology; Microbial interactions with animals and plants; The human microbiome; Medical microbiology and immunology; Biotechnology applications; Food spoilage and food fermentations.					
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 describe the key features of the major microbial phyla and place them in an evolutionary context  CLO 2 explain the major physiological and genetic processes in prokaryotes and eukaryotic microorganisms and compare the similarities and differences between these two domains					
		dentify the microorganism bood production and spoila		in ecological process	es, human dise	ase and medicine,
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL					
Offer in 2021 - 2022	N Of	fer in 2022 - 2023 : N			Examination	
Grade Descriptors (A+ to F)	A	reading or research is evide	ord of excellence. All criteria are ent. Ideas show an exceptional disprioritization of issues. Presen	I understanding of concep	ots. Arguments are	
	show excellent judgment and prioritization of issues. Presentation is highly creative and appealing.  (70-84%) Approaches the standard of excellence. All criteria are addressed. Organization of ideas and clarity are very good. Ideas show a complete understanding of concepts. Arguments are persuasive and prioritize major issues. Presentation is creative and appealing.					
		creative and appealing.				
	С	(55-69%) Meets an accepta an effective understanding o	ble standard. All criteria are add f concepts. Arguments identify r	najor issues. Presentation	is appealing but ma	ay lack clarity.
	C D Fail	(55-69%) Meets an accepta an effective understanding o (45-54%) Below acceptable incomplete understanding of		major issues. Presentation dressed. Organization of i ersuasive. Presentation la	is appealing but ma deas and clarity are cks creativity or is n	ay lack clarity. e weak. Ideas show an ot appealing.
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intensive Course	D Fail	(55-69%) Meets an accepta an effective understanding o (45-54%) Below acceptable incomplete understanding of (<45%) Unacceptable. Inab	f concepts. Arguments identify r standard. Most criteria are add concepts. Arguments are not p lility to identify major criteria. V No coherent argument. Presenta	major issues. Presentation dressed. Organization of i ersuasive. Presentation la /ery weak organization o	is appealing but ma deas and clarity are cks creativity or is n f ideas and clarity.	ay lack clarity. e weak. Ideas show an ot appealing.
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intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Pail N Lecture w Activitie Lectures Laborato Tutorials Reading	(55-69%) Meets an accepta an effective understanding of (45-54%) Below acceptable incomplete understanding of (<45%) Unacceptable. Inabunderstanding of concepts. It with laboratory components is	f concepts. Arguments identify r standard. Most criteria are add concepts. Arguments are not p ility to identify major criteria. No coherent argument. Presentat t course  Details	major issues. Presentation iressed. Organization of i ersuasive. Presentation la /ery weak organization o ation lacks creativity or is u	is appealing but madeas and clarity are cks creativity or is n f ideas and clarity. Inappealing.	ay lack clarity. 2 weak. Ideas show an ot appealing. Ideas show a lack of  No. of Hours  24  24  6  100  Assessment Methods
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Pail N Lecture w Activitie Lectures Laborato Tutorials Reading Methods Examina	(55-69%) Meets an accepta an effective understanding of (45-54%) Below acceptable incomplete understanding of (<45%) Unacceptable. Inabunderstanding of concepts. It with laboratory components is	f concepts. Arguments identify r standard. Most criteria are add concepts. Arguments are not p ility to identify major criteria. No coherent argument. Presentat t course  Details	major issues. Presentation iressed. Organization of i ersuasive. Presentation la /ery weak organization o ation lacks creativity or is u	is appealing but madeas and clarity are cks creativity or is n f ideas and clarity. Inappealing.	ay lack clarity.  e weak. Ideas show an ot appealing.  Ideas show a lack of  No. of Hours  24  24  6  100  Assessment  Methods  to CLO Mapping
Communication- intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	Pail N Lecture w Activitie Lectures Laborato Tutorials Reading Methods Examina Laborato	(55-69%) Meets an accepta an effective understanding of (45-54%) Below acceptable incomplete understanding of (<45%) Unacceptable. Inab understanding of concepts. Note that the concept is a second of the concep	f concepts. Arguments identify r standard. Most criteria are add concepts. Arguments are not p lility to identify major criteria. Vo coherent argument. Presentate t course  Details  Details	major issues. Presentation dressed. Organization of i ersuasive. Presentation la fery weak organization o ation lacks creativity or is under the course weight of the course weight of the course weight or the course weight or the course weight of the course weight or the course weig	is appealing but madeas and clarity are cks creativity or is n f ideas and clarity. Inappealing.  ting in final e grade (%)  70 30	ay lack clarity. 2 weak. Ideas show an ot appealing. Ideas show a lack of  No. of Hours  24  24  6  100  Assessment Methods to CLO Mapping  CLO 1,2,3  CLO 3

BIOL1201	Introduction to food and nutrition (6 cre	dits)	Academic Year	2021			
Offering Department	Biological Sciences	•	Quota	150			
Course Co-ordinator	Dr L Zhang, Biological Sciences (Izhang17@hku	.hk)					
Teachers Involved	(Dr J C Y Lee,Biological Sciences) (Dr L Zhang,Biological Sciences) (Dr T C S Lam,Biological Sciences)						
Course Objectives	To enable student to appreciate the multidisciplinary nature in the study of Food and Nutrition. From the farmer's field to the dinner table, a basic understanding of the general properties of food in production, processing, storage and safety, as well as food security will be covered. Basic macro- and micronutrients from these food and its absorption, distribution, metabolism, and excretion will allow students to understand the function of these nutrients in the human body.  This is an independent course which can be taken by students from various disciplines. It also prepares students for further studies in Food and Nutritional Science.						
Course Contents & Topics	Topics will include food composition and functi safety and regulation; food security; healthy ea relationship.						
Course Learning	On successful completion of this course, students	s should be able to:					
Outcomes	CLO 1 understand the key components of food	and be able to discuss their fur	nctional properties	3			
	CLO 2 understand the significance of food safe	ety and be able to identify source	es of contamination	on			
	CLO 3 understand the concept of a balanced d	liet					
	CLO 4 critically assess health problems associ	ate with malnutrition					
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL						
Offer in 2021 - 2022	Y 1st sem Offer in 2022 - 2023 : Y		Examination	Dec			
Grade Descriptors (A+ to F)	A Demonstrate thorough grasp of the subject knowledge. Demonstrate highly effective organ	nization / writing skills.	•				
(71-101)	B Demonstrate substantial grasp of the subject matter covered. Show full capacity to use the appropriate concepts and assimilate the materials to solve problems. Demonstrate effective organization / writing skills.						
	C Demonstrate general but incomplete grasp of problems. Demonstrate adequate organization	/ writing skills.		· · ·			
	D Demonstrate partial but limited grasp, wit Misunderstanding of the materials is not uncor basic organization / writing skills.						
	Fail Demonstrate little or no grasp, with retention	of little relevant information, of the s	ubject matter covered	d. Fail to understand			

	concepts and show	v minimal competence in problem solvin	g. Demonstrate poor organization and writing	skills.	
Communication- intensive Course	N				
Course Type	Lecture-based course				
Course Teaching	Activities	Details		No. of Hours	
& Learning Activities	Lectures			36	
	Tutorials	student-centered learni	ing	12	
	Reading / Self study			100	
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignments		50	CLO 1,2,3,4	
	Examination		50	CLO 1,2,3,4	
Required/recommended reading and online materials	Fennema's Food Chemistry, Fifth Edition, CRC Press (2017) Essentials of Human Nutrition, Fifth Edition, Oxford(2017) Brown A. Understanding Food: Principles and Preparation. Wadsworth, Cengage Learning, 2011 Hotchkiss J.H. & Porter N.N. Food Science. Chapman & Hall, 1995				
Course Website	http://moodle.hku.hk/		•		

	Evolution	nary diversity (6	credits)	Academic Yea	ır 2021		
Offering Department	Biological S		•	Quota	250		
Course Co-ordinator	Dr M Yasu	hara, Biological Scie	ences (yasuhara@hku.hk)				
Teachers Involved	(Dr C Schu	unter,Biological Scie	nces)				
	(Dr M Yası	uhara,Biological Scie	ences)				
		nicci,Biological Scier					
		K Saunders, Biologic					
Course Objectives	To provide students with an introduction to the diversity of plant and animal life. Recent research has resulted in fundamental changes in our understanding of evolutionary history (phylogeny). Current evolutionary trees will be used as the basis for a survey of different groups in phylogenetic sequence, and for understanding how structures processes and behaviours have changed through time.						
Course Contents & Topics	Introductio (Rhodophy seedless v Ginkgophy Mollusca,	Introduction to the methodology for reconstructing the sequence of past evolutionary events (cladistics); algae (Rhodophyta, Phaeophyta and Chlorophyta); non-vascular plants (Hepatophyta, Anthocerophyta and Bryophyta) seedless vascular plants (Lycophyta, Psilophyta, Sphenophyta and Pterophyta); seed plants (Cycadophyta, Ginkgophyta, Coniferophyta, Gnetophyta and Anthophyta); invertebrates (Cnidaria, Platyhelminthes, Annelida, Mollusca, Nematoda, Arthropoda and Echinodermata); fish (Chondrichthyes and Actinopterygii); amphibians (Batrachomorpha); reptiles (Anapsida, Lepidosauromorpha and Archosauromorpha); and mammals (Monotremata)					
Course Learning	On succes	sful completion of th	is course, students should be able to	):			
Outcomes	CLO 1 inte	erpret phylogenies	in order to understand the relatedn	ness of taxonomic groups a	and the pattern o		
	evo	olutionary changes i	n structures, processes and behaviou	urs			
			stics of different evolutionary lineage	s of plants and animals and i	recall the names o		
		e main taxonomic gro	•				
	CLO 3 exp	plain the possible se	lective advantages of the highlighted	structures, processes and b	ehaviours		
and Co-requisites and Impermissible combinations) Offer in 2021 - 2022	Y 2nd	sem Offer in 2022	- 2023 · Y	Examination	May		
	A						
Grade Descriptors (A+ to F)	learning outcomes, with extensive use of named examples. Show evidence of significant critical abilities and logical thinking. Apply highly effective presentation skills.						
(A+ to F)	_	Apply highly effective pr	extensive use of named examples. Show e esentation skills.	evidence of significant critical abilities	es and logical thinking		
(A+ to F)	В	Apply highly effective pr Demonstrate substantia	n extensive use of named examples. Show e esentation skills. I command of knowledge required for attainin	evidence of significant critical abilities or most of the course learning outco	es and logical thinking omes, with some use		
(A+ 10 F)	ВС	Apply highly effective pr Demonstrate substantia named examples. Show Demonstrate general b outcomes, with only lir	n extensive use of named examples. Show e esentation skills. I command of knowledge required for attainin evidence of critical abilities and logical thinkin ut incomplete command of knowledge and nited use of named examples. Show evider	evidence of significant critical abilition of most of the course learning outcome. Apply effective presentation skills skills required for attaining most of	es and logical thinking omes, with some use s. of the course learnin		
(A+ to F)		Apply highly effective pr Demonstrate substantial named examples. Show Demonstrate general b outcomes, with only lir moderately effective pre Demonstrate partial but with insufficient use of n	n extensive use of named examples. Show e esentation skills. I command of knowledge required for attainin evidence of critical abilities and logical thinkin ut incomplete command of knowledge and nited use of named examples. Show evider	evidence of significant critical abilities ig most of the course learning outcorns. Apply effective presentation skills skills required for attaining most note of some critical abilities and quired for attaining some of the course.	es and logical thinking omes, with some use of s. of the course learnin logical thinking. Appl urse learning outcome		
(A+ to F)	С	Apply nighly effective pr Demonstrate substantial named examples. Show Demonstrate general b outcomes, with only lir moderately effective pre Demonstrate partial but with insufficient use of n skills. Demonstrate little or no without use of named	n extensive use of named examples. Show e esentation skills. I command of knowledge required for attainin evidence of critical abilities and logical thinkin ut incomplete command of knowledge and nited use of named examples. Show evider sentation skills. Ilimited command of knowledge and skills rec amed examples. Show evidence of limited crit o evidence of command of knowledge and s examples. Show little or no evidence of criti	evidence of significant critical abilities ig most of the course learning outcome. Apply effective presentation skills skills required for attaining most once of some critical abilities and quired for attaining some of the coutcome abilities and logical thinking. Ap- skills required for attaining the course.	es and logical thinking omes, with some use is. of the course learnin logical thinking. Appl urse learning outcome oply limited presentation rese learning outcomes		
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Communication- ntensive Course Course Type Course Teaching & Learning Activities	D Fail N Lecture wit Activities Lectures Laboratory	Apply nighly effective pr Demonstrate substantial named examples. Show Demonstrate general b outcomes, with only lir moderately effective pre Demonstrate partial but with insufficient use of n skills. Demonstrate little or no without use of named minimally effective or ine	extensive use of named examples. Show e escentation skills. I command of knowledge required for attaining evidence of critical abilities and logical thinking the transport of the second secon	evidence of significant critical abilities ig most of the course learning outcome. Apply effective presentation skills skills required for attaining most once of some critical abilities and quired for attaining some of the coutcome abilities and logical thinking. Ap- skills required for attaining the course.	es and logical thinking omes, with some use of s.  of the course learnin logical thinking. Appl urse learning outcomes only limited presentations resentational skills ar  No. of Hours  24  36  100  Assessment Methods		
Communication- ntensive Course Course Type Course Teaching & Learning Activities	C D Fail N Lecture wit Activities Lectures Laboratory Reading / Methods	Apply nighly effective pr Demonstrate substantia named examples. Show Demonstrate general b outcomes, with only lir moderately effective pre Demonstrate partial but with insufficient use of n skills. Demonstrate little or no without use of named minimally effective or ine th laboratory components y Self study	extensive use of named examples. Show e escentation skills.  I command of knowledge required for attaining evidence of critical abilities and logical thinking the transport of the second sense of the second sense of the sense	widence of significant critical abilities g most of the course learning outcome. Apply effective presentation skills skills required for attaining most once of some critical abilities and quired for attaining some of the coutical abilities and logical thinking. Applications are applicated as a significant of the countries of the countries are applicated by the countries are appli	es and logical thinking omes, with some use is. of the course learnin logical thinking. Appl irree learning outcome opply limited presentations reselves learning outcomes resentational skills are selficial to the course of the		
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Communication- ntensive Course Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	C D Fail N Lecture wit Activities Lectures Laboratory Reading / Methods Examinatic Laboratory	Apply nighly effective pr Demonstrate substantia named examples. Show Demonstrate general b outcomes, with only lir moderately effective pre Demonstrate partial but with insufficient use of n skills. Demonstrate little or no without use of named minimally effective or ine th laboratory compon  y Self study  on y reports	extensive use of named examples. Show e escentation skills.  I command of knowledge required for attaining evidence of critical abilities and logical thinking the transport of the property o	widence of significant critical abilities g most of the course learning outcome. Apply effective presentation skills skills required for attaining most once of some critical abilities and quired for attaining some of the cou- tical abilities and logical thinking. Ap- skills required for attaining the cou- tical abilities and logical thinking. P	es and logical thinking the same logical thinking the same learning of the course learning logical thinking. Appures learning outcome poly limited presentations elearning outcome tresentational skills at the same learning outcome resentational skills at the same learning outcome lea		
Communication- ntensive Course Course Type Course Teaching & Learning Activities Assessment Methods	C D Fail N Lecture with Activities Lectures Laboratory Reading / Methods  Examination Laboratory P. H. Rave	Apply nighly effective pr Demonstrate substantia named examples. Show Demonstrate general b outcomes, with only lir moderately effective pre Demonstrate partial but with insufficient use of n skills. Demonstrate little or no without use of named minimally effective or ine th laboratory components y Self study	extensive use of named examples. Show e escentation skills.  I command of knowledge required for attaining evidence of critical abilities and logical thinking the transport of the second sense of the second sense of the sense	widence of significant critical abilities g most of the course learning outcome. Apply effective presentation skills skills required for attaining most once of some critical abilities and equired for attaining some of the coutical abilities and logical thinking. Application of the coutical abilities and logical thinking. Application of the coutical abilities and logical thinking. Put the course are grade (%)  Weighting in final course grade (%)  70 30 an & Worth, New York, 2005	es and logical thinking the same logical thinking the same learning of the course learning logical thinking. Appures learning outcome poly limited presentations elearning outcome tresentational skills at the same learning outcome resentational skills at the same learning outcome lea		

BIOL1501	Bioethics (6 credits)	Academic Year	2021

Offering Department	Biologica	l Sciences		Quota	40		
Course Co-ordinator	, Biolog	jical Sciences ()					
Teachers Involved		gical Sciences)					
Course Objectives	The aim i	s to explore the ethical implicati	ons of the latest major advance	es in biology and medicir	ne.		
Course Contents							
& Topics	genetics, and the u	The course will discuss research ethic between student and mentor, and ethical implications in recent major advancements in biological and medical sciences. Major areas to be discussed include but are not limited to: genetics, reproduction, disease diagnosis and therapy, development, transplantation, aging, dying, environment, and the use of animals in research. Ethical and moral principles and implications for social framework and public policy raised by these advances will be discussed.					
Course Learning	On succe	ssful completion of this course,	students should be able to:				
Outcomes	b	amiliarize with the current ethi ioethics specifically related to the	e advancement of modern mol	ecular biology and geno	mics		
	u	eflect upon and formulate in a nderstand and enter into a responder	ectful dialogue with those who	possess another point o	f view		
		nderstand the basis of one's ow					
		eal with the quandaries that aris	se when facing modern medical	technology and advance	ements		
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL						
Offer in 2021 - 2022	N Of	fer in 2022 - 2023 : N		Examination			
Grade Descriptors (A+ to F)	Α	evidence of creative ability and co techniques and analysis of data and	subject matter covered. Show strong a impetence in professional-level proble I results to draw appropriate and insight collaborative-based organizational and	em solving. Critically use control to the solving of the solving o	mmunication skills and		
	highly effective individual as well as collaborative-based organizational and presentational skills.  B Demonstrate substantial grasp of the subject matter covered. Show evidence of analytical and critical abilities and logical thinking with some evidence of competence in professional-level problem solving. Use communication skills and techniques and analysis of data and results to draw generally appropriate conclusions to real-world problems. Demonstrate effective individual as well as collaborative-based organizational and presentational skills.						
	Demonstrate general but incomplete grasp of the subject matter covered. Show some evidence of analytical and critical abilities and logical thinking with limited competence in professional-level problem solving. Use communication skills and techniques and analysis of data and results to draw moderately appropriate but sometimes erroneous conclusions to real-world problems.						
	Demonstrate moderately individual as well as collaborative-based organizational and presentational skills.  Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Show some evidence of coherent and logical thinking, but lacking competence in professional-level problem solving. Use communication skills and techniques and analysis of data and results to draw sometimes appropriate but often erroneous conclusions to real-world problems. Demonstrate individual as well as collaborative-based organizational and presentational skills of limited effectiveness.						
	Fail  Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of coherent and logical thinking, and minimal competence in professional-level problem solving. Use communication skills and techniques and analysis of data and results ineffectively, leading generally to inappropriate and usually erroneous conclusions to real-world problems. Demonstrate ineffectiveness individual as well as collaborative-based organizational and presentational skills.						
Communication- intensive Course	N						
Course Type	Lecture-b	ased course					
Course Teaching	Activitie	s Detai	ls		No. of Hours		
& Learning Activities	Lectures				36		
-	Tutorials				12		
	Assessment			100			
Assessment Methods and Weighting	Methods	Detai	ls	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignm	ante	nuous assessment of essays, entation and debate exercises	60	CLO 1,2,3,4		
	Examina	tion		40	CLO 1,2,3,4		
Required/recommended reading and online materials		web-based reading materials					
Additional Course Information	This cour	se will be offered subject to a m	inimum enrollment number and	l availability of teachers.			

BIOL1502	The gene (6 credits)	Academic Year	2021
Offering Department	Biological Sciences	Quota	50
Course Co-ordinator	, Biological Sciences ()		
Teachers Involved	(,Biological Sciences)		
Course Objectives	The objective is to expose students to the impacts of genes to the society, genome and many agricultural crops and animals genomes, it brings not only performed by well as lots of technical and ethical issues/challenges that general public need is to open up students from all backgrounds to this basic unit of inheritance various scientific and social disciplines.	romises of a bette o deal with. The g	r quality of life a oal of this cours
Course Contents & Topics	Content/topics include: Introduction and review of basic cell biology Basic genetic - The gene Basic Molecular Biology and Biotechnology - Recombinant DNA and cloning Bacterial Genes - Gene and Environment Human Genes/Human genome - history and its Impacts! Human Genome - The Amazing discovery! Genes and Biotechnology Genes and Disease Genes and Cancer Animal and Plant Cloning Genes and Agricultural/Food Biotechnology Genes and Human Behavior		
Course Learning	On successful completion of this course, students should be able to:		

Outcomes	CLO 1 demonstrate understanding and to explain the principle of inheritance, recombinant DNA and cloning CLO 2 gain deep understanding about the advancement of biotechnology						
		etermine and explain th	e benefits and shortcomings of the a	application of biotechnolog	gy knowledge		
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL Not for s equivalen	ot for students with level 3 or above in HKDSE Biology or Combined Science with Biology component or					
Offer in 2021 - 2022	N Off	er in 2022 - 2023 : N		Examination			
Grade Descriptors (A+ to F)	A	evidence of creative ability and competence in professional-level problem solving. Critically use compute techniques and analysis of data and results to draw appropriate and insightful conclusions to real-world publishly effective individual as well as collaborative-based organizational and presentational skills.					
	В	thinking with some evidence analysis of data and result	grasp of the subject matter covered. Show bee of competence in professional-level proble is to draw generally appropriate conclusions sed organizational and presentational skills.	m solving. Use communication	skills and techniques and		
	С	and logical thinking with lin analysis of data and resu	ncomplete grasp of the subject matter covere nited competence in professional-level proble ills to draw moderately appropriate but sor udividual as well as collaborative-based organ	em solving. Use communication netimes erroneous conclusions	skills and techniques and to real-world problems.		
	D	Demonstrate moderately individual as well as collaborative-based organizational and presentational skills.  Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Show some evidence of coherent and logical thinking, but lacking competence in professional-level problem solving. Use communication skills and techniques and analysis of data and results to draw sometimes appropriate but often erroneous conclusions to rea world problems. Demonstrate individual as well as collaborative-based organizational and presentational skills of limited effectiveness.					
	Fail	Fail  Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of coherent and logical thinking, and minimal competence in professional-level problem solving. Use communication skills and techniques and analysis of data and results ineffectively, leading generally to inappropriate and usually erroneous conclusions to real-world problems. Demonstrate ineffectiveness individual as well as collaborative-based organizational and presentational skills.					
Communication- intensive Course	N						
Course Type	Lecture-b	ased course					
Course Teaching	Activities	S	Details		No. of Hours		
& Learning Activities	Lectures				36		
	Tutorials			12			
	Reading	/ Self study	including 45 hours on 15 es presentation (include preparation)		93		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments		discussion forum	35	CLO 1,2,3		
	Essay		essays & written reports	25	CLO 1,2,3		
	Presenta	tion	poster & oral presentation	30	CLO 1,2,3		
	Test		in-class participation & quizzes	10	CLO 1,2,3		
Required/recommended reading and online materials	Library &	Library & web-based reading materials					
Additional Course Information	This cours	se will be offered subjec	ct to a minimum enrollment number a	and availability of teachers	S.		

BIOL2101	Principl	les of food c	hemistry (6 o	credits)		1	Academic Year	2021
Offering Department	Biologica	l Sciences				(	Quota	100
Course Co-ordinator	Dr J C Y	Lee, Biological	Sciences (jetty	lee @hku.hk)				
Teachers Involved		Lee,School of Lam,School of						
Course Objectives		de a basic und food science a		chemistry in	food systems, a	and to provid	de practical trair	ning in chemistry
Course Contents & Topics	compone properties reactions	The course will cover the components of food, including water, proteins, carbohydrates and lipids, and minor components such as enzymes, vitamins, minerals, colorants, flavorants and additives. The physical and chemical properties of these important constituents of foods are covered in detail, and form the basis for understanding the reactions which occur during the production, processing, storage and handling of foods, and in understanding the methods used in analyzing foods						cal and chemical inderstanding the
Course Learning	On succe	essful completion	n of this course	e, students sh	ould be able to:			
Outcomes	CLO 1 understand the functions and properties of major and minor food components							
	CLO 2 understand the basic chemistry behind food processing							
	CLO 3 understand how major chemical and biochemical reactions influence food quality							
	CLO 4 have integrated their knowledge of biological and chemical principles into a food science and nutrition context							
Pre-requisites	Pass in B	BIOL1201; and I	NOT for studen	ts who have i	passed in BIOL3	3201.		
(and Co-requisites and Impermissible combinations)	The cours	se is only for st	udents admitted	d in 2017-201	8 or thereafter.			
Offer in 2021 - 2022	Y 1st	t sem Offer in	2022 - 2023 : `	Y		E	Examination	Dec
Grade Descriptors (A+ to F)	Α	A Demonstrate thorough grasp of the subject matter covered. Show extensive knowledge and understanding of the topics covered and can readily apply this knowledge. Critically use lab skills and techniques and analysis of data and results to draw appropriate and insightful conclusions.						
	B Demonstrate substantial grasp of the subject matter covered. Show thorough knowledge and understanding of the content and a high level of competence in the topics covered and able to apply this knowledge and skills to most situations. Use lab skills and techniques and analysis of data and results to draw generally appropriate conclusions.							
	Demonstrate general but incomplete grasp of the subject matter covered. The student has a sound knowledge and understanding of the main areas of content and has achieved an adequate level of competence in the topics covered. Use lab skills and techniques and analysis of data and results to draw moderately appropriate conclusions.							
	D	Demonstrate pa knowledge and	irtial but limited graunderstanding of the	asp, with retention ne content and h	n of some relevant	information of the	he subject matter co tence in the topics o	vered. Show a basic overed. Use lab skills
		Demonstrate lit	le or no grasp, w	ith retention of	ittle relevant inform	nation, of the su	bject matter covere	d. Show elementary

	Fail		ls and techniques and analysis of	nt and has achieved very limited competend data and results ineffectively, leading generation	
Communication- intensive Course	N				
Course Type	Lecture v	vith laboratory comp	onent course		
Course Teaching	Activitie	s	Details		No. of Hours
& Learning Activities	Lectures				24
	Laboratory				36
	Reading / Self study				100
Assessment Methods and Weighting	Methods	5	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignm	ents	Laboratory	30	CLO 1,2,3,4
	Examina	ition		40	CLO 1,2,3,4
	Test			30	CLO 1,2,3,4
Required/recommended reading and online materials			ry (Marcel Dekker 4th Ed, 200 erle, P, Food Chemistry (Spri		
Course Website	http://mo	odle.hku.hk			
Additional Course Information	Lab. A (C	Quota: 50): 14:30 pm	bject to a minimum enrollmen - 18:50 pm (Monday) - 17:50 pm (Wednesday)	t number and availability of teachers	

BIOL2102	Biostati	istics (6 credits)			Academic Year	2021	
Offering Department		l Sciences			Quota	169	
Course Co-ordinator	Dr E Pick	cett, Faculty (epickett@h	ku.hk)				
eachers Involved	(Dr E Pic	kett,Faculty of Science)					
	(Dr J D G	Saitan-Espitia,School of E	Biological Sciences)				
Course Objectives	attention knowledg analysis. the main	This course aims to is to introduce students to the core ideas and concepts of statistical analysis with speci attention to the modeling approaches used in biological sciences. The course will give students the skills ar knowledge to understand how to apply these concepts using the R statistical programming language for dat analysis. Although the course covers some basic concepts (experimental design, distributions, hypothesis testing the main emphasis of the course is on model building and selection, linear models (regression and analysis).					
Course Contents & Topics	Introducti Explanati Factorial Regressi	variance), basic random effects and mixed effects models, and multivariate statistics (PCA, MANOVA). Introduction to Statistics and Probability; Descriptive Statistics and Estimation; Statistical Inference; Statistica Explanation and Diagnosis; Likelihood and Model Selection, Categorical predictors (ANCOVA and ANOVA) Factorial design, Multiple Comparisons and Block Design; Correlation and Regression Analyses; Multiple Regression Analysis; Introduction to Multivariate Analyses. Students will learn how to use R to conduct the statistical analyses, and correctly interpret the results.					
Course Learning			course, students should be	able to:			
Outcomes	CLO 1		uestions into statistical que				
, 4, 1, 2, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,	CLO 2	design experiments e		30110113			
	CLO 3		ret statistics in scientific pa	ner			
	CLO 4			•			
	, i						
	CLO 5 understand the assumptions of commonly used statistical methods CLO 6 critically evaluate the scientific literature						
	CLO 6 critically evaluate the scientific literature CLO 7 apply different statistical modeling methods						
Pre-requisites and Co-requisites and Impermissible combinations)	Pass in B	Pass in BIOC1600 or BIOL1110 or BIOL2306 or ENVS1301 or ENVS2002 or SCNC1111					
Offer in 2021 - 2022	Y 1st	t sem Offer in 2022 - 2	023 : Y	E	Examination	No Exam	
Grade Descriptors (A+ to F)	A Demonstrate thorough grasp of the subject and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought. Apply highly effective computational skills and techniques for basic statistical analyses. Be able to critically use data and statistical results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills.						
	B Demonstrate substantial grasp of the subject and skills required for attaining at least most of the course learning outcomes. Present evidence of analytical and critical abilities and logical thinking. Apply effective computational skills and techniques for basic statistical analyses. Be able to correctly use data and statistical results to draw appropriate conclusions. Apply effective organizational and presentational skills.						
	С	C Demonstrate general but incomplete grasp of the subject and skills required for attaining some of the course learning outcomes. Present evidence of some analytical and critical abilities and logical thinking. Apply moderately effective computational skills and techniques for basic statistical analyses. Demonstrate mostly correct but some erroneous use of data and statistical results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.					
	D						
	Fail  Demonstrate evidence of little or no grasp of the subject and skills required for attaining any of the course learning outcomes. Present evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Apply minimally effective or ineffective computational skills and techniques for basic statistical analyses. Demonstrate misuse of data and statistical results and/or unable to draw appropriate conclusions. Apply minimally effective or ineffective organizational and presentational skills.						
Communication- ntensive Course	N	· ·					
Course Type	Lecture-b	pased course					
Course Teaching	Activitie	s	Details			No. of Hours	
& Learning Activities	Lectures					36	
Learning Activities	Tutorials					24	
Learning Activities							
k Learning Activities		/ Self study				100	

	Assignments	2 x 15 % each	30	CLO 1,2,3,4,5,6,7
	Project reports	5% proposal + 5% peer review + 30% final project	40	CLO 1,2,3,4,5,6,7
	Test	2 x 15% each	30	CLO 1,2,3,4,5,6,7
Required/recommended reading and online materials	Good, P.I. (2013). Introduction to S Verzani, J. (2014). Using R for Intr	alysis, 5th edition. Pearson. Using Statistics: A Biologist's Guide Statistics through Resampling Meth roductory Statistics. 2nd edition. CR with R. 2nd edition CRC Press. [e-l	ods and R. Wiley (e-book C Press. [e-book via ebr	k via ebrary).
Course Website	http://moodle.hku.hk/			

BIOL2103			tory course (6 credits)	Academic Ye			
Offering Department	Biological			Quota	210		
Course Co-ordinator	Dr W Y Lu	ıi, Biological Sciences (	(wylui @hku.hk)				
Teachers Involved	(Dr W Y L	(Dr A Yan,Biological Sciences) (Dr W Y Lui,Biological Sciences) (Prof B K C Chow,Biological Sciences)					
Course Objectives	The object	ctive is to provide stud	dents a comprehensive training in				
		biological studies. The course will cover a number of techniques used by molecular biologists and microbiologists to conduct scientific research.					
Course Contents & Topics		se will be divided into the ne: Nucleic acid analysi	ree modules and each module will	have 3 laboratory sessions	S.		
			try, gel electrophoresis, restriction e	enzyme analysis and DNA	sequence analysis.		
		o: Protein analysis ation, chromatography a	and SDS-PAGE electrophoresis.				
	Microscop serial dilut	tion, enumeration of mi	oorganisms and staining of bacter crobial cells by Petroff-Hausser cou atural source and statistical analysis	unting chamber, and turbid			
Course Learning			course, students should be able to:				
Outcomes	CLO 1 de	emonstrate knowledge i	n proper use of simple research eq	uipment			
	CLO 2 demonstrate knowledge and understanding of how and why certain techniques are used in setting						
	CLO 3 m	aster some basic labora	atory techniques for carrying out ex	periments			
			ways that microorganisms were cat and how they were counted	tegorized according to thei	r size, shape, colour		
Pre-requisites	Pass in Bl	IOL1110.					
(and Co-requisites	Not for stu	ıdents having taken an	y level 3 (or above) Biochemistry (B	SIOC) course or BBMS200	1.		
and Impermissible							
combinations)		0.1.00					
Offer in 2021 - 2022			in 2022 - 2023 : Y	Examination			
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive knowledge required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills.					
	В	Demonstrate substantial command of a broad range of knowledge required for attaining at least most of the course learning outcomes. Evidence of analytical and critical abilities and logical thinking. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.					
	С	Demonstrate general but incomplete command of knowledge required for attaining most of the course learning outcomes. Evidence of some analytical and critical abilities and logical thinking. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational					
	D	and presentational skills.  Demonstrate partial but limited command of knowledge required for attaining some of the course learning outcomes. Evidence of					
		some coherent and logical thinking, but with limited analytical and critical abilities. Apply partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.					
	Fail	little or lack of analytical a	vidence of command of knowledge required nd critical abilities, logical and coherent thin a and results and/or unable to draw appropri active.	king. Apply minimally effective or	r ineffective lab skills and		
Communication- intensive Course	N						
Course Type	Laborator	y and workshop course					
Course Teaching	Activities	3	Details		No. of Hours		
& Learning Activities	Laborator	ТУ	11 laboratory sessions (4 hours each)		44		
	Tutorials		lecture/tutorials		18		
	Reading /	Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Laborator	v reports	plus lab performance	60	CLO 1,2,3,4		
	Test	, ,	1 hour final examination	40	CLO 1,2		
Course Website		dle.hku.hk/		· · · · · · · · · · · · · · · · · · ·	,		
Additional Course		5 - 1st Semester					
Information	Lab A on		and Lab. B on Thurs. with 70 stude	nts			

BIOL2220	Principles of biochemistry (6 credits)	Academic Year	2021

Offering Department	Biological	Sciences		Quota	100		
Course Co-ordinator	Dr C S C I	o, Biological Sciences (	clivelo@hku.hk)				
Teachers Involved	(Dr C S C	(Dr C S C Lo,Biological Sciences)					
Course Objectives		his course is designed to provide undergraduate (non-biochemistry major) an overview of fundamental concepts biochemistry as well as hands-on experience in biochemical techniques.					
Course Contents & Topics	emphasis	on amino acids, proteir	ecules in terms of their structuns, enzymes, carbohydrates, lip neir roles in various life processe	ids and nucleic acids. The c			
Course Learning Outcomes	CLO 1 de CLO 2 un CLO 3 ex	n successful completion of this course, students should be able to: CLO 1 describe the key structural features of carbohydrates, proteins, lipids and nucleotides CLO 2 understand the basic enzyme kinetic properties CLO 3 explain how the common sugars, fatty acids and amino acids are metabolized and synthesized in living					
Pre-requisites and Co-requisites and Impermissible combinations)		OL1110; and	in BIOC2600, or have already e	enrolled in this course.			
Offer in 2021 - 2022	Y 1st	sem Offer in 2022 - 20	023 : Y	Examination	Dec		
Grade Descriptors (A+ to F)	A	learning outcomes. Show st	tery at an advanced level of extensive rong analytical and critical abilities and de range of complex, familiar and unfa e and techniques	logical thinking, with evidence of ori	ginal thought, and ability		
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. General integration of theories, principles, evidence and techniques						
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Some partial integration of theories, principles, evidence and techniques					
	D	Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Limited integration of theories, principles, evidence and techniques					
	Fail	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Late of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to sol problems. Little or no or inapt integration of theories, principles, evidence and techniques					
Communication- intensive Course	N						
Course Type	Lecture wi	th laboratory componen	t course				
ourse Teaching	Activities	<b>;</b>	Details		No. of Hours		
Learning Activities	Lectures				24		
	Laboratory		3 laboratory sessions	24			
	Tutorials				12		
	Reading / Self study				100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Examination			50	CLO 1,2,3		
	Laboratory reports			15	CLO 1,2,3		
	Test	-		35	CLO 1,2,3		
Required/recommended reading and	L.A. Moran, H.R. Horton, K.G. Scrimgeour, M.D. Perry: Principles of Biochemistry 5th edition (Pe International Edition)				edition (Pearson		
online materials		,					

BIOL2306	Ecology and evolution (6 credits)	Academic Year	2021
Offering Department	Biological Sciences	Quota	80
Course Co-ordinator	Dr A L Ashton, Biological Sciences (lashton@hku.hk)		
Teachers Involved	(Dr A L Ashton,Biological Sciences) (Dr B Guenard,Biological Sciences) (Dr C Dingle,Biological Sciences) (Dr C Schunter,Biological Sciences) (Prof G A Williams (Field course component only),Biological Sciences)		
Course Objectives	The interaction between organisms and their environment is addressed using explains how the ecology of plants and animals has been shaped by evolutional environment. The course also demonstrates how we can use what we see in nature using scientific methods. A field course component how the environment influences community composition, biodiversity and	olution through interaction understand and explain the ent provides the opportur	ns with their living the significance of hity to investigate
Course Contents & Topics	The environment influences organisms profoundly. It affects their present and how many can survive there) and, through natural selection acting or and adaptations. Present day human-induced changes to the environm species and degrading their habitats. This introductory course introduceology and evolution, showing how they are linked to the environmevolutionary adaptation which, in turn, lead to specialization and ger interactions will be a major focus of the course together with discuss structuring, life histories, and niche dynamics. The principles of ecological with the environment will also be demonstrated by describing the origin record and relationship to other primates, and the main ecological transenvironmental impacts. The course will conclude with an account of the that threaten it globally. Lectures are complemented by a 5-day field course during the Reading V Kong habitats to study their biodiversity, community composition and the environment	ver past generations, infleent are also responsible suces some basic scient nament by physiological nerate biodiversity. Indivision of population dynan y and evolution resulting s of modern humans, in sformations caused by humportance of biodiversity.	uences their form for endangering ific principles of tolerances and iduals and their mics, community from interaction cluding our fossil umans and their y, and the factors a variety of Hong
Course Learning	On successful completion of this course, students should be able to:		
Outcomes	CLO 1 understand how scientific methods (hypotheses, experiments,	comparisons) are used	d to investigate

	ecological and evolutionary processes					
	CLO 2 un		chanism of natural selection, and h	ow interactions with the $\epsilon$	environment lead to	
	CLO 3 un		and behaviour can be interpreted	in the light of selective	pressures from the	
			factors influencing evolution, using	the human evolutionary tr	ee as an evample	
			ity ecology and biodiversity of s			
		aptations of organisms		sciected florig Rong flat	bitato, and typical	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BI	OL1110 or BIOL1309 or	r ENVS1301 or ENVS1401			
Offer in 2021 - 2022	Y 1st	sem Offer in 2022 - 20	023 : Y	Examination	Dec	
Grade Descriptors (A+ to F)	A	rated by attainment of all nabitats. Show excellent (for A+) work relative to				
	В	outcomes, and use of na	erstanding and a good grasp of the subject a amed (organism) examples, including localical skills and fieldwork techniques. Work mo	al species and habitats. Show	w good organizational,	
	С					
	Evidence of retention of a minimum of relevant information and incomplete understanding of the subject (i.e. knowledge is very incomplete), as demonstrated by partial but limited attainment of learning outcomes. Insufficient familiarity with fieldwork techniques, habitats or organisms. Work merely (for D+) or barely (D) adequate for what is required at degree level.					
	<b>Fail</b> Evidence of poor or inadequate knowledge and understanding of the subject such that the majority of learning outcomes cannot be attained. Little or no evidence of familiarity with fieldwork techniques, habitats or organisms. Work fails to reach degree level.					
Communication- intensive Course	N	be attained. Little of 110 evide	ence or familianty with nettwork techniques,	Tiabitats of Organisms. Work fair	s to reach degree level.	
Course Type	Lecture wi	th laboratory componen	t course			
Course Teaching	Activities	· · ·	Details		No. of Hours	
& Learning Activities	Lectures		24 hours lectures, plus 10 houresidential field course	34		
	Laboratory		at least 36 hours field and laboratindividuals	ory work, as groups and	36	
	Reading / Self study		during the semester in the form of internet tutorials, assigned reading and a laboratory workshop		80	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	nts	Field course assessment	30	CLO 1,2,3,4	
	Examinati	ion		50	CLO 1,5	
	Test		In-lecture quizzes	20	CLO 1,2,3,4	
Required/recommended reading and online materials			The Economy of Nature (8th edition nature) and Applications (8th edition			
Course Website	http://moo	dle.hku.hk				
Additional Course Information	Details of	the location and cost of ilable at the start of the	ent during the reading week. f the field course, which will be hel s semester. Priority will be given to			

BIOL2408	Green ea	th-plants and mankind (6 credits	1	Academic Year	2021			
Offering Department	Biological S	ciences		Quota	30			
Course Co-ordinator	Prof. M L C	Prof. M L Chye, Biological Sciences (mlchye@hku.hk)						
Teachers Involved		hool of Biological Sciences) nye,School of Biological Sciences)						
Course Objectives	the essent	This course is intended for students interested in the fundamentals of plant biology. The course will emphasize or the essential attributes of plants to humans. At the end of the course, students are expected to know the distinct features of plants and appreciate the importance of plants in our daily lives. Specific topics such as genetic engineering and the use of plants for food and medicine, will be addressed.						
Course Contents & Topics	Plants and	nce of plants to human. How to be a pla pathogens. Phytohormones. Plants and t? Medicinal plants.						
Course Learning Outcomes	CLO 1 Re CLO 2 Co CLO 3 Un env CLO 4 Re	ful completion of this course, students shilize how plant structure enables function aprehend the essentials of plant growth a terstand the abilities of plants to detectionment ognize the interactions of plants with the reciate the contribution of plants to humans.	s nd development t, process, and interpret in living and non-living environ		neir surrounding			
Pre-requisites (and Co-requisites and Impermissible combinations)		Pass in BIOL1110 and BIOL2103						
Offer in 2021 - 2022	N Offe	in 2022 - 2023 : N		Examination				
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking, with evidence of original thought. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills.							
	В	Demonstrate substantial command of a broad ran	ge of knowledge and skills require	ed for attaining at leas	t most of the course			

		learning outcomes. Demonstrate substantial grasp of the subject. Show evidence of analytical and critical abilities and learning. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective lab skills and techniques.						
	С	outcomes. Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical thinking. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data appropriate conclusions. Apply moderately effective organizational and presentational skills.						
	D							
	Fail	Demonstrate evidence of analytical and critical ability	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of littl analytical and critical abilities, logical and coherent thinking. Apply minimally effective or ineffective lab skills and Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills a					
Communication- intensive Course	N							
Course Type	Lecture w	ith laboratory compone	nt course					
Course Teaching	Activities		Details	No. of Hours				
& Learning Activities	Lectures			24				
	Laboratory			24				
	Field work		Field trip	6				
	Reading / Self study				100			
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignments		Lab sessions / reports	30	CLO 1,2,3,4,5			
	Examina	tion		50	CLO 1,2,3,4,5			
	Test			20	CLO 1,2,3,4,5			
Required/recommended reading and online materials	1. Simps Reference 2. Teach https://ac	Core Textbooks  1. Simpson, B.B. & M.C. Ogorzaly. 2014. Economic Botany: Plants in our World. McGraw-Hill.  References and Online Materials  2. Teaching Tools in Plant Biology (American Society of Plant Biologists)  https://academic.oup.com/plcell/pages/teaching-tools-plant-biology  3. Levetin E. & McMahon, K. 2016. Plants & Society 7th Ed. McGraw Hill						
Course Website		odle.hku.hk	, <u></u>					
Additional Course			ct to a minimum enrollment nu	mber and availability of teachers	S.			
Information		•		•				

BIOL2409	Biotechnology industry and entrepreneurship (6 credits)  Academic Year 2						
Offering Department	Biological	Biological Sciences Quota 40					
Course Co-ordinator	Dr W B L Lim, Biological Sciences (bllim@hku.hk)						
Teachers Involved	(Dr W B L	v,Faculty of Science) .im,School of Biological Sciences) ecturer,School of Biological Sciences)					
Course Objectives		se will give an overview of the innovative developments in biotec ols in learning how an exciting research idea can be turned into a		the students with			
Course Contents & Topics	The purpose of the course is to introduce you to the entrepreneurial process with a focus on the biotechnology industry. The course will provide a thoughtful, practical guide to the process of successfully launching an entrepreneurial venture. We place a special emphasis on the decision to become a biotech entrepreneur and how to develop successful business ideas, however we will also discuss the process of moving from an idea to a biotect firm. Topics on intellectual properties, patent laws, patent application process, licensing and fundraising will be covered as well. Throughout the course, guest entrepreneurs, managers and directors of the biotech industry will be presenting case studies and explain their involvement in various biotech and pharmaceutical companies. Topics:  1. Introduction to Biotechnology Industry: 4 P in Biotechnology Business (3 hours)  2. IP rights: Patent application, Patent system, USPTO, SIPO, PCT (6 hours)  3. Licensing of IP rights (3 hours)  4. Technology Transfer Office and HKSTP (3 hours)  5. How to raise fund for startup companies (3 hours)?  6. Agrobiotechnology and Green Tech (Monsanto, Novozymes, etc) (4.5 hours)  7. Drug development and clinical trials (Gilead Sciences, Wuxi PharmaTech, etc). (6 hours)  8. Diagnostics business (BGI, Diagcor, etc) (4.5 hours)  9. Company analysis (3 hours)						
Course Learning Outcomes	CLO 1 ur CLO 2 ur CLO 3 na up CLO 4 ga	11. Company analysis On successful completion of this course, students should be able to: CLO 1 understand and demonstrate knowledge of the development and management of biotechnology business CLO 2 understand and demonstrate how discoveries and inventions are commercialized CLO 3 navigate the various steps in the development of a biotechnology derived product: from bench, to scale up,to market CLO 4 gain technical and business knowledge of the biotechnology and bioprocessing industries					
Pre-requisites (and Co-requisites and Impermissible combinations)	CLO 5 participate and contribute to the business side of scientific enterprises  Pass in 1110  NOT for students who have passed in BIOL3409.						
Offer in 2021 - 2022	Y 2nd	d sem Offer in 2022 - 2023 : Y	Examination	No Exam			
Grade Descriptors (A+ to F)	Α	Students acquire exceptional skills and knowledge from the course and are catechnological developments of various biotechnology ventures.					
(A+ 10 F)	B Students demonstrate a broad and in-depth understanding of the current developments in biotechnology industry and are capable of analyzing the business and technological developments of various biotechnology ventures under guidance.						

	С	C Students demonstrate a broad and in-depth understanding of the current developments in biotechnology industry.						
	D	D Students demonstrate a moderate understanding of the current developments in biotechnology industry.						
	Fail	Students fail to demonstrat	Students fail to demonstrate a moderate understanding of the current developments in biotechnology industry.					
Communication- intensive Course	N	N						
Course Type	Lecture-	-based course						
Course Teaching	Activiti	es	Details		No. of Hours			
& Learning Activities	Lecture	s			36			
	Field work				6			
	Group work		Presentation	Presentation				
	Reading / Self study				60			
	Assessment				18			
Assessment Methods and Weighting	Method	ds	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignr	nents		50	CLO 1,2,3,4,5			
	Presen	tation		30	CLO 1,2,3,4,5			
	Test			20	CLO 1,2,3,4,5			
Required/recommended reading and online materials	McGrav Compar	, ,	rf, Andrew J. Nelson (20	011) Technology Ventures: From Idea	to Enterprise 3rd ed.			
Course Website	http://me	oodle.hku.hk/						
Additional Course Information		This course will be offered subject to a minimum enrollment number and availability of teachers.  Priority will be given to students majoring or minoring in MBB						

BIOL3101		behaviour (6 cı	redits)		Academic Yea	r  2021		
Offering Department	Biologica	l Sciences			Quota	32		
Course Co-ordinator	Dr S W Y	Dr S W Y Sin, Biological Sciences (sinyw@hku.hk)						
Teachers Involved	(Dr S W Y Sin, School of Biological Sciences)							
Course Objectives	understar	The purpose of this course is to introduce students with the diversity in animal behaviour and the means of understanding animal behaviour. The course will teach students the underlying mechanism and function of behaviour, and how did a particular behaviour develop and evolve.						
Course Contents & Topics	influence students behaviora foraging; sociality i field, as v	Why do animal behaviours vary among individuals and species? How do environment and ecological interactions influence behaviours? What are the underlying genetic mechanism of a particular behaviour? In this course, students will learn to think within the ecological and evolutionary perspectives on animal behaviour. Topics include behavioral ecology; behavioral genetics; reproductive behaviour; mating system; parental care; communication; foraging; learning; migration and biological rhythms; evolutionary stable strategies; sexual selection; altruism; and sociality in vertebrates and invertebrates. We will discuss several classical studies that form the foundation of this field, as well as more recent research that have led to current understanding of animal behaviour. This course will give students a unique perspective on the natural world and our own species.						
Course Learning	On succe	essful completion o	of this course	e, students should be able to:				
Outcomes	CLO 1 le	earn and appreciate	te the mecha	anism, function, development, and	d evolution of animal beh	naviour		
				teractions between natural and s				
	CLO 3 a	ppreciate current t	theories that	form basis for modern understar	nding of animal behaviou	r		
	CLO 4 le	earn the scientific re	reasoning ar	nd methodology in the field of Ani	mal Behaviour			
	CLO 5 th	nink analytically, ba	ased upon e	ecological and evolutionary princi	ples, to explain the beha	viours observed i		
	th	ne natural world an	nd our own s	specie				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BIOL2306							
Offer in 2021 - 2022			022 - 2023 :		Examination	Dec		
Grade Descriptors (A+ to F)	A Evidence of a thorough grasp of the subject in a broader comparative perspective as demonstrated by background reading and excellent use of named examples and case studies. Evidence of independent critical thought with excellent use of a broad range of fundamental concepts to draw insightful and logical conclusions. Show eagerness to learn, great abilities of independent work, effective presentation skills with excellent analytical argumentation. Excellent or outstanding work relative to what is required at degree level.							
	В	Evidence of a good grasp of the subject as demonstrated by some background reading and appropriate use of named examples and some case studies. Evidence of good critical thought, although not necessarily original. Good and very good (but not outstanding) abilities of independent work, effective presentation skills with good analytical and logical argumentation. Good general command of acquired knowledge to draw meaningful and logical conclusions. Work more than sufficient for what is required at degree level.						
	C Demonstrate an adequate, but not coherent and incomplete grasp of the subject, with limited background reading and limited use of named examples and case studies. Some abilities of logical critical thinking, but not insightful and/or independent; only partial abilities to use acquired knowledge and work independently to draw meaningful conclusions. Fair presentation skills, with mostly correct argumentation, but limited (or no) abilities to integrate broader concepts. Work sufficient for what is required for degree level.							
	Demonstrate some grasp of the subject, but partial and limited to the most basic concepts, examples, and limited (or none) case studies. Insufficient evidence of background reading, limited abilities of critical independent thinking, and not particularly effective presentation skills with generally weak logical argumentation and restricted ability of drawing appropriate conclusions. Work barely meets what is required at degree level.							
	Fail  No evidence of basic minimum knowledge and understanding of the subject. No evidence of background reading and no familiarity with any relevant examples and case studies. Inadequate evidence of coherent logical thought; ineffective presentation skills with poor argumentation and no abilities to draw meaningful conclusions. Work fails to reach degree level.							
Communication- intensive Course	N	, ,		ű	g .			
Course Type	Lecture w	vith laboratory com	nponent cou	rse				
Course Teaching	Activitie	s	Det	ails		No. of Hours		
Learning Activities	Lectures					24		
	Laborato	ry	Lab	work, field trips, or debates/prese	entations	24		
	Tutorials	•				6		

Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
Assignments		60	CLO 1,2,3,4,5			
Examination		40	CLO 1,2,3,4,5			
D. R. Rubenstein & J. Alcock. Ani	mal Behavior: An Evolutionary Ap	proach. Oxford University	Press; 11th edition;			
2018.						
N. B. Davies, J. R. Krebs & S. A. V	Vest. An Introduction to Behaviour	ral Ecology. Wiley-Blackwe	II; 4th edition; 2012.			
http://moodle.hku.hk	http://moodle.hku.hk					
This course will be offered subject to a minimum enrollment number and availability of teachers.						
	Assignments Examination D. R. Rubenstein & J. Alcock. Ani 2018. N. B. Davies, J. R. Krebs & S. A. V	Assignments  Examination  D. R. Rubenstein & J. Alcock. Animal Behavior: An Evolutionary Ag 2018.  N. B. Davies, J. R. Krebs & S. A. West. An Introduction to Behavious http://moodle.hku.hk	Assignments  Examination  D. R. Rubenstein & J. Alcock. Animal Behavior: An Evolutionary Approach. Oxford University 2018.  N. B. Davies, J. R. Krebs & S. A. West. An Introduction to Behavioural Ecology. Wiley-Blackwe http://moodle.hku.hk			

	Animai p	physiology and env	ironmental adaptation (6 credits	Academic Yea	r 2021			
Offering Department	Biological	Sciences		Quota	35			
Course Co-ordinator	Prof A O L	Prof A O L Wong, Biological Sciences (olwong@hku.hk)						
Teachers Involved	(Dr W Y Lui,Biological Sciences) (Dr Y L Zhai,Biological Sciences) (Prof A O L Wong,Biological Sciences)							
Course Objectives	The course covers the major aspects of animal physiology for environmental adaptation in terrestrial & aquatic habitats. Stress will be given to the functional interactions between animals and the environment, especially on the mechanisms by which animals obtain resources for survival from the environment, detect environmental changes via sensory structures, and respond to adversities in the environment by altering their body forms & functions.							
Course Contents & Topics	metabolism terrestrial Visual sign & mechan in aquation morpholog	Basic concepts of animal adaptation to environmental changes/extreme environment; Modification of energy metabolism according to oxygen availability; Different models of gaseous exchange for aquatic, inter-tidal, and terrestrial habitats; Cross-adaptation to different environment: air-breathing fish vs diving adaptations in mammals; Visual signals & differential levels of photoreception from protozoa to mammals; Background adaptation: functions & mechanisms for color presentation; Sound wave as environmental signals: functions & mechanisms of detection in aquatic & terrestrial habitats; Echo sounding in bats for navigation without visual signals; Behavioral, morphological & physiological adaptations in hostile environment: extreme hot vs freezing cold; salinity changes in aquatic habitats & water availability in terrestrial habitats on osmoregulation, water balance & nitrogenous						
Course Learning Outcomes	CLO 1 ha CLO 2 ap CLO 3 co	ove a broad understanding preciate the role of the imprehend a wide range.	course, students should be able to: ing on functional interactions between a environment in shaping the evolution o ge of physiological adaptations (both s environmental changes	f animal structures & fui	nctions			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BI	OL2103 or BIOL2220 o	r BIOC2600 or MEDE2301					
Offer in 2021 - 2022	Y 2nd	sem Offer in 2022 - 2	2023 : Y	Examination	May			
Grade Descriptors (A+ to F)	B C	Demonstrate thorough mastery at an advanced level of extensive knowledge required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational skills. Writings consistently demonstrate informed, thoughtful intellectual engagement with broad range of relevant concepts.  Demonstrate substantial command of a broad range of knowledge required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational skills. Writings mostly demonstrate informed, thoughtful intellectual engagement with broad range of relevant concepts.  Demonstrate general but incomplete command of knowledge required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational skills. Writings mostly indicate informed, intellectual engagement with concepts or						
		Apply moderately effective	organizational skills. Writings mostly indicate i		most familiar situations.			
	D Fail	Apply moderately effective theories but not always with Demonstrate partial but lim evidence of some coheren knowledge to solve problengagement with concepts. Demonstrate little or no evanalytical and critical abilitie.	organizational skills. Writings mostly indicate in sufficient depth, breadth or understanding, nitled command of knowledge required for attaint and logical thinking, but with limited analytice ems. Apply limited or barely effective organizor theories but mostly at a superficial level. widence of command of knowledge required fees, logical and coherent thinking. Show very little	informed, intellectual engage ning some of the course lea al and critical abilities. Show zational skills. Writings indi- or attaining the course learn e or no ability to apply knowle	most familiar situations, ment with concepts or irring outcomes. Show limited ability to apply cate some intellectual ing outcomes. Lack of edge to solve problems.			
Communication-		Apply moderately effective theories but not always with Demonstrate partial but lim evidence of some coheren knowledge to solve problengagement with concepts. Demonstrate little or no evanalytical and critical abilitie.	organizational skills. Writings mostly indicate in sufficient depth, breadth or understanding, nitled command of knowledge required for attaint and logical thinking, but with limited analytice ems. Apply limited or barely effective organizor theories but mostly at a superficial level. vidence of command of knowledge required foes, logical and coherent thinking. Show very little inimally effective or ineffective. Writings reveal a	informed, intellectual engage ning some of the course lea al and critical abilities. Show zational skills. Writings indi- or attaining the course learn e or no ability to apply knowle	most familiar situations, ment with concepts or irring outcomes. Show limited ability to apply cate some intellectual ing outcomes. Lack of edge to solve problems.			
intensive Course	Fail	Apply moderately effective theories but not always with Demonstrate partial but lin evidence of some coheren knowledge to solve proble engagement with concepts Demonstrate little or no evanalytical and critical abilitie Organizational skills are mi or theories. Writings are irre	organizational skills. Writings mostly indicate in sufficient depth, breadth or understanding, nitled command of knowledge required for attaint and logical thinking, but with limited analytice ems. Apply limited or barely effective organizor theories but mostly at a superficial level. vidence of command of knowledge required foes, logical and coherent thinking. Show very little inimally effective or ineffective. Writings reveal a	informed, intellectual engage ning some of the course lea al and critical abilities. Show zational skills. Writings indi- or attaining the course learn e or no ability to apply knowle	most familiar situations, ment with concepts or irring outcomes. Show limited ability to apply cate some intellectual ing outcomes. Lack of edge to solve problems.			
intensive Course Course Type	Fail N Lecture-ba	Apply moderately effective theories but not always with Demonstrate partial but lin evidence of some coheren knowledge to solve proble engagement with concepts Demonstrate little or no evanalytical and critical abilitie Organizational skills are mi or theories. Writings are irrespassed course	organizational skills. Writings mostly indicate in sufficient depth, breadth or understanding. Inited command of knowledge required for attaint and logical thinking, but with limited analytica ems. Apply limited or barely effective organizor theories but mostly at a superficial level. Vidence of command of knowledge required fees, logical and coherent thinking. Show very little inimally effective or ineffective. Writings reveal a elevant or superficial.	informed, intellectual engage ning some of the course lea al and critical abilities. Show zational skills. Writings indi- or attaining the course learn e or no ability to apply knowle	most familiar situations, ment with concepts or irning outcomes. Show limited ability to apply cate some intellectual ing outcomes. Lack of adge to solve problems, agement with concepts			
intensive Course Course Type Course Teaching	Fail  N  Lecture-ba  Activities	Apply moderately effective theories but not always with Demonstrate partial but lin evidence of some coheren knowledge to solve proble engagement with concepts Demonstrate little or no evanalytical and critical abilitie Organizational skills are mi or theories. Writings are irrespassed course	organizational skills. Writings mostly indicate in sufficient depth, breadth or understanding, nitled command of knowledge required for attaint and logical thinking, but with limited analytice ems. Apply limited or barely effective organizor theories but mostly at a superficial level. vidence of command of knowledge required foes, logical and coherent thinking. Show very little inimally effective or ineffective. Writings reveal a	informed, intellectual engage ning some of the course lea al and critical abilities. Show zational skills. Writings indi- or attaining the course learn e or no ability to apply knowle	most familiar situations, ment with concepts or irring outcomes. Show limited ability to apply cate some intellectual ing outcomes. Lack of adge to solve problems, agement with concepts			
intensive Course Course Type Course Teaching	Fail  N  Lecture-ba  Activities  Lectures	Apply moderately effective theories but not always with Demonstrate partial but lin evidence of some coheren knowledge to solve proble engagement with concepts Demonstrate little or no evanalytical and critical abilitie Organizational skills are mi or theories. Writings are irrespassed course	organizational skills. Writings mostly indicate in sufficient depth, breadth or understanding. Inited command of knowledge required for attaint and logical thinking, but with limited analytica ems. Apply limited or barely effective organizor theories but mostly at a superficial level. Vidence of command of knowledge required fees, logical and coherent thinking. Show very little inimally effective or ineffective. Writings reveal a elevant or superficial.	informed, intellectual engage ning some of the course lea al and critical abilities. Show zational skills. Writings indi- or attaining the course learn e or no ability to apply knowle	most familiar situations, ment with concepts or irring outcomes. Show limited ability to apply cate some intellectual ing outcomes. Lack of adge to solve problems, agement with concepts  No. of Hours  36			
intensive Course Course Type Course Teaching	Fail  N  Lecture-ba  Activities  Lectures  Tutorials	Apply moderately effective theories but not always with Demonstrate partial but lin evidence of some coheren knowledge to solve proble engagement with concepts Demonstrate little or no evanalytical and critical abilitie Organizational skills are mi or theories. Writings are irreseased course	organizational skills. Writings mostly indicate in sufficient depth, breadth or understanding. Inited command of knowledge required for attaint and logical thinking, but with limited analytica ems. Apply limited or barely effective organizor theories but mostly at a superficial level. Vidence of command of knowledge required fees, logical and coherent thinking. Show very little inimally effective or ineffective. Writings reveal a elevant or superficial.	informed, intellectual engage ning some of the course lea al and critical abilities. Show zational skills. Writings indi- or attaining the course learn e or no ability to apply knowle	most familiar situations, ment with concepts or uning outcomes. Show limited ability to apply cate some intellectual cate some intellectual ing outcomes. Lack of edge to solve problems, agement with concepts  No. of Hours  36 12			
intensive Course Course Type Course Teaching & Learning Activities	Fail  N  Lecture-ba  Activities  Lectures  Tutorials  Reading /	Apply moderately effective theories but not always with Demonstrate partial but lin evidence of some coheren knowledge to solve proble engagement with concepts Demonstrate little or no evanalytical and critical abilitie Organizational skills are mi or theories. Writings are irrespassed course	organizational skills. Writings mostly indicate in sufficient depth, breadth or understanding. Inited command of knowledge required for attaint and logical thinking, but with limited analytica ems. Apply limited or barely effective organizor theories but mostly at a superficial level. Vidence of command of knowledge required fees, logical and coherent thinking. Show very little nimally effective or ineffective. Writings reveal a elevant or superficial.  Details	informed, intellectual engage ning some of the course lea al and critical abilities. Show zational skills. Writings indic or attaining the course learn e or no ability to apply knowle in absence of intellectual eng	most familiar situations, ment with concepts or irring outcomes. Show limited ability to apply cate some intellectual ing outcomes. Lack of adge to solve problems, agement with concepts  No. of Hours  36 12 100			
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture-ba Activities Lectures Tutorials Reading / Methods	Apply moderately effective theories but not always with Demonstrate partial but lin evidence of some coheren knowledge to solve proble engagement with concepts Demonstrate little or no evanalytical and critical abilitie Organizational skills are mi or theories. Writings are irreduced to the composition of the compos	organizational skills. Writings mostly indicate in sufficient depth, breadth or understanding. Inited command of knowledge required for attaint and logical thinking, but with limited analytica ems. Apply limited or barely effective organizor theories but mostly at a superficial level. Vidence of command of knowledge required fees, logical and coherent thinking. Show very little inimally effective or ineffective. Writings reveal a elevant or superficial.	informed, intellectual engage ning some of the course lea al and critical abilities. Show zational skills. Writings indie or attaining the course learn e or no ability to apply knowle in absence of intellectual eng	most familiar situations, ment with concepts or uning outcomes. Show limited ability to apply cate some intellectual sing outcomes. Lack of edge to solve problems, agement with concepts  No. of Hours 36 12 100 Assessment Methods to CLO Mapping			
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail  N  Lecture-ba  Activities Lectures Tutorials Reading / Methods  Examinati	Apply moderately effective theories but not always with Demonstrate partial but lin evidence of some coheren knowledge to solve proble engagement with concepts Demonstrate little or no evanalytical and critical abilitie Organizational skills are mi or theories. Writings are irreduced to the composition of the compos	organizational skills. Writings mostly indicate is sufficient depth, breadth or understanding. Initied command of knowledge required for attaint and logical thinking, but with limited analytica ems. Apply limited or barely effective organizor theories but mostly at a superficial level. Vidence of command of knowledge required fees, logical and coherent thinking. Show very little inimally effective or ineffective. Writings reveal a elevant or superficial.  Details  Details	informed, intellectual engage ning some of the course lea al and critical abilities. Show zational skills. Writings indie or attaining the course learn e or no ability to apply knowle in absence of intellectual eng  Weighting in final course grade (%)	most familiar situations, ment with concepts or iming outcomes. Show limited ability to apply cate some intellectual sing outcomes. Lack of edge to solve problems, agement with concepts  No. of Hours  36  12  100  Assessment Methods to CLO Mapping CLO 1,2,3			
Communication- intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	Fail  N  Lecture-ba Activities Lectures Tutorials Reading / Methods  Examinati Test Christophe Richard W E. N. Mari	Apply moderately effective theories but not always with Demonstrate partial but lin evidence of some coheren knowledge to solve proble engagement with concepts Demonstrate little or no evanalytical and critical abilitie Organizational skills are mi or theories. Writings are irrespectively asset to the companies of the companies	organizational skills. Writings mostly indicate in sufficient depth, breadth or understanding. Inited command of knowledge required for attaint and logical thinking, but with limited analytica ems. Apply limited or barely effective organizor theories but mostly at a superficial level. Vidence of command of knowledge required fees, logical and coherent thinking. Show very little nimally effective or ineffective. Writings reveal a elevant or superficial.  Details	informed, intellectual engage ining some of the course lea al and critical abilities. Show zational skills. Writings indie or attaining the course learn e or no ability to apply knowle in absence of intellectual eng  Weighting in final course grade (%)  50  50  Physiology, Pearson. hysiology, Sinauer Asso	most familiar situations, ment with concepts or iming outcomes. Show limited ability to apply cate some intellectual sing outcomes. Lack of edge to solve problems, agement with concepts  No. of Hours  36  12  100  Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2,3			
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Fail  N  Lecture-ba Activities Lectures Tutorials Reading / Methods  Examinati Test Christophe Richard W E. N. Mari http://moo	Apply moderately effective theories but not always with Demonstrate partial but lin evidence of some coheren knowledge to solve proble engagement with concepts Demonstrate little or no evanalytical and critical abilitie Organizational skills are mi or theories. Writings are irrespected to the companies of the c	organizational skills. Writings mostly indicate in sufficient depth, breadth or understanding. Institute command of knowledge required for attaint and logical thinking, but with limited analytical ems. Apply limited or barely effective organization theories but mostly at a superficial level. Vidence of command of knowledge required fees, logical and coherent thinking. Show very little nimally effective or ineffective. Writings reveal a selevant or superficial.  Details  Details  Details  Continual assessment  M. Schulte (2015), Principles of Animal & Margaret Anderson (2012), Animal Pf Human Anatomy & Physiology. Benjan	informed, intellectual engage ining some of the course lea al and critical abilities. Show zational skills. Writings indie or attaining the course learn e or no ability to apply knowle in absence of intellectual eng  Weighting in final course grade (%)  50  50  Physiology, Pearson. hysiology, Sinauer Asso	most familiar situations, ment with concepts or iming outcomes. Show limited ability to apply cate some intellectual sing outcomes. Lack of edge to solve problems, agement with concepts  No. of Hours  36  12  100  Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2,3			

BIOL3107	Plant physiology (6 credits)	Academic Year	2021
Offering Department	Biological Sciences	Quota	30

Course Co-ordinator		ogical Sciences ()					
Teachers Involved	(TBC,Biological Sciences)						
Course Objectives	mechanisr	To give an understanding of plant processes such as plant growth and development and their regulatory mechanisms.					
Course Contents & Topics	Discovery, assay, chemical nature, mechanism, structure-activity relationships, physiological effects, and signal transduction of plant hormones. Hormonal transport. Selected topics on plant growth and development including photo-morphogenesis, seed germination, dormancy, apical dominance, fruit ripening, leaf abscission, and plant defense.						
Course Learning	On succes	ssful completion of th	is course, students should b	pe able to:			
Outcomes				nts in model plant Arabidopsis			
				nipulating plant gene expression			
			ation of plant growth and de	velopment by various plant hormone	es		
Pre-requisites (and Co-requisites and Impermissible combinations)		Pass in BIOL2103 NOT for students who have passed in ENVS3202					
Offer in 2021 - 2022	N Offe	er in 2022 - 2023 : N		Examination			
Grade Descriptors (A+ to F)	A	evidence of originality. Ir	n practical sessions: excellent insig	nd presentation, the discussion would be ver ght in to the practical aims; submit good repo	ts.		
, ,	В	In written examination: coherent organization and clear presentation, the discussion would be a complete questions. In practical sessions: full understanding of the practical aims; submit accurate reports.					
	С	In written examination and practical sessions: Good in parts, but important points omitted. Might also have defects in presentation or be not very well written. Reasonably competent, but might show misunderstanding of the material: significant inaccuracies or errors.					
	D	understanding, organization, clarity or accuracy. Write-ups that are unduly brief would fall into this category.					
	Fail	In written examination and practical sessions: Poor knowledge and understanding of the subject, a lack of coherent and organization, and answers are largely irrelevant.					
Communication- intensive Course	N						
Course Type	Lecture wi	ith laboratory compor	nent course				
Course Teaching	Activities	3	Details	Details			
& Learning Activities	Lectures						
	Laborator	У			24		
	Tutorials				6		
	Reading /	Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Examinat			75	CLO 1,2,3		
	Laborator	• •		25	CLO 3		
Required/recommended reading and online materials	2nd ed.) P.J. Davis	P. J. Davis: Plant Hormones: Physiology, Biochemistry and Molecular Biology (Martinus Nijhoff Publishers, 1995, 2nd ed.) P.J. Davis: Plant Hormones: Biosynthesis, Signal Transduction, Action! (Springer Netherlands, 2010) Lecturing materials and journal articles will be posted on HKU Moodle.					
Course Website		dle.hku.hk/	·				
Additional Course Information	This cours	se will be offered subj	ject to a minimum enrollmer	nt number and availability of teacher	S.		

BIOL3108	Microbial physiology (6 credits)	Academic Year 2021					
Offering Department	Biological Sciences	Quota 50					
Course Co-ordinator	Dr A Yan, Biological Sciences (ayan8@hku.hk)						
Teachers Involved	(Dr A Yan,Biological Sciences)						
Course Objectives	Microbes are amazing and important entities on earth. Knowledge of microbes is widely applied in food, pharmaceutics, biotechnologies, diseases control, and biogeochemical processes. Microbial Physiology provides molecular basis for understanding of these important processes and applications, and to serve as essential foundations for sub-disciplines of Microbiology, such as environmental, industrial, and medicinal Microbiology. Upon completion, students will acquire fundamental knowledge and methodologies for microbial studies and be able to relate knowledge to various microbial applications.						
Course Contents & Topics	Serving as a fundamental course for the understanding of the world of microorganized and presented in three themes: 'Microbial Rules', 'Microbial Breat these three themes, a broad range of highly educational and infincluding: 'Microorganisms and their position in the living world', 'Fundamen microbes', 'Microbial structures and functions', 'Microbial growth and cont metabolism', and 'Regulation and control of metabolic Activities'. Topics are thighly interactive tutorial session following each of the topics such that stustimulating, and problem-based learning experiences.	h', and 'Microbial Adaption'. Under teresting topics are presented tal methodologies for the study of rol', 'Energy Generation', 'Central aught in a coherent manner with a					
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 appreciate the diversity of microbial metabolisms and the strategies for their adaptive responses						
	CLO 2 comprehend the principles underlying the dynamic nature of microbial physiology						
	CLO 3 relate knowledge to practical application of microbes in industry and medicine						
	CLO 4 develop abilities to read and assess scientific literature in microbiology area						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BIOC2600 or BIOL2103 or BIOC3604						
Offer in 2021 - 2022	N Offer in 2022 - 2023 : N	Examination					
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge recoutcomes. Show strong analytical and critical abilities and logical thinking, with evid knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly	ence of original thought, and ability to apply					
	B  Demonstrate substantial command of a broad range of knowledge required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and						

		some unfamiliar situations	s. Apply effective organization	onal skills.			
	С	Demonstrate general but evidence of some analyti	Demonstrate general but incomplete command of knowledge required for attaining most of the course learning of evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most far typly moderately effective organizational skills. Demonstrate partial but limited command of knowledge required for attaining some of the course learning of evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited nowledge to solve problems. Apply limited or barely effective organizational skills.				
	D	Demonstrate partial but evidence of some coher					
	Fail	Demonstrate little or no analytical and critical abil	evidence of command of	knowledge required f hinking. Show very litt	or attaining the course lear le or no ability to apply know		
Communication- intensive Course	N		<u> </u>				
Course Type	Lecture-b	ased course					
Course Teaching	Activitie	s	Details			No. of Hours	
& Learning Activities	Lectures						
	Tutorials					12	
	Project work					2	
	Reading / Self study					100	
Assessment Methods and Weighting	Methods	5	Details		Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignments				20	CLO 1,2,3,4	
	Examination				50	CLO 1,2,3	
	Test		mid-term		30	CLO 1,2,3	
Required/recommended reading and online materials							
Course Website			/ ۳۶۰۰۰ رق				
Additional Course Information	http://moodle.hku.hk/ This course will be offered subject to a minimum enrollment number and availability of teachers.						

BIOL3109	Environ	mental microbiology	/ (6 credits)	Academic Year	2021		
Offering Department	Biological	Sciences	· ·	Quota	40		
Course Co-ordinator	TCB, Biolo	ogical Sciences ()					
Teachers Involved							
Course Objectives	such as c biodegrad	To familarize students with the role of various microorganisms in natural process which affect our environme such as cycling of chemical elements, interactions with plants and animals, and the way in which they carry biodegradation of environmentally important pollutants. Selective groups of microorganism will be examined detail for their biochemical processes. Key concepts are illustrated with known examples and cases					
Course Contents & Topics	Contrib     Microbi	<ol> <li>Advanced aspects of microbial diversity, ecology and growth</li> <li>Contribution of microbial metabolism to biogeochemical processes important in cycling of nutrients</li> <li>Microbial interactions with plants and animals</li> <li>Microbial metabolism of organic compounds, metals and man-made polymers</li> </ol>					
Course Learning			ourse, students should be able to:	p p s.ye.e			
Outcomes		•	and diversity of microorganisms in i	maior environmental habitat	'S		
		•	olic potential translates to ecophysic	•			
	CLO 3 cc		pial abundance, diversity, and meta				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Bl	OL2103					
Offer in 2021 - 2022	N Off	er in 2022 - 2023 : N		Examination			
Grade Descriptors (A+ to F)	A Thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Thorough grasp of the subject matter. Show very strong analytical and critical abilities and high logical thinking, with evidence of original thought. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills.						
	В	B Substantial command of a broad range of knowledge and skills required for attaining at least most of the course learnin outcomes. Substantial grasp of the subject. Show evidence of analytical and critical abilities and logical thinking. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective organizational an presentational skills.					
	C General but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. General but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.						
	Partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Partially effective lab skills and techniques. Limited ability to use data and results to draw						
	Fail  Fail  Little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Minimally effective or ineffective lab skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.						
Communication- Intensive Course	N						
Course Type	Lecture h	ased course					
Course Type	Activities		Details		No. of Hours		
Learning Activities	Lectures		Details		36		
Louining Activities	Tutorials				16		
		ork					
	Project w				14 100		
		Self study					
Assessment Methods	Methods		Details	Weighting in final	Assessment		

and Weighting			course grade (%)	Methods to CLO Mapping
	Assignments		80	CLO 1,2,3
	Test		20	CLO 1,2,3
Required/recommended reading and online materials	References Molecular Biology of the Cell - Fifth Julian Lewis, Martin Raff, Keith Ro R. Mitchell and JD. Gu: Environm	I Ecology: Fundamentals and Appli Edition by Bruce Alberts, Alexanda berts, Peter Walter (December 200 Jental Microbiology (Wiley-Blackwel	cations (Benjamin Cumm er Johnson, 7)	`
Course Website	http://moodle.hku.hk/			
Additional Course Information	This course will be offered subject	to a minimum enrollment number a	nd availability of teachers	S.

BIOL3110	Environ	mental toxicolog	y (6 credits)	Academic Yea	r 2021		
Offering Department	Biological		,	Quota	60		
Course Co-ordinator	-	ogical Sciences ()		100	1 - 1		
Teachers Involved	(TBC,Biolo	ogical Sciences)					
Course Objectives	pollutants be analyze involved w	in lithosphere, hydr ed through adsorpti vill be highlighted. Sp	pasic principles of environmental and e osphere, atmosphere and biosphere. I on, metabolism, toxicity and eliminatio pecific cases of toxicity will be presente	Mechanisms of toxicity as on. Major metabolic proces d and discussed.	dose-response wi sses and enzyme		
Course Contents & Topics	biomagnifi 2. Partition 3. Quantita 4. Emergin 5. Elimina	<ol> <li>Environmental chemistry of pollutants and their toxicity and factors governing toxic effects, bioaccumulation ar biomagnification</li> <li>Partitioning and transformation of environmental pollutants</li> <li>Quantitative toxicology using dose-response approaches</li> <li>Emerging endocrine-disrupting chemicals and carcinogens at molecular levels</li> <li>Elimination of pollutants from the environments</li> <li>Laboratory testing of toxicity and review various adsorption isotherm models</li> </ol>					
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 understand fate and distribution of chemicals in various compartments of the ecosystem  CLO 2 understand toxicity through adsorption, metabolism, elimination and target site and quantitative analyses.  CLO 3 understand mechanism of toxicity from specific pollutants of choice  CLO 4 understand specific biochemical processes and enzymes involved in pollutants transformation						
		neralization	o tochniques in environmental cleaning	LID			
Pre-requisites (and Co-requisites and Impermissible combinations)		OL2103 or CHEM31	e techniques in environmental cleaning l41 or ENVS3042	цр			
Offer in 2021 - 2022	N Offe	er in 2022 - 2023 : N		Examination			
Grade Descriptors (A+ to F)	A Thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Thorough grasp of the subject matter. Show very strong analytical and critical abilities and high logical thinking, with evidence of original thought. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills.						
	B Substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Substantial grasp of the subject. Show evidence of analytical and critical abilities and logical thinking. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.						
	General but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Genera but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions Apply moderately effective organizational and presentational skills.						
	Partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.						
	Fail  Little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logice and coherent thinking. Minimally effective or ineffective lab skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.						
Communication- intensive Course	N						
Course Type		th laboratory compo			No. of Hours		
Course Teaching	Activities	3	Details	Details			
Learning Activities	Lectures	24	laboratory assignments and	nor	24		
	Laborator	'Self study	laboratory, assignment; and semi	iai	36 100		
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Examinat	ion		60	CLO 1,2,3,4,		
	Laborator		student-based assessment includes laboratory report, assignment, presentations or oth forms	40	CLO 1,2,3,4,		
Da							
Required/recommended reading and online materials	R. Mitchel	l and JD. Gu: Envir		II, 2009, 2nd ed.)			
eading and	R. Mitchel http://moo	l and JD. Gu: Envir dle.hku.hk/		· · · · · · · · · · · · · · · · · · ·	•		

Information

BIOL3201	Food ch	emistry (6 credits)		Academic Yea	r 2021		
Offering Department	Biological			Quota	60		
Course Co-ordinator	Dr J C Y L	ee, Biological Sciences	(jettylee @hku.hk)				
Teachers Involved		Lee,School of Biologica Lam,School of Biologica					
Course Objectives	To provide		g of chemistry in food sys	stems, and to provide practical tra	aining in chemistry		
Course Contents & Topics	The course will cover the components of food, including water, proteins, carbohydrates and lipids, and components such as enzymes, vitamins, minerals, colorants, flavorants and additives. The physical and ch properties of these important constituents of foods are covered in detail, and form the basis for understand reactions which occur during the production, processing, storage and handling of foods, and in understand methods used in analyzing foods.  A series of laboratory sessions will cover analysis of food components, protein chemistry, lipid oxidation, proof sugars and starches, enzymatic and non-enzymatic browning reactions, and sensory analysis of foods.						
Course Learning			course, students should be a				
Outcomes		•	and properties of major and				
	CLO 2 un	derstand the basic cher	mistry behind food processir	ng			
		ave integrated their kno ontext	wledge of biological and c	hemical principles into a food sci	ence and nutrition		
Pre-requisites (and Co-requisites and Impermissible combinations)			or BIOL2220 or MEDE2301; Idmitted in 2016-2017 or befo	and NOT for students who have pore.	assed in BIOL2101		
Offer in 2021 - 2022	N Offe	er in 2022 - 2023 : N		Examination			
Grade Descriptors (A+ to F)	A Demonstrate thorough grasp of the subject matter covered. Show extensive knowledge and understanding of the topics covered and can readily apply this knowledge. Critically use lab skills and techniques and analysis of data and results to draw appropriate and insightful conclusions.						
	B Demonstrate substantial grasp of the subject matter covered. Show thorough knowledge and understanding of the content and a high level of competence in the topics covered and able to apply this knowledge and skills to most situations. Use lab skills and techniques and analysis of data and results to draw generally appropriate conclusions.  C Demonstrate general but incomplete grasp of the subject matter covered. The student has a sound knowledge and						
	understanding of the main areas of content and has achieved an adequate level of competence in the topics covered. Use lab skills and techniques and analysis of data and results to draw moderately appropriate conclusions.  Demonstrate partial but limited grasp, with retention of some relevant information of the subject matter covered. Show a basic knowledge and understanding of the content and has achieved a limited level of competence in the topics covered. Use lab skills						
	Fail  The properties of data and results to draw appropriate conclusions occasionally.  Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show elementary knowledge and understanding in few areas of the content and has achieved very limited competence in some of the topics covered. Use lab skills and techniques and analysis of data and results ineffectively, leading generally to inappropriate and usually erroneous conclusions.						
Communication- intensive Course	N						
Course Type	Lecture wi	ith laboratory componer	nt course				
Course Teaching	Activities	3	Details		No. of Hours		
& Learning Activities	Lectures			24			
	Laborator	У			24		
	Tutorials	/ O / F / J			6		
		Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme		Laboratory	30	CLO 1,2,3		
	Examinat	ion		40	CLO 1,2,3		
	Test			30	CLO 1,2,3		
Required/recommended reading and online materials			larcel Dekker 4th Ed, 2008) P, Food Chemistry (Springe				
Course Website		dle.hku.hk/					
Additional Course Information	Lab. A (Q	se will be offered subjec uota: 30): 14:30 pm - 18 uota 30) : 13:30 pm - 17	:50 pm (Monday)	umber and availability of teachers			

BIOL3202	Nutritional biochemistry (6 credits)	Academic Year	2021
Offering Department	Biological Sciences	Quota	100
Course Co-ordinator	Dr C B Chan, Biological Sciences (chancb@hku.hk)		
Teachers Involved	(Dr C B Chan, Biological Sciences)		
Course Objectives	To introduce the fundamental concepts of nutrition through an integrated appreciate and intermediary metabolism.	oach in discussinç	g the interactions
Course Contents & Topics	Essential nutrients and their requirement; Metabolic control of macronutrient utilization; Metabolism of micronutrients Nutritional impacts of hexoses, long chain polyunsaturated fatty acid, chole minerals	sterol, amino acio	ds, vitamins and
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 explain how different organs coordinate to achieve metabolic control of  CLO 2 understand the metabolic pathways of cholesterol and polyunsaturated  CLO 3 understand the theoretical constructs of nitrogen requirement and the in  CLO 4 understand the biochemical roles of micronutrient in human health	fatty acids	rea cycle

Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BIOC2600 or BIOL2220 or MEDE2301						
Offer in 2021 - 2022	Y 1st sem Offer in 2022 - 2023 : Y Examination Dec						
Grade Descriptors (A+ to F)	A	identification and solvin conclusions. Demonstrat	grasp of the subject matter cover g. Show outstanding ability to crit te highly effective organization / writi	tically analyze and interpret scienting skills.	ific data a	and draw appropriate	
	В	and solving. Show reas Demonstrate effective or		and interpret scientific data and	draw app	propriate conclusions.	
	С	some ability on knowled data and draw proper co	It incomplete grasp of the subject m lge integration, problem identificatio inclusions. Demonstrate adequate of	n and solving. Show some ability to rganization / writing skills.	analyze a	and interpret scientific	
	D	Misunderstanding of the	at limited grasp, with retention of ematerials is not uncommon. Show y approaches to analyze and inte- nization / writing skills.	limited ability on knowledge integra	ation, prob	olem identification and	
	Fail Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of coherent and logical thinking, and minimal competence in problem solving. Fail to integrate information and identify problems. Seriously deficient in ability to analyze and interpret scientific data and draw conclusions. Demonstrate poor organization / writing skills.						
Communication- intensive Course	N					•	
Course Type	Lecture-ba	ased course					
Course Teaching	Activities	\$	Details			No. of Hours	
	Lectures						
& Learning Activities	Lectures					34	
& Learning Activities		/ Self study					
Assessment Methods		•	Details	Weighting in fi	(%)	34	
Assessment Methods	Reading /	·	Details		(%)	34 100 Assessment Methods	
Assessment Methods	Reading / Methods	ents	Details	course grade	(%)	34 100 Assessment Methods to CLO Mapping	
Assessment Methods	Reading / Methods  Assignme	ents	Details	course grade	(%)	34 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5	
Assessment Methods and Weighting  Required/recommended reading and	Reading / Methods  Assignme Examinati Test S.S. Gropp M.H. Stipa Elsevier	ents ion per & J. L. Smith 'Adv	vanced Nutrition and Human Biochemical, physiological, a	course grade  20 50 30  Metabolism' (6th edition) Else	(%)	34 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5 CLO 1,2,3,4,5 CLO 1,2,3,4,5	
& Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials  Course Website	Reading / Methods  Assignme Examinati Test S.S. Gropp M.H. Stipa Elsevier K. N. Fray	ents ion per & J. L. Smith 'Adv anuk & M.A. Caudill '	vanced Nutrition and Human Biochemical, physiological, a	course grade  20 50 30  Metabolism' (6th edition) Else	(%)	34 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5 CLO 1,2,3,4,5 CLO 1,2,3,4,5	

	Food mi	nicrobi	ology (6 cre	dits)				Academ	ic Year	2021
Offering Department	Biological	al Sciene	es					Quota		140
Course Co-ordinator	Dr H S El-	I-Nezar	i, Biological S	ciences (el	nezami @h	ku.hk)				
Teachers Involved		(Dr H S El-Nezami,Biological Sciences) (Dr T C S Lam,Biological Sciences)								
Course Objectives		This course provides the key concepts and principles of food microbiology with special emphasis on the interaction between microorganisms and food., microbial food spoilage and foodborne diseases will be discussed in detail.								
Course Contents & Topics	significand	Detection and enumeration of microbes in foods, Factors that influence microbes in foods, Spores and their significance, Physical methods of food preservation, Chemical preservation and natural antimicrobials, Foodborne pathogens.								
Course Learning	On succes	essful c	mpletion of th	is course, s	tudents sh	ould be a	ble to:			
Outcomes			methods for e							
	th	hat can	spoil a given fo	ood						a microorganisn
	fo	ood					•			roorganisms in a
	CLO 4 de	demonst	ate the ability	to work in a	a team to ir	nvestigate	and solve p	roblems in food	l microb	iology
Pre-requisites (and Co-requisites and Impermissible	Pass in Bl	BIOC26	0 or BIOL222	0 or MEDE	2301					
combinations)										
combinations) Offer in 2021 - 2022	Y 2nd	nd sem	Offer in 2022	- 2023 : Y				Examina	ition	No Exam
	Y 2nd	Demo evider analys	strate thorough go ce of creative ab s of data and res	rasp of the sulity and compults to draw a	petence in pro appropriate ar	ofessional-le nd insightful	vel problem so	tical and critical at	oilities and	No Exam I logical thinking, wit and techniques an strate highly effectiv
Offer in 2021 - 2022 Grade Descriptors		Demo evider analys team- Demo thinkir data	strate thorough goe of creative ab s of data and res ased organization astrate substantiag with some evidents.	lity and comp ults to draw a nal and preser I grasp of the ence of compe aw generally	petence in pro appropriate ar ntational skills e subject ma etence in prof appropriate	ofessional-le nd insightful s. atter covered fessional-lev	vel problem so conclusions to d. Show evider el problem solv	ytical and critical at lving. Critically use real-world problem ace of analytical a ing. Use lab skills	pilities and lab skills s. Demon	l logical thinking, wit
Offer in 2021 - 2022 Grade Descriptors	A	Demo evider analys team- Demo thinkir data organi Demo and lo	istrate thorough goe of creative ab sof data and resussitation istrate substantiag with some evidend results to dicational and presestrate general bugical thinking with	rasp of the sulity and computes to draw a nal and preser I grasp of the ence of competaw generally entational skills t limited compet w moderately	petence in pro appropriate ar ntational skills e subject ma etence in profor appropriate s. grasp of the s etence in profor	ofessional-le nd insightful s. atter covered fessional-lev conclusion subject matte fessional-lev but sometin	vel problem so conclusions to d. Show evider el problem solvs to real-world er covered. Show evider problem solvels er croneous el problem solvels erroneous el problem solvels el problem sol	tical and critical al lving. Critically use real-world problem are of analytical a ing. Use lab skills problems. Demo w some evidence c ing. Use lab skills	polities and laborated and critical and technonstrate earth and technonstrate and technologies and tech	I logical thinking, wit and techniques an- strate highly effectiv abilities and logica iques and analysis of
Offer in 2021 - 2022 Grade Descriptors	В	Demo evider analys team- Demo thinkir data organi Demo and Ic data a model Demo evider techni	istrate thorough of ce of creative ab so of data and res ased organization istrate substantia g with some evident of cells and results to dicational and pressistrate general budical thinking with and results to drately effective tea istrate partial but ce of coherent a ques and analysi	rasp of the sulity and compuls to draw a mal and preser I grasp of the area of compe area grasp of the grasp	petence in proper proper proper and a stills e subject ma etence in profer appropriate s. grasp of the setence in profer appropriate inizational and proper	ofessional-led insightful is atter covered fessional-lev conclusion subject matter fessional-lev but sometim d presentation of some cking competraw sometim was attentional to the competition of the compe	vel problem so conclusions to d. Show evider el problem solv sr covered. Shorel problem solv el problem solv el problem solv el problem solv else erroneous con al skills. relevant informetence in profemes appropriat	rtical and critical at living. Critically use real-world problem uce of analytical a ing. Use lab skils i problems. Diemo w some evidence of ing. Use lab skills conclusions to real ation, of the subject ssional-level proble	bilities and lab skills s. Demon and critical and techn onstrate e of analytic and techn e-world proct matter em solving eous concepts.	I logical thinking, wit and techniques an strate highly effectiv abilities and logical iques and analysis of ffective team-based al and critical abilitie iques and analysis of
Offer in 2021 - 2022 Grade Descriptors	В	Demo evider analys team- Demo thinkir data organi Demo and Ic data a model Demo evider technii proble Demo and Ic data a	istrate thorough of ce of creative ab so of data and res ased organization istrate substantia g with some evident of certain and present as the cational and present and cresults to drately effective tea istrate partial but ce of coherent a ques and analysins. Demonstrate sutrate little or no igical thinking, and gical thinking, and	rasp of the sulity and compuls to draw a mal and preser I grasp of the area of compeasure graw generally intational skills tincomplete glimited compeasure may enerately medical things of data and legan-based organ grasp, with reminimal computively, leading to draw the subject of the subject	petence in proppropriate ar an intational skills be subject ma etence in profor appropriate s. grasp of the setence in profor appropriate inizational and inizational and initiational br>initiational init	ofessional-led insightful is.  the terror covered fessional-led conclusion subject matter fessional-led but sometim d presentation of some cking competraw sometiand present le relevant in ofessional-led o inappropri	vel problem so conclusions to d. Show evider el problem solver covered. Shotel problem solver covered. Shotel problem solver en covered. Shotel problem solver es erroneous anal skills. relevant information of the covered shotel skills of nformation, of the vel problem solvel and usually selected in solver solver solvers.	rtical and critical at living. Critically use real-world problem are of analytical a ing. Use lab skills I problems. Demo w some evidence of ing. Use lab skills conclusions to real ation, of the subject sesional-level proble be but often errone limited effectivenes ne subject matter of ving. Use lab skills of erroneous concli	bilities and lab skills. Demon and critical and technonstrate e of analytic and techno-world proct matter erm solving tous concis.	I logical thinking, wit and techniques an- strate highly effectiv abilities and logica iques and analysis of ffective team-based al and critical abilitie iques and analysis of oblems. Demonstrat- covered. Show som J. Use lab skills and

Course Type	Lecture with laboratory com	ponent course		
Course Teaching	Activities	No. of Hours		
& Learning Activities	Lectures			24
	Laboratory			24
	Tutorials			12
	Reading / Self study			100
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments	Seminars	30	CLO 2,4
	Laboratory reports		20	
	Test		50	CLO 2,4
Required/recommended reading and online materials	Microbiology (ASM) Press, Food Microbiology: Fundam	Washington, DC	Montville and Karl Matthews, Ar ed by Michael P. Doyle, Larry R. B ASM) Press, Washington, DC	•
Course Website	http://moodle.hku.hk/			
Additional Course Information	Quota in sub class A: 70; Quota in sub class B: 70. This course will be offered s	subject to a minimum enrollment	number and availability of teachers	S

	Nutritio	n and the life cyc	le (6 credits)	Academic Y	ear 2021		
Offering Department		l Sciences	•	Quota	50		
Course Co-ordinator	Dr J C Y I	Louie, Biological Scie	nces (jimmyl@hku.hk)				
Teachers Involved	(Dr J C Y	Louie, Biological Scient	ences)				
Course Objectives	essential		out different stages of the life cycle. The nutritional and highlight the nutritional				
Course Contents & Topics	issues: n influence	eeds of macro- and nutrient requirement	ke place through an evidence-based micronutrients, as well as the physi s at different stages of the human life atus will also be covered.	iological and psychologic	cal determinants tha		
Course Learning Outcomes	CLO 1	On successful completion of this course, students should be able to:  CLO 1   be able to critically assess and identify the specific needs at different stages of th  CLO 2   relate the concept of requirement to physiological needs					
			ct of socio-cultural factors on nutritiona	l status			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in B	IOL2220 or BIOC260	00 or BIOL3202				
Offer in 2021 - 2022	Y 2nd	d sem Offer in 2022		Examination			
Grade Descriptors (A+ to F)	A	identification and solvi	grasp of the subject matter covered. Show ng. Show outstanding ability to critically anal ate highly effective team-based organization and	yze and interpret scientific da			
	B Demonstrate substantial grasp of the subject matter covered. Show full ability on knowledge integration, problem identification and solving. Show reasonable ability to critically analyze and interpret scientific data and draw appropriate conclusions. Demonstrate effective team-based organization and presentation skills.						
	C Demonstrate general but incomplete grasp of the subject matter covered. Might show misunderstanding of the materials. Show some ability on knowledge integration, problem identification and solving. Show some ability to analyze and interpret scientific data and draw proper conclusions. Demonstrate adequately effective team-based organization and presentation skills.						
	D Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered.  Misunderstanding of the materials is not uncommon. Show limited ability on knowledge integration, problem identification and solving. Use elementary approaches to analyze and interpret scientific data and draw sometimes erroneous conclusions. Demonstrate team-based organization and presentation skills of limited effectiveness.						
			ed organization and presentation skills of limited	effectiveness	s erroneous conclusions		
	Fail	Demonstrate little or no and logical thinking, an	ed organization and presentation skills of limited grasp, with retention of little relevant informati d minimal competence in problem solving. Fail alyze and interpret scientific data and draw cond	on, of the subject matter covere to integrate information and id	ed. Show lack of coherer entify problems. Seriousl		
	Fail N	Demonstrate little or no and logical thinking, an deficient in ability to an	grasp, with retention of little relevant informati d minimal competence in problem solving. Fail	on, of the subject matter covere to integrate information and id	ed. Show lack of coherer entify problems. Seriousl		
intensive Course	N	Demonstrate little or no and logical thinking, an deficient in ability to an	grasp, with retention of little relevant informati d minimal competence in problem solving. Fail	on, of the subject matter covere to integrate information and id	ed. Show lack of coherer entify problems. Seriousl		
ntensive Course Course Type	N	Demonstrate little or no and logical thinking, an deficient in ability to an skills.	grasp, with retention of little relevant informati d minimal competence in problem solving. Fail	on, of the subject matter covere to integrate information and id	ed. Show lack of coherer entify problems. Seriousl		
ntensive Course Course Type Course Teaching	N Lecture-b	Demonstrate little or no and logical thinking, an deficient in ability to an skills.	grasp, with retention of little relevant informati d minimal competence in problem solving. Fail alyze and interpret scientific data and draw cond	on, of the subject matter covere to integrate information and id	ed. Show lack of coherer entify problems. Seriousl anization and presentatio		
intensive Course Course Type Course Teaching	N Lecture-b Activitie Lectures Tutorials	Demonstrate little or no and logical thinking, an deficient in ability to an skills.	grasp, with retention of little relevant informati d minimal competence in problem solving. Fail alyze and interpret scientific data and draw cond	on, of the subject matter covere to integrate information and id	ed. Show lack of coherer entify problems. Seriousl anization and presentation and presentat		
intensive Course Course Type Course Teaching	N Lecture-b Activitie Lectures Tutorials	Demonstrate little or no and logical thinking, an deficient in ability to an skills.	p grasp, with retention of little relevant informati d minimal competence in problem solving. Fail alyze and interpret scientific data and draw cond	on, of the subject matter covere to integrate information and id	ed. Show lack of coherer entify problems. Seriousl anization and presentation.  No. of Hours  36		
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture-b Activitie Lectures Tutorials	Demonstrate little or no and logical thinking, an deficient in ability to an skills.  Assed course  S	p grasp, with retention of little relevant informati d minimal competence in problem solving. Fail alyze and interpret scientific data and draw cond	on, of the subject matter covere to integrate information and id	ed. Show lack of coherer entify problems. Seriousl anization and presentation.  No. of Hours  36 12		
ntensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture-b Activitie: Lectures Tutorials Reading	Demonstrate little or no and logical thinking, an deficient in ability to an skills.  Passed course  S  / Self study	p grasp, with retention of little relevant information of minimal competence in problem solving. Fail alyze and interpret scientific data and draw conditions are considered by the condition of the conditions are conditionally assume that the conditions are conditionally assume that the conditions are conditionally as a condition of the conditions are conditionally assume that the conditions are conditionally as a condition of the condition of the condition of the conditions are conditionally as a condition of the condition of the conditions are conditionally as a condition of the condition	on, of the subject matter covere to integrate information and id clusions. Demonstrate poor organization of the control of the	ed. Show lack of coherer entify problems. Seriouslanization and presentation and presentati		
ntensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture-b Activities Lectures Tutorials Reading Methods	Demonstrate little or no and logical thinking, an deficient in ability to an skills.  assed course  S  / Self study  ents	p grasp, with retention of little relevant information of minimal competence in problem solving. Fail alyze and interpret scientific data and draw conditions are student-centered learning  Details  Details  Research-Based Assignment	on, of the subject matter covere to integrate information and id clusions. Demonstrate poor organization of the course grade (%)	No. of Hours 36 12 100 Assessment Methods to CLO Mapping		
ntensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture-b Activitie Lectures Tutorials Reading Methods Assignment	Demonstrate little or no and logical thinking, an deficient in ability to an skills.  passed course  S  / Self study  ents  ents	p grasp, with retention of little relevant information of minimal competence in problem solving. Fail alyze and interpret scientific data and draw conditions are student-centered learning  Details  Details  Research-Based Assignment (Individual)	on, of the subject matter covere to integrate information and id clusions. Demonstrate poor organization of the course grade (%)	No. of Hours  No. of Hours  36  12  100  Assessment Methods to CLO Mapping CLO 1,2,3		
ntensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture-b Activitie Lectures Tutorials Reading Methods Assignme	Demonstrate little or no and logical thinking, an deficient in ability to an skills.  passed course  S  / Self study  ents  ents	p grasp, with retention of little relevant information of minimal competence in problem solving. Fail alyze and interpret scientific data and draw conditions are student-centered learning  Details  Research-Based Assignment (Individual)  Oral presentation	on, of the subject matter covere to integrate information and id clusions. Demonstrate poor organization. Demonstrate poor organization weighting in final course grade (%)  20 30	No. of Hours  No. of Hours  36  12  100  Assessment Methods to CLO Mapping CLO 1,2,3  CLO 1,2,3		
Intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	N Lecture-b Activities Lectures Tutorials Reading Methods  Assignment Presenta Project refers Test Brown J.E. Gropper S	Demonstrate little or no and logical thinking, an deficient in ability to an skills.  Passed course  S  / Self study  ents  E. Nutrition Through to S.S., Smith J.L & Gr	perasp, with retention of little relevant information of minimal competence in problem solving. Fail alyze and interpret scientific data and draw conditions are student-centered learning    Details	weighting in final course grade (%)  20 30 20 30 20 30 Metabolism (Wadsworth	No. of Hours  No. of Hours  36  12  100  Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2,3 CLO 1,2,3 CLO 1,2,3 CLO 1,2,3 CLO 1,2,3		
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	N Lecture-b Activities Lectures Tutorials Reading Methods  Assignme Presenta Project re Test Brown J.E Gropper S Croxford,	Demonstrate little or no and logical thinking, an deficient in ability to an skills.  Assed course  S  / Self study  ents  E. Nutrition Through to S.S., Smith J.L & Grittsiopoulous, Forsyth	perasp, with retention of little relevant information of minimal competence in problem solving. Fail alyze and interpret scientific data and draw conditions are student-centered learning  Details  Research-Based Assignment (Individual) Oral presentation Group project  he Life Cycle. Thomson, 2011	weighting in final course grade (%)  20 30 20 30 20 30 Metabolism (Wadsworth	No. of Hours  No. of Hours  36  12  100  Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2,3 CLO 1,2,3 CLO 1,2,3 CLO 1,2,3 CLO 1,2,3		
Communication- intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials Course Website Additional Course	N Lecture-b Activitie Lectures Tutorials Reading Methods  Assignme Presenta Project re Test Brown J.E Gropper S Croxford, http://moo	Demonstrate little or no and logical thinking, an deficient in ability to an skills.  Passed course  S  / Self study  ents  E. Nutrition Through to S.S., Smith J.L & Griltsiopoulous, Forsythodle.hku.hk/	perasp, with retention of little relevant information of minimal competence in problem solving. Fail alyze and interpret scientific data and draw conditions are student-centered learning    Details	weighting in final course grade (%)  20 30 20 30 40 Metabolism (Wadsworther, Food & Nutrition Throught	No. of Hours  No. of Hours  36  12  100  Assessment Methods to CLO Mapping  CLO 1,2,3  CLO 1,2,3  CLO 1,2,3  CLO 1,2,3  CLO 1,2,3  In 2009) Ighout Life (2015)		

BIOL3205	Human physiology (6 cred	dits)	Academic Year	r 2021		
Offering Department	Biological Sciences	•	Quota	135		
Course Co-ordinator	Dr W Y Lui, Biological Sciences	(wylui@hku.hk)				
Teachers Involved	(Dr C B Chan,Biological Science (Dr W Y Lui,Biological Sciences (Prof A O L Wong,Biologicl Sciences	·) ´				
Course Objectives	The course covers major aspectompleting this course, studer	ects of the physiology of the hun nts will have acquired fundamenta n biology will find this course most	al principles of how the body			
Course Contents & Topics	physiology; The digestive syst	systems and homeostasis; Neural em; Cardiac physiology, the blood he skeletal & muscular system; Se ergy homeostasis.	d vessels and blood pressure	e; The respiratory		
Course Learning		s course, students should be able to	0:			
Outcomes		nce of how the body meets chan		ining a relatively		
	CLO 2 understand the function	• •				
		ctions through integration of basic	physiologic concepts			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BIOC2600 or BIOL2103	or BIOL2220 or MEDE2301				
Offer in 2021 - 2022	Y 1st sem Offer in 2022 -	2023 : Y	Examination	Dec		
Grade Descriptors (A+ to F)	Demonstrate thorough mastery at an advanced level of extensive knowledge required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational skills.					
	Demonstrate substantial command of a broad range of knowledge required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational skills.					
	Demonstrate general but incomplete command of knowledge required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational skills.					
	evidence of some analyt Apply moderately effective	ical and critical abilities and logical thinking e organizational skills.	g, and ability to apply knowledge to m	nost familiar situations.		
	evidence of some analyt Apply moderately effectiv  D Demonstrate partial but evidence of some coher	ical and critical abilities and logical thinking	g, and ability to apply knowledge to m or attaining some of the course learn analytical and critical abilities. Show I	nost familiar situations. ning outcomes. Show		
	evidence of some analyt Apply moderately effectiv D Demonstrate partial but evidence of some coher knowledge to solve probl Demonstrate little or no analytical and critical abi	ical and critical abilities and logical thinking e organizational skills. limited command of knowledge required for ent and logical thinking, but with limited a	g, and ability to apply knowledge to mor or attaining some of the course lean unalytical and critical abilities. Show I zational skills. uired for attaining the course learnin	nost familiar situations.  ning outcomes. Show limited ability to apply outcomes. Lack of		
intensive Course	evidence of some analyt Apply moderately effective Demonstrate partial but evidence of some coher knowledge to solve problem Demonstrate little or no analytical and critical abi Organizational skills are solved.	ical and critical abilities and logical thinking e organizational skills. limited command of knowledge required fi ent and logical thinking, but with limited a ems. Apply limited or barely effective organi evidence of command of knowledge req lities, logical and coherent thinking. Show v	g, and ability to apply knowledge to mor or attaining some of the course lean unalytical and critical abilities. Show I zational skills. uired for attaining the course learnin	nost familiar situations.  ning outcomes. Show limited ability to apply outcomes. Lack of		
ntensive Course Course Type	evidence of some analyt Apply moderately effective D Demonstrate partial but evidence of some coher knowledge to solve problem Demonstrate little or no analytical and critical abio Organizational skills are solved.	ical and critical abilities and logical thinking e organizational skills. limited command of knowledge required fe ent and logical thinking, but with limited a ems. Apply limited or barely effective organi evidence of command of knowledge req litites, logical and coherent thinking. Show v minimally effective or ineffective.	g, and ability to apply knowledge to mor or attaining some of the course lean unalytical and critical abilities. Show I zational skills. uired for attaining the course learnin	nost familiar situations. ning outcomes. Show limited ability to apply ng outcomes. Lack of dge to solve problems.		
ntensive Course Course Type Course Teaching	evidence of some analyt Apply moderately effective Demonstrate partial but evidence of some coher knowledge to solve problem.  Fail Demonstrate little or no analytical and critical abi Organizational skills are solved.	ical and critical abilities and logical thinking e organizational skills. limited command of knowledge required fi ent and logical thinking, but with limited a ems. Apply limited or barely effective organi evidence of command of knowledge req lities, logical and coherent thinking. Show v	g, and ability to apply knowledge to mor or attaining some of the course lean unalytical and critical abilities. Show I zational skills. uired for attaining the course learnin	nost familiar situations.  ning outcomes. Show  limited ability to apply  ng outcomes. Lack of  dge to solve problems.  No. of Hours		
intensive Course Course Type Course Teaching	evidence of some analyt Apply moderately effective Demonstrate partial but evidence of some coher knowledge to solve problem.  Fail Demonstrate little or no analytical and critical abi Organizational skills are solved.	ical and critical abilities and logical thinking e organizational skills. limited command of knowledge required fe ent and logical thinking, but with limited a ems. Apply limited or barely effective organi evidence of command of knowledge req litites, logical and coherent thinking. Show v minimally effective or ineffective.	g, and ability to apply knowledge to mor or attaining some of the course lean unalytical and critical abilities. Show I zational skills. uired for attaining the course learnin	nost familiar situations.  ning outcomes. Show limited ability to apply and outcomes. Lack of dge to solve problems.  No. of Hours  36		
intensive Course Course Type Course Teaching	evidence of some analyty Apply moderately effectiv Demonstrate partial but evidence of some coher knowledge to solve probl Demonstrate little or no analytical and critical abi Organizational skills are in  N Lecture-based course Activities Lectures Tutorials	ical and critical abilities and logical thinking e organizational skills. limited command of knowledge required fe ent and logical thinking, but with limited a ems. Apply limited or barely effective organi evidence of command of knowledge req litites, logical and coherent thinking. Show v minimally effective or ineffective.	g, and ability to apply knowledge to mor or attaining some of the course lean unalytical and critical abilities. Show I zational skills. uired for attaining the course learnin	nost familiar situations.  ning outcomes. Show limited ability to apply and outcomes. Lack of dge to solve problems  No. of Hours  36 12		
intensive Course Course Type Course Teaching & Learning Activities	evidence of some analyty Apply moderately effectiv Demonstrate partial but evidence of some coher knowledge to solve probl Demonstrate little or no analytical and critical abi Organizational skills are in  N Lecture-based course Activities Lectures Tutorials Reading / Self study	ical and critical abilities and logical thinking e organizational skills. Ilmited command of knowledge required from the and logical thinking, but with limited a ems. Apply limited or barely effective organi evidence of command of knowledge requities, logical and coherent thinking. Show vininimally effective or ineffective.  Details	g, and ability to apply knowledge to mor attaining some of the course learn inalytical and critical abilities. Show I zational skills. Lifted for attaining the course learning ery little or no ability to apply knowled	nost familiar situations.  ning outcomes. Show limited ability to apply and outcomes. Lack of dige to solve problems  No. of Hours  36  12  100		
Communication- intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting	evidence of some analyty Apply moderately effectiv Demonstrate partial but evidence of some coher knowledge to solve probl Demonstrate little or no analytical and critical abi Organizational skills are in  N Lecture-based course Activities Lectures Tutorials	ical and critical abilities and logical thinking e organizational skills. limited command of knowledge required fe ent and logical thinking, but with limited a ems. Apply limited or barely effective organi evidence of command of knowledge req litites, logical and coherent thinking. Show v minimally effective or ineffective.	y, and ability to apply knowledge to mor attaining some of the course learn analytical and critical abilities. Show I zational skills. uired for attaining the course learning rery little or no ability to apply knowled.  Weighting in final course grade (%)	nost familiar situations.  ning outcomes. Show limited ability to apply and outcomes. Lack of dge to solve problems  No. of Hours  36 12		
Intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	evidence of some analyty Apply moderately effectiv Demonstrate partial but evidence of some coher knowledge to solve probl Demonstrate little or no analytical and critical abi Organizational skills are in  N Lecture-based course Activities Lectures Tutorials Reading / Self study	ical and critical abilities and logical thinking e organizational skills. Ilmited command of knowledge required from the and logical thinking, but with limited a ems. Apply limited or barely effective organi evidence of command of knowledge requities, logical and coherent thinking. Show vininimally effective or ineffective.  Details	y, and ability to apply knowledge to mor attaining some of the course learn analytical and critical abilities. Show I zational skills. uired for attaining the course learning rery little or no ability to apply knowled.  Weighting in final course grade (%)	nost familiar situations.  ning outcomes. Show limited ability to apply an outcomes. Lack of tige to solve problems  No. of Hours  36  12  100  Assessment Methods		
Intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	evidence of some analyt Apply moderately effective Demonstrate partial but evidence of some coher knowledge to solve problem Demonstrate little or no analytical and critical abi Organizational skills are to N  Lecture-based course  Activities Lectures Tutorials  Reading / Self study  Methods	ical and critical abilities and logical thinking e organizational skills. Ilmited command of knowledge required from the and logical thinking, but with limited a ems. Apply limited or barely effective organi evidence of command of knowledge requities, logical and coherent thinking. Show vininimally effective or ineffective.  Details	g, and ability to apply knowledge to mor attaining some of the course learn alytical and critical abilities. Show I zational skills. uired for attaining the course learning ery little or no ability to apply knowled.  Weighting in final course grade (%)	nost familiar situations ning outcomes. Show limited ability to apply ng outcomes. Lack of dge to solve problems  No. of Hours 36 12 100 Assessment Methods to CLO Mapping		
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	evidence of some analyt Apply moderately effectiv Demonstrate partial but evidence of some coher knowledge to solve problem. Demonstrate little or no analytical and critical abi Organizational skills are to N  Lecture-based course  Activities Lectures Tutorials Reading / Self study  Methods  Examination Test Silverthorn D. U.: Human Physis Sherwood L.: Human Physiolog Johnson M. D.: Human Biology Siegel G. J. et al.: Basic Neuroc	ical and critical abilities and logical thinking e organizational skills. Ilmitled command of knowledge required fent and logical thinking, but with limited a ems. Apply limited or barely effective organicy evidence of command of knowledge requitites, logical and coherent thinking. Show volume in the command of knowledge requitites, logical and coherent thinking. Show volume in the command of knowledge requitites, logical and coherent thinking. Show volume in the command of knowledge requitites, logical and coherent thinking. Show volume in the coherent thinking. Show volume in the coherent thinking. Show volume is the coherent thinking.	weighting in final course grade (%)  Weighting in final course grade (%)  Weighting in final course grade (%)  50  50  arson, 2008)  n, 2007)	nost familiar situations.  ning outcomes. Show limited ability to apply a go outcomes. Lack of dge to solve problems  No. of Hours  36  12  100  Assessment Methods to CLO Mapping CLO 1,2,3		
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	evidence of some analyt Apply moderately effectiv Demonstrate partial but evidence of some coher knowledge to solve problem. Demonstrate little or no analytical and critical abi Organizational skills are to N  Lecture-based course  Activities Lectures Tutorials Reading / Self study  Methods  Examination Test Silverthorn D. U.: Human Physisology Johnson M. D.: Human Biology Siegel G. J. et al.: Basic Neurod Mulroney S.E. & Myers A.K. Ne	ical and critical abilities and logical thinking e organizational skills. Ilmited command of knowledge required fent and logical thinking, but with limited a ems. Apply limited or barely effective organi evidence of command of knowledge requities, logical and coherent thinking. Show vininimally effective or ineffective.    Details   Details	weighting in final course grade (%)  Weighting in final course grade (%)  Weighting in final course grade (%)  50  50  arson, 2008)  n, 2007)	nost familiar situations.  ning outcomes. Show limited ability to apply a go outcomes. Lack of dge to solve problems  No. of Hours  36  12  100  Assessment Methods to CLO Mapping CLO 1,2,3		
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	evidence of some analyt Apply moderately effective Demonstrate partial but evidence of some coher knowledge to solve problem. Demonstrate little or no analytical and critical abi Organizational skills are solved.  N  Lecture-based course  Activities Lectures Tutorials Reading / Self study  Methods  Examination Test Silverthorn D. U.: Human Physicology Johnson M. D.: Human Biology Siegel G. J. et al.: Basic Neuroc Mulroney S.E. & Myers A.K. Nehttp://moodle.hku.hk/	ical and critical abilities and logical thinking e organizational skills. Ilmitled command of knowledge required fent and logical thinking, but with limited a ems. Apply limited or barely effective organicy evidence of command of knowledge requitites, logical and coherent thinking. Show volume in the command of knowledge requitites, logical and coherent thinking. Show volume in the command of knowledge requitites, logical and coherent thinking. Show volume in the command of knowledge requitites, logical and coherent thinking. Show volume in the coherent thinking. Show volume in the coherent thinking. Show volume is the coherent thinking.	weighting in final course grade (%)  Weighting in final course grade (%)  50  50  50  arson, 2008)  n, 2007)	nost familiar situations ning outcomes. Show limited ability to apply ng outcomes. Lack of dge to solve problems  No. of Hours 36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3		

BIOL3206	Clinical nutrition (6 credits)	Academic Year	2021
Offering Department	Biological Sciences	Quota	70
Course Co-ordinator	Dr J M F Wan, Biological Sciences (jmfwan@hku.hk)		
Teachers Involved	(Dr J M F Wan,Biological Sciences)		
Course Objectives	This course aims to provide understanding and insight into diseases associal specifically to:  1. Explain the relationships between diet and disease. 2. Describe the role of diet in the development and prevention of common of obesity and anorexia, cardiovascular disease, cancer, immune deficiency and re 3. Differentiate risk factors that influence dietary choice. 4. Describe the rationales for postoperative nutritional support for hospitalized p	nronic diseases s nal failure.	
Course Contents & Topics	The basics of nutrition for health and fitness and medical nutrition therapy. The prevention of chronic diseases such as cancer, diabetes, obesity and anor cardiovascular diseases, renal failure, etc. Malnutrition. Nutrition and immune ful food allergy and food intolerance. Nutrition in pregnancy and lactation.	exia as well as l	oulimia nervosa,
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 discuss the different relationships between diet and disease CLO 2 describe the role of diet in the development and prevention of cardiovascular disease, cancer, immune deficiency, and renal failure CLO 3 clearly differentiate and interpret risk factors that influence dietary choice CLO 4 describe the rationales for postoperative nutritional support for hospitaliz	·	and anorexia,
Pre-requisites	Pass in BIOL3202 or BIOL3203 or BIOL3204 or BIOL3205	·	

(and Co-requisites and Impermissible combinations)							
Offer in 2021 - 2022	N Of	fer in 2022 - 2023	: N	Exam	nination		
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills. Apply highly effective laboratory/fieldwork skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills.					
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Substantial grasp of the subject. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills. Apply effective laboratory /fieldwork skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.						
	С	outcomes. Genera thinking, and ability skills. Apply moder	eral but incomplete command of known but incomplete grasp of the subject of the s	t. Show evidence of some analytical situations. Apply moderately effective ills and techniques. Mostly correct by	al and critica e organization ut some erron	al abilities and logical nal and presentational neous use of data and	
	D	Partial but limited of and logical thinking Apply limited or b techniques. Limite	al but limited command of knowledge a grasp of the subject, retention of some g, but with limited analytical and critica arely effective organizational and produced d ability to use data and results to presentational skills.	e relevant information of the subject. al abilities. Show limited ability to ap esentational skills. Apply partially e	. Show evide pply knowled affective lab	nce of some coherent ge to solve problems. / fieldwork skills and	
	Fail	or no grasp of the thinking. Show very effective or ineffect	or no evidence of command of knowled knowledge and understanding of the y little or no ability to apply knowledge tive. Apply minimally effective or ineff ele to draw appropriate conclusions. Or	e subject. Lack of analytical and crit to solve problems. Organization and ective laboratory / fieldwork skills ar	itical abilities, d presentation nd techniques	logical and coherent nal skills are minimally s. Misuse of data and	
Communication- intensive Course	N						
Course Type	Lecture-b	ased course					
Course Teaching	Activitie	s	Details	Details			
& Learning Activities	Lectures					36	
	Tutorials					12	
	Reading	/ Self study				100	
Assessment Methods and Weighting	Methods	•	Details	Weighting in course grad	le (%)	Assessment Methods to CLO Mapping	
	Assignm	ents		20		CLO 1,2	
	Examina	tion		60		CLO 1,2,3,4	
	Presenta	tion		20		CLO 1,2,3,4	
Required/recommended reading and online materials	S. Rodwe	ell Williams: Nutri	be available on the class webs tion and Diet Therapy (7th ed. Gordon: Perspectives in Nutrit	) Suitor & Hunter: Nutrition: F	Principles	and Application in	
Course Website	http://mod	odle.hku.hk/					
Additional Course Information	This cour	se will be offered	subject to a minimum enrollme	nt number and availability of t	teachers.		

BIOL3207	Principle	s of toxicology (6 credits)	Academic Year	2021		
Offering Department	Biological	ciences	Quota	80		
Course Co-ordinator	Dr H S El-Nezami, Biological Sciences (elnezami@hku.hk)					
Teachers Involved	(Dr H S El-	lezami,Biological Sciences)				
	(Guest Lecturer, Biological Sciences)					
Course Objectives	confidence concepts t exposure t	e students to methods used in assessing the tox in the handling and interpretation of toxicological dehind toxicological evaluation, and the criteria for so chemicals. Students will understand the role of bill evaluation. This course aims to equip students	ata. Students will also be introdu etting guidance values for dietar ochemical, metabolic and toxico	uced to the basion y and nondietary kinetic studies in		
Course Contents & Topics	concepts i	Ide a discussion on exposure and entry routes, fate experimental toxicology, the dose response relational actions and types of carcinogens. A survey of the he ented.	onship, actions of toxic substant	ces, target organ		
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 de	nonstrate an understanding of the processes invol	ved in absorption, distribution,	metabolism and		
	exc	retion of toxicants, including an understanding of the	toxicokinetic behavior of toxicants	s in mammals		
	CLO 2 demonstrate an understanding of the various effects induced after exposure to toxicants					
	CLO 3 demonstrate an understanding of the factors which underlie species differences in response to potential toxicants					
	CLO 4 demonstrate the ability to work in a team to investigate and solve toxicological problems of importance in human health					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BIOC2600 or BIOL2220 or BIOL3205 or MEDE2301					
Offer in 2021 - 2022	Y 2nd	em Offer in 2022 - 2023 : Y	Examination	No Exam		
Grade Descriptors (A+ to F)	A	Demonstrate thorough grasp of the subject matter covered. Show evidence of creative ability and competence in professional-level analysis of data and results to draw appropriate and insightful co leam-based organizational and presentational skills.	I problem solving. Critically use lab skills	and techniques and		
	team-based organizational and presentational skills.  B Demonstrate substantial grasp of the subject matter covered. Show evidence of analytical and critical abilities and logical thinking with some evidence of competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw generally appropriate conclusions to real-world problems. Demonstrate effective team-based organizational and presentational skills.					

	С	and logical thinking with lindata and results to draw	ncomplete grasp of the subject matter cove nited competence in professional-level pro moderately appropriate but sometimes en based organizational and presentational sk	blem solving. Use lab skills and roneous conclusions to real-wo	techniques and analysis of	
	D	evidence of coherent and techniques and analysis of	nited grasp, with retention of some releva logical thinking, but lacking competence of data and results to draw sometimes a am-based organizational and presentationa	in professional-level problem s ppropriate but often erroneous	solving. Use lab skills and	
	Fail	and logical thinking, and m data and results ineffective	asp, with retention of little relevant informa inimal competence in professional-level pro rely, leading generally to inappropriate ar ss team-based organizational and presenta	oblem solving. Úse lab skills and nd usually erroneous conclusion	techniques and analysis of	
Communication- intensive Course	N					
Course Type	Lecture w	ith laboratory compone	nt course			
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures			24		
	Laboratory				24	
	Tutorials				12	
	Reading / Self study				100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignm	ents	seminars (30%) & opinion paper (30%)	60	CLO 2,4	
	Laborato	ry reports		20	CLO 2	
	Test		Mid-term	20	CLO 2,4	
Required/recommended reading and online materials	S. S. Des	S. S. Deshpande: Handbook of Food Toxicology (Marcel Dekker Inc., NY, 2002)				
Course Website	http://mod	odle.hku.hk/				
Additional Course Information	This cour	This course will be offered subject to a minimum enrollment number and availability of teachers.				

	Food Sa	fety and quality mai	nagement (6 credits)		Academic Year	2021	
Offering Department	Biologica	Sciences			Quota	45	
Course Co-ordinator	Dr O Hab	Dr O Habimana, Biological Sciences (ohabim@hku.hk)					
Teachers Involved							
Course Objectives	succeed i		management concepts use ntroduce students to analys				
Course Contents & Topics	- Basic cc - Statistic - Quality I - Quality I - Develop food safe - Role of - Intellect - Religiou	oncepts in TQM al Process Control Function Deployment management standards ( ment and implementation ty management system/ environmental managem ual Property issues in the s, ethical, and cultural fo	n of a Hazard Analysis Criti supply chain approach) ent systems (ISO 14000) in e food industry	cal Control Point (H	IACCP) plan (witl	hin an ISO 22000	
Course Learning Outcomes	CLO 1 ul CLO 2 be CLO 3 be	nderstand the historical of familiar with a set of ma	ourse, students should be a levelopment of government anagement techniques appl oduction problems and mak	regulation of food s cable in the food in	dustry	prove quality and	
Pre-requisites	Pass in BIOL3201 or BIOL3203						
(and Co-requisites and Impermissible combinations)							
and Impermissible combinations) Offer in 2021 - 2022		er in 2022 - 2023 : N			Examination		
and Impermissible combinations)	N Offi A B C D	Demonstrate thorough grass evidence of creative ability techniques and analysis of highly effective team-based Demonstrate substantial gr thinking with some evidence and analysis of data and re based organizational and pr Demonstrate general but independent of the properties of the	complete grasp of the subject matted competence in professional-lev sults to draw moderately appropriective team-based organizational ated grasp, with retention of some logical thinking, but lacking continuous and analysis of data an oblems. Demonstrate team-based sp, with retention of little relevant minimal competence in professiolata and results ineffectively, leading and professiolata and results ineffectively, leading and results ineffectively.	now strong analytical an avel problem solving. Cr te and insightful conclus skills.  d. Show evidence of a el problem solving. Use e conclusions to real-work of the conclusions to the conclusions of the conclusions of the subject of the conclusions of the conclus	d critical abilities and titically use quality maisions to real-world properties and critical quality management rid problems. Demor evidence of analytical quality management neous conclusions to the subject matter of the subject matter overed. Sing. Use quality marriate and usually errorists	anagement skills and oblems. Demonstrate abilities and logical skills and techniques astrate effective team al and critical abilities skills and techniques real-world problems covered. Show some solving. Use quality but often erroneous ted effectiveness. how lack of coherent agement skills and	
and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)	A B C D	Demonstrate thorough grass evidence of creative ability techniques and analysis of highly effective team-based Demonstrate substantial gr thinking with some evidence and analysis of data and re based organizational and pr Demonstrate general but independent of the properties of the	and competence in professional-ledata and results to draw appropria organizational and presentational: asp of the subject matter covere of competence in professional-leves utility to the subject matter covere of competence in professional-leves esentational skills.  Complete grasp of the subject matted competence in professional-leves utility to draw moderately appropriective team-based organizational ated grasp, with retention of some logical thinking, but lacking contiques and analysis of data and analysis of data and analysis of data and the subject of	now strong analytical an avel problem solving. Cr te and insightful conclus skills.  d. Show evidence of a el problem solving. Use e conclusions to real-work of the conclusions to the conclusions of the conclusions of the subject of the conclusions of the conclus	d critical abilities and titically use quality maisions to real-world properties and critical quality management rid problems. Demor evidence of analytical quality management neous conclusions to the subject matter of the subject matter overed. Sing. Use quality marriate and usually errorists	anagement skills and oblems. Demonstrate abilities and logical skills and techniques astrate effective team al and critical abilities skills and techniques real-world problems covered. Show some solving. Use quality but often erroneous ted effectiveness. how lack of coherent agement skills and	
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& Learning Activities	Lectures			36			
	Tutorials	including presentation		12			
	Group work			30			
	Reading / Self study			100			
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignments		10	CLO 2			
	Examination		60	CLO 1,2,3			
	Project reports	including presentation	30	CLO 2,3			
Required/recommended reading and online materials	Mortimore, S. and Wallace, C.: H.	Jones, J. M.: Food Safety (Eagan Press, 1992) Mortimore, S. and Wallace, C.: HACCP: A Practical Approach (Chapman and Hall, 1994) Forsythe, S. J.: The Microbiology of Safe Food (2nd Ed., Wiley-Blackwell, 2010)					
Course Website	http://moodle.hku.hk/						
Additional Course Information	This course will be offered subject	This course will be offered subject to a minimum enrollment number and availability of teachers.					

BIOL3209	Food an	d nutrient ana	lysis (6 credits)		Academic Ye	ar 2021
Offering Department		Sciences	_ ,		Quota	80
Course Co-ordinator	Dr J C Y Lee, Biological Sciences (jettylee@hku.hk)					
Teachers Involved	(Dr J C Y Lee,Biological Sciences)					
		eung,Biological S				
Course Objectives	understan	nd the principles b		ents used in food	d and nutrient analysis. I d analysis. To train studer	•
Course Contents					context will be introduce	d. Basic analytica
& Topics	technique adulterant	s for macronutrients in food will be on the standard series in food will be on the standard series in the standard	ents (e.g. protein, cárboh covered. A variety of clas	ydrate and fats) sical and instrum	n, micronutrients (vitamins nental techniques used in n, color, spectroscopy, ch	and minerals) and ood analysis will b
Course Learning	On succes	ssful completion o	of this course, students sh	ould be able to:		
Outcomes	CLO 1 ur	nderstand the bas	ic principles of food and r	nutrient analysis		
	CLO 2 be	e familiar with a va	ariety of classical and inst	rumental analytic	cal techniques	
	CLO 4 be	e able apply thei acronutrient and i	micronutrient of food prod	tory skills in no ucts	ciated with food ovel situations to measure ue to solve practical food a	
Pre-requisites	Pass in B		, ,	,	,	, ,
(and Co-requisites and Impermissible combinations)			passed in CHEM3242			
Offer in 2021 - 2022	Y 1st	sem Offer in 20	)22 - 2023 : Y		Examination	No Exam
Grade Descriptors (A+ to F)	A Demonstrate thorough grasp of the subject matter covered. Show strong analytical and critical abilities and logical thinking, with evidence of creative ability and competence in professional-level problem solving. Critically use lab skills and techniques and analysis of data and results to draw appropriate and insightful conclusions to real-world problems. Demonstrate highly effective team-based organizational and presentational skills.					
	B Demonstrate substantial grasp of the subject matter covered. Show evidence of analytical and critical abilities and logical thinking with some evidence of competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw generally appropriate conclusions to real-world problems. Demonstrate effective team-based organizational and presentational skills.					
	C Demonstrate general but incomplete grasp of the subject matter covered. Show some evidence of analytical and critical abilities and logical thinking with limited competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw moderately appropriate but sometimes erroneous conclusions to real-world problems. Demonstrate moderately effective team-based organizational and presentational skills.					
	D Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Show some evidence of coherent and logical thinking, but lacking competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw sometimes appropriate but often erroneous conclusions to real-world problems. Demonstrate team-based organizational and presentational skills of limited effectiveness.					
	Fail  Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of coherent and logical thinking, and minimal competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results ineffectively, leading generally to inappropriate and usually erroneous conclusions to real-world problems. Demonstrate ineffectiveness team-based organizational and presentational skills.					
Communication- intensive Course	N		v	·		
Course Type	Lecture w	ith laboratory com	nponent course			
Course Teaching	Activities	s	Details	Details		No. of Hours
& Learning Activities	Lectures					24
	Laborator	ry				24
	Tutorials					6
		/ Self study				100
Assessment Methods and Weighting	Methods		Details		Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignme	ents	Laboratory 40%,	Reports 20%	60	CLO 1,2,3,4,5
	Test				40	CLO 1,2,4,5
Required/recommended reading and			oan: Food Analysis: Theo to the Chemical Analysis		Van Nostrand Reinhold, 19 & Barlett, 2000, 2nd ed.)	994, 3rd ed.)
online materials						
	http://moodle.hku.hk/					
Course Website Additional Course		http://moodle.hku.hk/ [his course will be offered subject to a minimum enrollment number and availability of teachers.				

BIOL3210	Grain pro	oduction and uti	nzation (o ci caito)	Academic Year	2021		
Offering Department		Biological Sciences Quota 40					
Course Co-ordinator	Prof H Corke, Biological Sciences (harold@hku.hk)						
Teachers Involved							
Course Objectives		e a broad understand alth and nutrition.	ding of the utilization and significan	ice of the major grains in the fo	ood industry and i		
Course Contents		rain production and o					
& Topics		en Revolution and its	aftermath				
		onal grain trade					
			neology, the baking process, baking				
		mall-scale tests for c	ucts including steamed bread and no	oodies			
			umer preferences, milling, quality, q	quality testing products			
		1 7	g, animal feed development	quanty tooming, products			
		focusing on bioethan	•				
	- Illustrativ	e business case stud	dies on the grain processing industr	ry will be discussed			
Course Learning			nis course, students should be able				
Outcomes			production, import, and export patte		zation of grain		
			ology behind the production of grain-				
			and nature of professional level qua	ality testing for grain products			
		•	ints to global food sufficiency				
		•	issues behind the diversion of grain	into meat and biofuel production	on		
Pre-requisites	Pass in an	ny level 2 BIOL cours	se				
(and Co-requisites and Impermissible							
combinations)							
Offer in 2021 - 2022	N Offe	er in 2022 - 2023 · N		Examination			
arage Descriptors	Δ	Demonstrate thorough of	grasp of the subject matter covered. Show s	strong analytical and critical abilities ar	nd logical thinking, wit		
(A+ to F)	A	evidence of creative ab analysis of data and res	oility and competence in professional-level p sults to draw appropriate and insightful cond	problem solving. Critically use lab skill	ls and techniques and		
-	В	evidence of creative ab analysis of data and res team-based organization	ility and competence in professional-level	problem solving. Critically use lab skill clusions to real-world problems. Demo	s and techniques and nstrate highly effective		
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Communication- intensive Course Course Type Course Teaching	B C D Fail N Lecture-ba Activities Lectures	evidence of creative ab analysis of data and res team-based organization. Demonstrate substantia thinking with some evid data and results to dorganizational and press. Demonstrate general but and logical thinking with data and results to dramoderately effective teat Demonstrate partial but evidence of coherent at techniques and analysis problems. Demonstrate Demonstrate little or no and logical thinking, and data and results ineffederive asset course.	sults to draw appropriate and insightful conc nal and presentational skills. al grasp of the subject matter covered. Stence of competence in professional-level priraw generally appropriate conclusions to entational skills. It incomplete grasp of the subject matter con- limited competence in professional-level private moderately appropriate but sometimes eim-based organizational and presentational st t limited grasp, with retention of some relevant logical thinking, but lacking competencies of data and results to draw sometimes team-based organizational and presentation grasp, with retention of little relevant inform diminimal competence in professional-level protectively, leading generally to inappropriate inness team-based organizational and presentations of the professional-level professional-level professional-level professional-level professional-level professional-level professional-level professional-based organizational and presentations and presentations and presentational and presentational and presentations are professional-level professional-based organizational and presentational and presentations are professional-level professional-based organizational and presentational and presentations are professional-based organizational and presentations are professional-based organizational and presentations.	problem solving. Critically use lab skill clusions to real-world problems. Demo how evidence of analytical and criticaroblem solving. Use lab skills and tech or real-world problems. Demonstrate lovered. Show some evidence of analytiroblem solving. Use lab skills and tech erroneous conclusions to real-world p skills. Want information, of the subject matter ce in professional-level problem solving appropriate but often erroneous connal skills of limited effectiveness. Mation, of the subject matter covered. Oroblem solving. Use lab skills and tech and usually erroneous conclusions to	is and techniques and instrate highly effective all abilities and logical niques and analysis of effective team-based call and critical abilities iniques and analysis of roblems. Demonstrate covered. Show some 1g. Use lab skills and clusions to real-world. Show lack of coherent iniques and analysis of real-world problems.  No. of Hours  36		
Communication- intensive Course Course Type Course Teaching & Learning Activities	B C D Fail N Lecture-ba Activities Lectures Tutorials	evidence of creative ab analysis of data and res team-based organization. Demonstrate substantia thinking with some evid data and results to dorganizational and press. Demonstrate general but and logical thinking with data and results to dramoderately effective tean Demonstrate partial but evidence of coherent at techniques and analysis problems. Demonstrate Demonstrate little or no and logical thinking, and data and results ineffective desertions.	sults to draw appropriate and insightful conc nal and presentational skills. al grasp of the subject matter covered. Stence of competence in professional-level priraw generally appropriate conclusions to entational skills. It incomplete grasp of the subject matter con- limited competence in professional-level private moderately appropriate but sometimes eim-based organizational and presentational st t limited grasp, with retention of some relevant logical thinking, but lacking competencies of data and results to draw sometimes team-based organizational and presentation grasp, with retention of little relevant inform diminimal competence in professional-level protectively, leading generally to inappropriate inness team-based organizational and presentations of the professional-level professional-level professional-level professional-level professional-level professional-level professional-level professional-based organizational and presentations and presentations and presentational and presentational and presentations are professional-level professional-based organizational and presentational and presentations are professional-level professional-based organizational and presentational and presentations are professional-based organizational and presentations are professional-based organizational and presentations.	problem solving. Critically use lab skill clusions to real-world problems. Demo how evidence of analytical and criticaroblem solving. Use lab skills and tech or real-world problems. Demonstrate lovered. Show some evidence of analytiroblem solving. Use lab skills and tech erroneous conclusions to real-world p skills. Want information, of the subject matter ce in professional-level problem solving appropriate but often erroneous connal skills of limited effectiveness. Mation, of the subject matter covered. Oroblem solving. Use lab skills and tech and usually erroneous conclusions to	Is and techniques and nestrate highly effective all abilities and logica niques and analysis of effective team-based call and critical abilities iniques and analysis of roblems. Demonstrate covered. Show some 1g. Use lab skills and clusions to real-world. Show lack of coherent iniques and analysis of real-world problems.  No. of Hours  36  12		
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Communication- intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting	B C D Fail N Lecture-ba Activities Lectures Tutorials Reading / Methods Examinati Project rej	evidence of creative ab analysis of data and res team-based organization. Demonstrate substantia thinking with some evid data and results to dorganizational and press. Demonstrate general but and logical thinking with data and results to dramoderately effective teat Demonstrate partial but be used to constrate partial but be used to constrain the properties of the pr	sults to draw appropriate and insightful concellation and presentational skills.  al grasp of the subject matter covered. Stence of competence in professional-level priraw generally appropriate conclusions to entational skills.  It incomplete grasp of the subject matter conclusions to entational skills.  It incomplete grasp of the subject matter con limited competence in professional-level prive moderately appropriate but sometimes embedding and presentational st limited grasp, with retention of some relevant logical thinking, but lacking competencis of data and results to draw sometimes team-based organizational and presentation of minimal competence in professional-level professional competence in professional-level professional steam-based organizational and presentation diminimal competence in professional-level professional-level professional-level professional steam-based organizational and presentation diminimal competence in professional-level professional-level professional steam-based organizational and presentation including presentation including presentation including presentation	problem solving. Critically use lab skill clusions to real-world problems. Demo how evidence of analytical and criticaroblem solving. Use lab skills and tech or real-world problems. Demonstrate voted. Show some evidence of analytical short solving. Use lab skills and tech erroneous conclusions to real-world pskills.  The professional-level problem solving appropriate but often erroneous conclusions to finite appropriate but often erroneous connal skills of limited effectiveness. The professional shills of limited effectiveness. The professional skills and tech and usually erroneous conclusions to the subject matter covered. The professional skills and tech and usually erroneous conclusions to the subject matter covered. The professional skills and tech and usually erroneous conclusions to the subject matter covered. The professional skills.  Weighting in final course grade (%)  70 30	Is and techniques and nestrate highly effective all abilities and logical niques and analysis of effective team-based call and critical abilities indiques and analysis of roblems. Demonstrate covered. Show some ig. Use lab skills and clusions to real-world. Show lack of coherent indiques and analysis of real-world problems.  No. of Hours  36  12  100  Assessment Methods to CLO Mapping CLO 1,2,3,4,5  CLO 2,3		
Communication- intensive Course Course Type Course Teaching	B C D Fail N Lecture-ba Activities Lectures Tutorials Reading / Methods Examinati Project re Encyclope	evidence of creative ab analysis of data and res team-based organization. Demonstrate substantia thinking with some evid data and results to dorganizational and press. Demonstrate general but and logical thinking with data and results to dramoderately effective teat Demonstrate partial but be used to constrate partial but be used to constrain the properties of the pr	sults to draw appropriate and insightful concellation and and presentational skills.  al grasp of the subject matter covered. Steme of competence in professional-level prizaw generally appropriate conclusions to entational skills.  at incomplete grasp of the subject matter conclusions to entational skills.  at incomplete grasp of the subject matter conclusions to entational skills.  at incomplete grasp of the subject matter conclusions of limited competence in professional-level prive moderately appropriate but sometimes team-based organizational and presentational is to limited grasp, with retention of some relevant of data and results to draw sometimes team-based organizational and presentation of minimal competence in professional-level professional competence of grasp, with retention of little relevant inform of minimal competence in professional-level professional-level profess team-based organizational and presentation.  Details  Details  including presentation  e, edited by Wrigley CW, Corke H,	problem solving. Critically use lab skill clusions to real-world problems. Demo how evidence of analytical and criticaroblem solving. Use lab skills and tech or real-world problems. Demonstrate voted. Show some evidence of analytical short solving. Use lab skills and tech erroneous conclusions to real-world pskills.  The professional-level problem solving appropriate but often erroneous conclusions to finite appropriate but often erroneous connal skills of limited effectiveness. The professional shills of limited effectiveness. The professional skills and tech and usually erroneous conclusions to the subject matter covered. The professional skills and tech and usually erroneous conclusions to the subject matter covered. The professional skills and tech and usually erroneous conclusions to the subject matter covered. The professional skills.  Weighting in final course grade (%)  70 30	Is and techniques and nestrate highly effective all abilities and logical niques and analysis of effective team-based call and critical abilities indiques and analysis of roblems. Demonstrate covered. Show some ig. Use lab skills and clusions to real-world. Show lack of coherent indiques and analysis of real-world problems.  No. of Hours  36  12  100  Assessment Methods to CLO Mapping CLO 1,2,3,4,5  CLO 2,3		
Communication- intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	B C D Fail N Lecture-ba Activities Lectures Tutorials Reading / Methods Examinati Project re Encyclope Elsevier, C	evidence of creative ab analysis of data and res team-based organization Demonstrate substantia thinking with some evid data and results to dorganizational and pressible and logical thinking with data and results to dra moderately effective tea Demonstrate partial but widence of coherent at techniques and analysis problems. Demonstrate Demonstrate little or no and logical thinking, and data and results ineffe Demonstrate ineffective ased course  Self study  Self study	sults to draw appropriate and insightful concellation and and presentational skills.  al grasp of the subject matter covered. Steme of competence in professional-level prizaw generally appropriate conclusions to entational skills.  at incomplete grasp of the subject matter conclusions to entational skills.  at incomplete grasp of the subject matter conclusions to entational skills.  at incomplete grasp of the subject matter conclusions of limited competence in professional-level prive moderately appropriate but sometimes team-based organizational and presentational is to limited grasp, with retention of some relevant of data and results to draw sometimes team-based organizational and presentation of minimal competence in professional-level professional competence of grasp, with retention of little relevant inform of minimal competence in professional-level professional-level profess team-based organizational and presentation.  Details  Details  including presentation  e, edited by Wrigley CW, Corke H,	problem solving. Critically use lab skill clusions to real-world problems. Demo how evidence of analytical and criticaroblem solving. Use lab skills and tech or real-world problems. Demonstrate voted. Show some evidence of analytical short solving. Use lab skills and tech erroneous conclusions to real-world pskills.  The professional-level problem solving appropriate but often erroneous conclusions to finite appropriate but often erroneous connal skills of limited effectiveness. The professional shills of limited effectiveness. The professional skills and tech and usually erroneous conclusions to the subject matter covered. The professional skills and tech and usually erroneous conclusions to the subject matter covered. The professional skills and tech and usually erroneous conclusions to the subject matter covered. The professional skills.  Weighting in final course grade (%)  70 30	Is and techniques and nestrate highly effective all abilities and logical niques and analysis of effective team-based call and critical abilities indiques and analysis of roblems. Demonstrate covered. Show some ig. Use lab skills and clusions to real-world. Show lack of coherent indiques and analysis of real-world problems.  No. of Hours  36  12  100  Assessment Methods to CLO Mapping CLO 1,2,3,4,5  CLO 2,3		
Communication- intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended	B C D Fail N Lecture-ba Activities Lectures Tutorials Reading / Methods Examinati Project rej Encyclope Elsevier, C Other read	evidence of creative ab analysis of data and res team-based organization Demonstrate substantia thinking with some evid data and results to dorganizational and president of the properties of t	sults to draw appropriate and insightful concellation and and presentational skills.  al grasp of the subject matter covered. Steme of competence in professional-level prizaw generally appropriate conclusions to entational skills.  at incomplete grasp of the subject matter conclusions to entational skills.  at incomplete grasp of the subject matter conclusions to entational skills.  at incomplete grasp of the subject matter conclusions of limited competence in professional-level prive moderately appropriate but sometimes team-based organizational and presentational is to limited grasp, with retention of some relevant of data and results to draw sometimes team-based organizational and presentation of minimal competence in professional-level professional competence of grasp, with retention of little relevant inform of minimal competence in professional-level professional-level profess team-based organizational and presentation.  Details  Details  including presentation  e, edited by Wrigley CW, Corke H,	problem solving. Critically use lab skill clusions to real-world problems. Demo how evidence of analytical and criticaroblem solving. Use lab skills and tech or real-world problems. Demonstrate voted. Show some evidence of analytical short solving. Use lab skills and tech erroneous conclusions to real-world pskills.  The professional-level problem solving appropriate but often erroneous conclusions to finite appropriate but often erroneous connal skills of limited effectiveness. The professional shills of limited effectiveness. The professional skills and tech and usually erroneous conclusions to the subject matter covered. The professional skills and tech and usually erroneous conclusions to the subject matter covered. The professional skills and tech and usually erroneous conclusions to the subject matter covered. The professional skills.  Weighting in final course grade (%)  70 30	Is and techniques and nestrate highly effective all abilities and logical niques and analysis of effective team-based call and critical abilities indiques and analysis of roblems. Demonstrate covered. Show some ig. Use lab skills and clusions to real-world. Show lack of coherent indiques and analysis of real-world problems.  No. of Hours  36  12  100  Assessment Methods to CLO Mapping CLO 1,2,3,4,5  CLO 2,3		
Communication- intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	B C D Fail N Lecture-ba Activities Lectures Tutorials Reading / Methods Examinati Project rej Encyclope Elsevier, C Other read http://mood	evidence of creative ab analysis of data and res team-based organization Demonstrate substantia thinking with some evid data and results to dorganizational and press. Demonstrate general bu and logical thinking with data and results to dra moderately effective teat Demonstrate partial but evidence of coherent at techniques and analysis problems. Demonstrate little or nand logical thinking, and data and results ineffe Demonstrate ineffective ased course.  Self study  Self study  Self study  Self study	sults to draw appropriate and insightful concellation and and presentational skills.  al grasp of the subject matter covered. Steme of competence in professional-level prizaw generally appropriate conclusions to entational skills.  at incomplete grasp of the subject matter conclusions to entational skills.  at incomplete grasp of the subject matter conclusions to entational skills.  at incomplete grasp of the subject matter conclusions of limited competence in professional-level prive moderately appropriate but sometimes team-based organizational and presentational is to limited grasp, with retention of some relevant of data and results to draw sometimes team-based organizational and presentation of minimal competence in professional-level professional competence of grasp, with retention of little relevant inform of minimal competence in professional-level professional-level profess team-based organizational and presentation.  Details  Details  including presentation  e, edited by Wrigley CW, Corke H,	problem solving. Critically use lab skill clusions to real-world problems. Demo how evidence of analytical and criticaroblem solving. Use lab skills and tech or real-world problems. Demonstrate overed. Show some evidence of analyticoblem solving. Use lab skills and tech erroneous conclusions to real-world pskills. want information, of the subject matter cor in professional-level problem solving appropriate but often erroneous conal skills of limited effectiveness. mation, of the subject matter covered problem solving. Use lab skills and tech and usually erroneous conclusions to stational skills.  Weighting in final course grade (%)  70  30  and Walker CE (2004) 3 Volusions to the subject matter covered.	Is and techniques and nestrate highly effective all abilities and logical niques and analysis of effective team-based call and critical abilities indiques and analysis of roblems. Demonstrate covered. Show some ig. Use lab skills and clusions to real-world. Show lack of coherent indiques and analysis of real-world problems.  No. of Hours  36  12  100  Assessment Methods to CLO Mapping CLO 1,2,3,4,5  CLO 2,3		

BIOL3211	Nutrigenomics (6 credits)	Academic Year	2021
Offering Department	Biological Sciences	Quota	40
Course Co-ordinator	Dr K C Tan-Un, Biological Sciences (kctanun@hku.hk)		
Teachers Involved	(Dr K C Tan-Un,Biological Sciences)		
Course Objectives	Recent advances in the understanding of the human genome have resulted in called Nutrigenomics. This course aims to provide students with an understanding underpinning the science of nutrition and the relation between genes and diet-result of nutrition at the molecular level and the concepts of nutrigenomics and nutriger	ng of the biochem elated diseases. It	nical mechanisms
Course Contents & Topics	Concepts of nutrigenomics, nutrigenetics, metabolomics and nutritional biochemic Regulation of gene expression; Single Nucleotide Polymorphisms and relation to Overview of lipid metabolism; cholesterol metabolic pathway; hyperlipidaemia, LI Relevance of folate, vitamin B12; hyperhomocysteinemia and gene polymorphis Epigenetics, Barker s hypothesis, influence of maternal nutrition in fetal ge predisposition, candidate genes like leptin, FTO and other hormones involved in Polyunsaturated fatty acid and their roles in the control of gene expression exampathways; Inborn errors of metabolism in the context of genetic mutations and personalized	diseases. DL receptor mutal ms in diseases. ene expression. the control of app nple lipogenesis a	Obesity, genetic etite

Course Learning	On successful completion of this course, students should be able to:				
Outcomes	CLO 1 explain the principles of the control of gene expression				
		monstrate understandi ease	ng of the role of metabolic	c pathways in relationship to diet, g	ene expression and
	CLO 3 dis	cuss how genetic varia	ations are used to study the	e role of genes in nutrient-related ce	ellular processes
		•		etics and diet-related diseases	•
				utrition based on individual genetic	variation
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Bl	OC2600 or BIOL2220 (	or MEDE2301		
Offer in 2021 - 2022	Y 1st	sem Offer in 2022 - 2	023 : Y	Examination	Dec
Grade Descriptors (A+ to F)	A	skills. Show excellent abi		Show extensive ability of knowledge integraterpret complex scientific data and draw a	
	В		tantial ability to critically analyz	red. Show substantial ability of knowledge te and interpret scientific data and draw	
	С		w moderate ability to analyze an	natter covered. Show acceptable ability of k nd interpret scientific data and draw proper c	
	D Demonstrate marginal grasp of the subject matter covered. Show limited ability on knowledge integration and problem solving skills. Show limited ability to analyse and interpret scientific data. Demonstrate basic organization and writing skills.				
	Fail Demonstrate little or no grasp, with little retention of information of the subject matter covered. Show lack of coherent and logical thinking, and minimal evidence in problem solving. Fail to integrate information and identify problems. Show little or minimal ability to analyze and interpret scientific data and draw conclusions. Demonstrate poor organization and writing skills.				
Communication- intensive Course	N				
Course Type	Lecture-ba	sed course			
Course Teaching	Activities		Details		No. of Hours
& Learning Activities	Lectures				36
	Tutorials		student-centered learning		12
	Reading /	Self study			100
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignme	nts		20	CLO 1,2,3,4,5
	Examinati	on		60	CLO 1,2,3,4,5
	Test			20	CLO 1
Required/recommended reading and online materials	Lehninger Principles of Biochemistry Ordovas: Nutrigenetics and Nutrigenomics. Wiley. 2004 Brigelius-Flohe, Joost: Nutritional Genomics. Wiley. 2006. Rimbach, Fuchs, Packer: Nutrigenomics, CRC Press. 2005 Journals in Nutrition, Molecular Biology and Genetics				
Course Website	http://moo	dle.hku.hk/			
Additional Course Information	This cours	e will be offered subjec	ct to a minimum enrollment	t number and availability of teachers	3.

BIOL3215	Principl	les of dietary assessment (6 credits)		Academic Year	2021		
Offering Department	Biologica	I Sciences		Quota	30		
Course Co-ordinator	Dr J C Y	Louie, Biological Sciences (jimmyl@hku.hk)					
Teachers Involved	(Dr J C Y	Louie,Biological Sciences)					
Course Objectives		se examines the various methods used to measur assess these measurements against international ment.					
Course Contents & Topics	use of fo monitorin	overed will include the validity and reliability of differ and composition databases, nutrition screening to g and evaluation. Students will conduct project wo tary assessment tools.	ols and the planning	and use of nat	ional surveys fo		
Course Learning	On succe	essful completion of this course, students should be	able to:				
Outcomes	CLO 1 u	nderstand the principles of dietary assessment met	hods, and the streng	ths of limitations	of these methods		
	CLO 2 evaluate the validity and reliability of dietary assessment tools						
	CLO 3 choose the most appropriate nutrition assessment methods for different purposes						
	CLO 4 explain the meaning and uses of Dietary Reference Intakes						
	CLO 5 competently use dietary assessment software with local and international nutrient databases to assess individual dietary intake						
	CLO 6 interpret foods and diets in terms of nutritional quality and nutrient adequacy, and make appropriate recommendation(s) for improvement, in both product development and dietary review contexts						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in B	SIOL2102					
Offer in 2021 - 2022	N Of	fer in 2022 - 2023 : N		Examination			
Grade Descriptors (A+ to F)	A Demonstrate thorough grasp of the subject matter covered. Show strong analytical and critical abilities and logical thinking, with evidence of creative ability and competence in professional-level problem solving. Critically use practical skills and techniques and analysis of data and results to draw appropriate and insightful conclusions to real-world problems. Demonstrate highly effective team-based organizational and presentational skills.						
	B Demonstrate substantial grasp of the subject matter covered. Show evidence of analytical and critical abilities and logical thinking with some evidence of competence in professional-level problem solving. Use practical skills and techniques and analysis of data and results to draw generally appropriate conclusions to real-world problems. Demonstrate effective team-based organizational and presentational skills.						
	С	Demonstrate general but incomplete grasp of the subject ma and logical thinking with limited competence in profession analysis of data and results to draw moderately appropria	al-level problem solving.	Use practical skills	and techniques and		

Communication-	D Demonstrate partial evidence of coheren techniques and ana problems. Demonstrate little or and logical thinking, analysis of data and	Demonstrate moderately effective team-based organizational and presentational skills.  Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Show so evidence of coherent and logical thinking, but lacking competence in professional-level problem solving. Use practical skills a techniques and analysis of data and results to draw sometimes appropriate but often erroneous conclusions to real-wo problems. Demonstrate team-based organizational and presentational skills of limited effectiveness.  Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of cohern and logical thinking, and minimal competence in professional-level problem solving. Use practical skills and techniques analysis of data and results ineffectively, leading generally to inappropriate and usually erroneous conclusions to real-wo problems. Demonstrate ineffectiveness team-based organizational and presentational skills.				
Course Type	Laboratory and workshop co	ourse				
Course Teaching	Activities	Details		No. of Hours		
& Learning Activities	Workshops			48		
	Tutorials			12		
	Reading / Self study		90			
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Laboratory reports		40	CLO 1,2,3,4,5,6		
	Presentation	Group presentation	10	CLO 1,2,3		
	Project reports	- 11	30	CLO 1.2.3.4		
	Test		20	CLO 1,2,3,4		
Required/recommended reading and online materials	Required: Lee RD and Nieman DC, Nutritional Assessment 6th Ed. McGraw Hill Gibson RS, Principles of Nutritional Assessment 2nd Ed. Oxford University Press Online materials: Institute of Medicine (US) Food and Nutrition Board. Dietary Reference Intakes: A Risk Assessment Model for Establishing Upper Intake Levels for Nutrients. http://www.ncbi.nlm.nih.gov/books/NBK45182/					
Course Website	http://moodle.hku.hk					
Additional Course Information	This course will be offered subject to a minimum enrollment number and availability of teachers					

BIOL3216	Food waste management (6 credits)	Academic Year	2021			
Offering Department	Biological Sciences	Quota	30			
Course Co-ordinator	Dr O Habimana, Biological Sciences (ohabim@hku.hk)					
Teachers Involved	(Dr O Habimana, School of Biological Sciences)					
Course Objectives	,	food waste manageme Norldwide.	nt and resource			
Course Contents & Topics	recovery potential in Hong Kong in comparison to other countries in Asia/Worldwide.  With our current global population estimated to reach 9.1 billion in 2050, food production will be exp increase by 70% to meet food demand. However, our current world food supply is instead declining, with of all food produced for human consumption lost or wasted. This amounts to a staggering 1 to 2 billion me per year! Clearly we should be worried about food wastage.  In this course, the social, economic, and environmental implications associated with food waste will be it by presenting relevant facts and figures and case studies embodying agricultural, industrial and consum types. Basic waste management concepts will also be covered, examining current waste management Kong compared to other countries in Asia, while providing the basis for examining our own persons footprint. This course will address current applications and limitations of food waste treatment technologies Course outline:  -Background, Definitions, Social & Environmental implications of food waste  -Facts and figures related to food Waste  -Basic Waste Management concepts (3 R's)  -Case studies: Agricultural waste  -Case studies: Food Industrial waste  -Case studies: Food Industrial waste  -Waste Management in Hong Kong vs other countries in Asia  -Individual waste footprint: from awareness to legislation in Hong Kong					
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 understand and define the various types of waste as well as confootprint.  CLO 2 be able to define the 3 R's in waste management (reduce, reuse, polices in Hong Kong compared to other countries in Asia /Worldw CLO 3 be able to describe current and novel technologies for treating working value added resources.  CLO 4 to develop written and oral presentation skills necessary to effective social information related to waste management.	, recycle), and be familia vide. vaste, as well as transfo	rrized with waste			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BIOL2101					
Offer in 2021 - 2022	Y 2nd sem Offer in 2022 - 2023 : Y	Examination	May			
Grade Descriptors (A+ to F)	A Demonstrate thorough grasp of the subject matter covered. Show strong and evidence of creative ability and competence in professional-level problem so techniques and analysis of data and results to draw appropriate and insightful highly effective team-based organizational and presentational skills.	olving. Critically use quality ma ul conclusions to real-world pro	anagement skills and oblems. Demonstrate			
	B Demonstrate substantial grasp of the subject matter covered. Show evide thinking with some evidence of competence in professional-level problem solv and analysis of data and results to draw generally appropriate conclusions to based organizational and presentational skills.	ing. Use quality management	skills and techniques			
	C Demonstrate general but incomplete grasp of the subject matter covered. She and logical thinking with limited competence in professional-level problem solv					

		and analysis of data and results to draw moderately appropriate but sometimes erroneous con Demonstrate moderately effective team-based organizational and presentational skills.					
	D	evidence of coherent management skills and	t limited grasp, with retention of some and logical thinking, but lacking conditechniques and analysis of data and problems. Demonstrate team-based of	mpetence in professional-level proble d results to draw sometimes appropri	m solving. Use quality ate but often erroneous		
	Fail	and logical thinking, a techniques and analysis	o grasp, with retention of little relevant in and minimal competence in profession is of data and results ineffectively, leading commonstrate ineffectiveness team-based of	al-level problem solving. Use quality g generally to inappropriate and usually	management skills and		
Communication- intensive Course	N						
Course Type	Lecture-ba	sed course					
Course Teaching	Activities		Details	Details			
& Learning Activities	Lectures			36			
	Tutorials		including presentation	12			
	Group work				30		
	Reading / Self study				100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	nts		10	CLO 1,2,3		
	Examination	on		60	CLO 1,2,3,4		
	Project rep	oorts	including presentation	30	CLO 2,3,4		
Course Website	http://mood	lle.hku.hk					
Additional Course Information	This course	e will be offered sub	ject to a minimum enrolment nui	mber and availability of teachers			

BIOL3217	Food, e	nvironment and health (6 credits)	Academic Year	2021		
Offering Department		l Sciences ,	Quota	50		
Course Co-ordinator	Dr T C S	Lam, Biological Sciences (thomas.lam@hku.hk)				
Teachers Involved		eung,School of Biological Sciences) S Lam,School of Biological Sciences)				
Course Objectives	of food s our diet.	disciplinary exploration of the environmental, socio-economic, put ystems. To focus on how our food choices influence the enviror To examine the interactions among environment (e.g. pollution, burces (growth, production, consumption, processing, distribution	nment and how the envi soil and water quality,	ironment impact climate change)		
Course Contents & Topics	consump becoming consump can impr approach health. To sources of decisions environm evaluate understal healthy in	ronment, human well-being and the functioning of society are hatton. Are we destroying the environment as we struggle to feed g increasingly toxic for our health? The course will consist of tition on the environment; 2) The impact of environment on food rove these interactions, through evidence-based case example will be used with emphasis on 'real-life' cases connecting huma opics will include impacts of certain dietary habits and demands of calories, rise of meat consumption, demand for year-round lute defitilizers' use. We will consider how toxins, known as xenobiotic are influenced by the environment. The holistic approach used we the sociocultural, socio-behavioural, ethical and economic and the importance of biologically sustainable food production and adividual, environment and overall society.	growing populations? Is three blocks: 1) The i and human health, and les. A Problem Based in nutrition, well-being a on food systems (e.g. d vary foods) and the depcs, affect human health will help the students to ind private. Students will aspects of food and e	the environmen nfluence of food 1 3) What actions Learning (PBL) nd environmental emand for cheal oletion of soil and and how sensor navigate comple- learn to critically environment and		
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 To understand multifactorial and interdisciplinary relations in sustainable environment and nutrition  CLO 2 To address today's national and global challenges in the environmental and food sectors  CLO 3 To understand historical and current aspects (agricultural production, policy initiatives) locally, in Asia and worldwide  CLO 4 To address and analyze food/environment issues including food production, consumption, and the					
	fulfilment of the right to adequate food; strengths and weaknesses of political, social, and economic policies and other interventions  CLO 5  To demonstrate skills to become effective environmental educators to communicate the issues of food and environment to a variety of audiences and to apply theoretical knowledge while designing an applicable intervention in public setting					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	BIOL 2101 or ENVS2001 or ENVS2002				
Offer in 2021 - 2022	Y 2n	d sem Offer in 2022 - 2023 : Y	Examination	No Exam		
Grade Descriptors (A+ to F)	A	Demonstrate thorough grasp of the subject matter covered. Show strong anal evidence of creative ability and competence in professional-level problem so techniques and analysis of data and results to draw appropriate and insightfu highly effective team-based organizational and presentational skills.	lving. Critically use quality ma	anagement skills and		
	В					
	С	Demonstrate general but incomplete grasp of the subject matter covered. She and logical thinking with limited competence in professional-level problem solv and analysis of data and results to draw moderately appropriate but sometim Demonstrate moderately effective team-based organizational and presentation	ring. Use quality management nes erroneous conclusions to nal skills.	skills and techniques real-world problems		
	D	Demonstrate partial but limited grasp, with retention of some relevant inform evidence of coherent and logical thinking, but lacking competence in management skills and techniques and analysis of data and results to d conclusions to real-world problems. Demonstrate team-based organizational a	professional-level problem s raw sometimes appropriate	olving. Use quality but often erroneous		
	Fail	Demonstrate little or no grasp, with retention of little relevant information, of tand logical thinking, and minimal competence in professional-level proble				

			eading generally to inappropriate and usually ased organizational and presentational skills.	erroneous conclusions to		
Communication- intensive Course	N	Demonstrate menectiveness team-ba	aseu organizational anu presentational skills.			
Course Type	Lecture-based course	re-based course				
Course Teaching & Learning Activities	Activities	Details		No. of Hours		
	Lectures	with practicals		36		
	Tutorials			12		
	Project work			20		
	Reading / Self study			50		
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments		50	CLO 1,2,3,4,5		
	Presentation		50	CLO 1,2,4,5		
Required/recommended reading and online materials	There is no course textbook	. Most of the reading material	will be provided on Moodle or distribu	ited during lectures.		
Course Website	http://moodle.hku.hk					

BIOL3218	Food h	ygiene and qualit	y control (6 credits)	Academic Y	ear 2021	
Offering Department	Biologica	l Sciences	<u> </u>	Quota	30	
Course Co-ordinator	Dr O Hal	oimana, Biological Sc	iences (ohabim@hku.hk)	<u>'</u>		
Teachers Involved	(Dr O Ha	bimana,School of Bio	ological Sciences)			
Course Objectives	high-qua		key management, microbiology o introduce students to analysis a			
Course Contents & Topics	- Basic c - Statistic - Quality - Quality - Develop food safe - Role of - A review - Religiou	oncepts in TQM cal Process Control Function Deploymen management standal pment and implement management systems are provision mental manage of microbiology in aus, ethical, and culturation of microbiology in aus, ethical, and ethical of microbiology in aus, ethical, and ethical of microbiology in aus, ethical of microb	rds (ISO 9000) tation of a Hazard Analysis Critic em/ supply chain approach) gement systems (ISO 14000) in t I food safety context	al Control Point (HACCP) plan he food industry	(within an ISO 22000	
Course Learning			his course, students should be ab			
Outcomes			microbiological and food processi			
	CLO 2 b	e familiar with a set o	of management techniques applic	able in the food industry for pro	moting food safety	
		,	d production problems and make	e recommendations for action to	improve quality and	
		afety				
Pre-requisites (and Co-requisites and Impermissible combinations)		BIOL2101 or BIOL320 tudents who have pas				
Offer in 2021 - 2022	Y 1s	t sem Offer in 2022	: - 2023 : Y	Examination	Dec	
Grade Descriptors (A+ to F)	Α	evidence of creative al techniques and analysis	grasp of the subject matter covered. Sho bility and competence in professional-lev is of data and results to draw appropriate ased organizational and presentational sk	el problem solving. Critically use quali e and insightful conclusions to real-wor	ty management skills and	
	В	Demonstrate substantial grasp of the subject matter covered. Show evidence of analytical and critical abilities and logical thinking with some evidence of competence in professional-level problem solving. Use quality management skills and techniques and analysis of data and results to draw generally appropriate conclusions to real-world problems. Demonstrate effective team-based organizational and presentational skills.				
	С	Demonstrate general but incomplete grasp of the subject matter covered. Show some evidence of analytical and critical abilities and logical thinking with limited competence in professional-level problem solving. Use quality management skills and techniques and analysis of data and results to draw moderately appropriate but sometimes erroneous conclusions to real-world problems. Demonstrate moderately effective team-based organizational and presentational skills.				
	D	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Show some evidence of coherent and logical thinking, but lacking competence in professional-level problem solving. Use quality management skills and techniques and analysis of data and results to draw sometimes appropriate but often erroneous conclusions to real-world problems. Demonstrate team-based organizational and presentational skills of limited effectiveness.				
	Fail	and logical thinking, a techniques and analysi	o grasp, with retention of little relevant in and minimal competence in profession is of data and results ineffectively, leading emonstrate ineffectiveness team-based o	al-level problem solving. Use quality g generally to inappropriate and usually	management skills and	
Communication- intensive Course	N					
Course Type	Lecture-b	pased course				
Course Teaching	Activitie	es	Details		No. of Hours	
& Learning Activities	Lectures					
-	Group w					
	Project v					
	,	/ Self study			30 100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignm	nents		20	CLO 2	
				50		
	Examination			ວບ	GEO 173	
	Project r			30	CLO 1,2,3 CLO 2,3	

<b>Additional Course</b>	The course will be offered subject to a minimum enrollment number and availability of teachers.
Information	

	Marine I	biology (6 credi	ts)	Academic Y	ear 2021		
Offering Department		Sciences		Quota	40		
Course Co-ordinator			ciences (yasuhara@hku.hk)				
Teachers Involved	(Dr M Yas	sell,Biological Scie suhara,Biological S y E Mcilroy,Biologic ecturer,Biological Sc	ciences) cal Sciences)				
Course Objectives	To develo	o develop a basic understanding and appreciation of the field of marine biology, including the fascinating diversity f marine life, their function, ecology and inter-relationships. Contemporary issues including the benefits we derive om marine biological resources and threats to their long-term sustainability will also be discussed with case tudies highlighting key issues.					
Course Contents & Topics	The topics 1. The p temperatu 2. Importa and marin 3. Major n 4. Exploita	The topics cover:  The physical and chemical environments (e.g., light, current, atmospheric -ocean interactions, salinity, emperature, pH, dissolved oxygen, nutrients) and how these may affect the marine biota  Important groups of marine organisms (e.g., phytoplankton, zooplankton, benthos, nekton, marine mammals) and marine food web  Major marine habitats and ecosystems (e.g., intertidal, benthic, pelagic, deep sea, coral reefs, mangroves)  Exploitation of marine biological resources (e.g., fisheries and bioactive compounds)  Contemporary issues (e.g. climate change, marine pollution, sustainable use of marine living resources, invasive pecies)					
Course Learning	On succe	ssful completion of	this course, students should be	e able to:			
Outcomes			understanding of the diversity				
			ctions of marine biota and thei				
				and the threats of human activitie	s on their long-term		
D		ıstainability as well IOL2306 or ENVS2	as possible solutions				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass III B	IOL2306 OF ENVS2	2002				
Offer in 2021 - 2022	Y 1st	sem Offer in 202	22 - 2023 : Y	Examination	n Dec		
Grade Descriptors	Α			extensive knowledge and skills required for	or attaining all the course		
	В		ntial command of a broad range of k	nowledge and skills required for attaining at			
	C D Fail	and some unfamiliar Demonstrate genera outcomes. Show evi familiar situations. Ap Demonstrate partial I Show evidence of so knowledge to solve p Demonstrate little or of analytical and crii	whow evidence of analytical and critical situations. Apply effective organization but incomplete command of know dence of some analytical and critical pply moderately effective organization but limited command of knowledge a me coherent and logical thinking, but roblems. Apply limited or barely effective or gain and of knowled tical abilities, logical and coherent to the contract of command of knowled tical abilities, logical and coherent to the contract of command of knowled tical abilities, logical and coherent to the command coherent to the coherent	ledge and skills required for attaining most abilities and logical thinking, and ability to all and presentational skills. Individual skills required for attaining some of the of with limited analytical and critical abilities. So tive organizational and presentational skills. ge and skills required for attaining the course thinking. Show very little or no ability to a	apply knowledge to familiar st of the course learning apply knowledge to most course learning outcomes, how limited ability to apply e learning outcomes. Lack		
Communication-	D Fail	and some unfamiliar Demonstrate genera outcomes. Show evi familiar situations. Ap Demonstrate partial I Show evidence of so knowledge to solve p Demonstrate little or of analytical and crii	show evidence of analytical and critical situations. Apply effective organizatio il but incomplete command of know dence of some analytical and critical oply moderately effective organization but limited command of knowledge a me coherent and logical thinking, but troblems. Apply limited or barely effection evidence of command of knowled	nal and presentational skills.  ledge and skills required for attaining most abilities and logical thinking, and ability to all and presentational skills.  In skills required for attaining some of the court with limited analytical and critical abilities. Stive organizational and presentational skills. If a general skills required for attaining the course thinking. Show very little or no ability to a	apply knowledge to familiar st of the course learning apply knowledge to most course learning outcomes, how limited ability to apply e learning outcomes. Lack		
Communication- intensive Course	D	and some unfamiliar Demonstrate genera outcomes. Show evi familiar situations. Ap Demonstrate partial I Show evidence of so knowledge to solve p Demonstrate little or of analytical and crii	whow evidence of analytical and critical situations. Apply effective organization but incomplete command of know dence of some analytical and critical pply moderately effective organization but limited command of knowledge a me coherent and logical thinking, but roblems. Apply limited or barely effective or gain and of knowled tical abilities, logical and coherent to the contract of command of knowled tical abilities, logical and coherent to the contract of command of knowled tical abilities, logical and coherent to the command coherent to the coherent	nal and presentational skills.  ledge and skills required for attaining most abilities and logical thinking, and ability to all and presentational skills.  In skills required for attaining some of the court with limited analytical and critical abilities. Stive organizational and presentational skills. If a general skills required for attaining the course thinking. Show very little or no ability to a	apply knowledge to familiar st of the course learning apply knowledge to most course learning outcomes, how limited ability to apply e learning outcomes. Lack		
intensive Course	D Fail	and some unfamiliar Demonstrate genera outcomes. Show evi familiar situations. Ap Demonstrate partial I Show evidence of so knowledge to solve p Demonstrate little or of analytical and crii	show evidence of analytical and critical situations. Apply effective organization of but incomplete command of known dence of some analytical and critical poly moderately effective organization but limited command of knowledge a me coherent and logical thinking, but problems. Apply limited or barely effection evidence of command of knowled tical abilities, logical and coherent on and presentational skills are minim	nal and presentational skills.  ledge and skills required for attaining most abilities and logical thinking, and ability to all and presentational skills.  In skills required for attaining some of the court with limited analytical and critical abilities. Stive organizational and presentational skills. If a general skills required for attaining the course thinking. Show very little or no ability to a	apply knowledge to familiar st of the course learning apply knowledge to most course learning outcomes, how limited ability to apply e learning outcomes. Lack		
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intensive Course Course Type Course Teaching	D Fail N Lecture w Activities Lectures Field wor	and some unfamiliar Demonstrate genera outcomes. Show evid familiar situations. Ap Demonstrate partial I Show evidence of so knowledge to solve p Demonstrate little or of analytical and cri problems. Organization	whow evidence of analytical and critical situations. Apply effective organizatio is but incomplete command of known dence of some analytical and critical poly moderately effective organization but limited command of knowledge a me coherent and logical thinking, but problems. Apply limited or barely effection evidence of command of knowled tical abilities, logical and coherent on and presentational skills are minimized to the course.	nal and presentational skills.  ledge and skills required for attaining most abilities and logical thinking, and ability to all and presentational skills.  Ind skills required for attaining some of the owith limited analytical and critical abilities. So tive organizational and presentational skills. It is great and skills required for attaining the course hinking. Show very little or no ability to a ally effective or ineffective.	apply knowledge to familial st of the course learning apply knowledge to most course learning outcomes course learning outcomes. Lack apply knowledge to solve  No. of Hours  24  30		
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intensive Course Course Type Course Teaching	D Fail N Lecture w Activities Lectures Field wor	and some unfamiliar Demonstrate genera outcomes. Show evidential is situations. Ap Demonstrate partial is Show evidence of so knowledge to solve p Demonstrate little or of analytical and crip problems. Organization in the laboratory composition of the solution of the so	whow evidence of analytical and critical situations. Apply effective organizatio is but incomplete command of known dence of some analytical and critical poly moderately effective organization but limited command of knowledge a me coherent and logical thinking, but incommand of knowledge a me coherent and logical thinking, but orbidems. Apply limited or barely effection o evidence of command of knowled tical abilities, logical and coherent to on and presentational skills are minimized to the course and coherent course and coherent course are considered to the course and coherent course are considered to the considered to the course and coherent course are considered to the course and coherent course are considered to the considered to the coherent course are considered to the coherent course.	nal and presentational skills.  ledge and skills required for attaining most abilities and logical thinking, and ability to all and presentational skills.  Ind skills required for attaining some of the owith limited analytical and critical abilities. So tive organizational and presentational skills. It is great and skills required for attaining the course hinking. Show very little or no ability to a ally effective or ineffective.	apply knowledge to familial st of the course learning apply knowledge to most course learning outcomes course learning outcomes. Lack apply knowledge to solve  No. of Hours  24  30		
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	D Fail N Lecture w Activities Lectures Field wor Reading	and some unfamiliar Demonstrate genera outcomes. Show evid familiar situations. Ap Demonstrate partial it Show evidence of so knowledge to solve p Demonstrate little or of analytical and crit problems. Organization	whow evidence of analytical and critical situations. Apply effective organizatio is but incomplete command of known dence of some analytical and critical oply moderately effective organization but limited command of knowledge a me coherent and logical thinking, but incommand of knowledge a me coherent and logical thinking, but incommand of knowled tical abilities, logical and coherent to on and presentational skills are minimized to the course incommand of knowled tical abilities, logical and coherent to on and presentational skills are minimized to the course incommand	nal and presentational skills.  ledge and skills required for attaining most abilities and logical thinking, and ability to all and presentational skills.  nd skills required for attaining some of the cwith limited analytical and critical abilities. Stive organizational and presentational skills. The still seems to the course hinking. Show very little or no ability to a lally effective or ineffective.  Weighting in final	pply knowledge to familial st of the course learning apply knowledge to most course learning outcomes how limited ability to apply e learning outcomes. Lack pply knowledge to solve    No. of Hours		
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	D Fail N Lecture w Activities Lectures Field wor Reading Methods	and some unfamiliar Demonstrate genera outcomes. Show evid familiar situations. Ap Demonstrate partial it Show evidence of so knowledge to solve p Demonstrate little or of analytical and crit problems. Organization	whow evidence of analytical and critical situations. Apply effective organizatio is but incomplete command of known dence of some analytical and critical oply moderately effective organization but limited command of knowledge a me coherent and logical thinking, but incommand of knowledge a me coherent and logical thinking, but incommand of knowled tical abilities, logical and coherent to on and presentational skills are minimized to the course incommand of knowled tical abilities, logical and coherent to on and presentational skills are minimized to the course incommand	nal and presentational skills.  ledge and skills required for attaining most abilities and logical thinking, and ability to all and presentational skills.  nd skills required for attaining some of the own with limited analytical and critical abilities. Stive organizational and presentational skills. ge and skills required for attaining the course hinking. Show very little or no ability to a lally effective or ineffective.  Ctical & tutorials  Weighting in final course grade (%)	pply knowledge to familial st of the course learning apply knowledge to most course learning outcomes how limited ability to apply e learning outcomes. Lackpply knowledge to solve    No. of Hours		
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	D Fail  N Lecture w Activities Lectures Field wor Reading Methods  Assignme Examinat Levinton, Nybakker Cumming H. V. Thu	and some unfamiliar Demonstrate genera outcomes. Show evidences. Show evidence of so knowledge to solve p Demonstrate little or of analytical and criproblems. Organization  ith laboratory comp  k / Self study  ents tition J. S. 2001. Marine h, J.W. and Bertness. rman and E. A. Bur	whow evidence of analytical and critica situations. Apply effective organizatio II but incomplete command of know dence of some analytical and critical ply moderately effective organization but limited command of knowledge a me coherent and logical thinking, but roblems. Apply limited or barely effection o evidence of command of knowled tical abilities, logical and coherent on and presentational skills are minimal properties.  Details  Details  Biology; function, biodiversity ess, M.D., 2004. Marine Biology; function, biodiversity ess, M.D., 2004.	nal and presentational skills.  ledge and skills required for attaining most abilities and logical thinking, and ability to all and presentational skills.  nd skills required for attaining some of the owith limited analytical and critical abilities. Stive organizational and presentational skills. ge and skills required for attaining the course hinking. Show very little or no ability to a ally effective or ineffective.    Weighting in final course grade (%)   20	pply knowledge to familial st of the course learning apply knowledge to most course learning outcomes how limited ability to apply a learning outcomes. Lack apply knowledge to solve    No. of Hours		

BIOL3302	Systematics and phylogenetics (6 credits)	Academic Year	2021
Offering Department	Biological Sciences	Quota	60
Course Co-ordinator	Prof R M K Saunders, Biological Sciences (saunders @hku.hk)		
Teachers Involved	(Prof R M K Saunders, Biological Sciences)		
Course Objectives	To give students an understanding of the principles of systematics and phyl current trends and controversies. Systematics forms an invaluable grounding for anatomy, ecology, population biology and evolutionary biology), and enables techniques (including anatomy, biochemistry, chemistry, molecular biology, cytol	or many fields of l the integration of	biology (including a wide range of
Course Contents & Topics	Currrent classificatory theories: phenetic systematics (classifications based on o (evolutionary reconstruction). The species concept. Sources of taxonomic biochemistry, chemistry, molecular biology, cytology, and ethology. Causenvironmental factors; hybridization; breeding systems. Principles of nomencla aimed at illustrating taxonomic procedures and problems; students will not be ex	data: morpholo ses of taxonom ature. Laboratory	gy <sup>°</sup> & anatomy, ies complexity: sessions will be

	of scienti	ific names.					
Course Learning	On succe	essful completion of this	course, students should be	able to:			
Outcomes	CLO 1 explain taxon concepts (with particular reference to species) and show how multivariate statistical methods can be applied below the species level						
	CLO 2 describe the principles behind maximum parsimony methods of phylogenetic reconstruction (including sister-group relationships, out-group comparison, homoplasy and the assessment of clade stability)						
	CLO 3 e	evaluate the diversity of	sources of taxonomic data,	and explain the importance of spec	ific data sources		
	CLO 4 r	ecognise the main caus	es of taxonomic complexity	, and identify appropriate solutions			
		CLO 5 understand the principles of nomenclature in order to interpret the previous application of scientific nar are validly publish new names					
Pre-requisites	Pass in E	BIOL1309; and					
(and Co-requisites and Impermissible combinations)	Any leve	l 2 BIOL course					
Offer in 2021 - 2022	Y 1s	st sem Offer in 2022 - 2	2023 : Y	Examination	Dec		
Grade Descriptors (A+ to F)	A	Demonstrate thorough ma learning outcomes, with e critical abilities and logica	astery at an advanced level of ex vidence of extensive background I thinking. Apply highly effective p	tensive knowledge required for attaining r reading and use of named examples. Sho resentation skills. Demonstrate effective u- e of integration of a wide range of approp	w evidence of significant se of data and results to		
	В	Demonstrate substantial command of knowledge required for attaining most of the course learning outcomes, with evidence of some background reading and use of named examples. Show evidence of critical abilities and logical thinking. Apply effective presentation skills. Demonstrate use of data and results to draw appropriate and insightful conclusions. Show evidence of general integration of appropriate theories, principles, evidence and techniques.					
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes, with evidence of limited background reading and use of named examples. Show evidence of some critical abilities and logical thinking. Apply moderately effective presentation skills. Demonstrate mostly correct use of data and results to draw appropriate and insightful conclusions. Show evidence of partial integration of appropriate theories, principles, evidence and techniques.					
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes, with insufficient evidence of background reading and use of named examples. Show evidence of limited critical abilities and logical thinking. Apply limited presentation skills. Demonstrate limited ability to use data and results to draw appropriate and insightful conclusions. Show evidence of limited integration of appropriate theories, principles, evidence and techniques.					
	Fail	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes, with no evidence of background reading or use of named examples. Show little or no evidence of critical abilities and logical thinking. Presentational skills are minimally effective or ineffective. Misuse of data and results to draw appropriate conclusions. Little or no evidence of integration of appropriate theories, principles, evidence and techniques.					
Communication- intensive Course	N						
Course Type	Lecture v	with laboratory compone	nt course				
Course Teaching	Activitie	• •	Details		No. of Hours		
& Learning Activities	Lectures	3			24		
-	Laborato	orv			24		
	Project v	•			12		
	Reading / Self study				100		
Assessment Methods and Weighting	Method	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignm	nents		15	CLO 1,3,4,5		
	Examina			70	CLO 1,2,3,4,5		
		ory reports		15	CLO 1,3		
Required/recommended		, ·	es of Systematic Zoology (I	McGraw-Hill, 1991, 2nd ed.)			
reading and online materials			tics - A Phylogenetic Approx				
	http://mo	odle.hku.hk					
ourse Website	THUP.//IIIO	Oule.liku.lik					

BIOL3303	Conservation biology (6 credits)	Academic Year	2021
Offering Department	Biological Sciences	Quota	100
Course Co-ordinator	Dr T C Bonebrake, Biological Sciences (tbone @hku.hk)		
Teachers Involved	(Dr H Mummby,Biological Sciences) (Dr L A Ashton,Biological Sciences) (Dr T C Bonebrake,Biological Sciences) (Guest Lecturers,Biological Sciences)		
Course Objectives	To introduce students to the theory and practice of conservation and to punderstanding of practical, economic and management skills required for proficultimate aim is to promote an understanding of the natural biodiversity, the timanage them. We hope these will be your aims too, and that you will be able to learn from the course to reduce the local, regional and global loss of biodiversity	ciency in conserva hreats to it, and to use the skills an	ation biology. Our the best ways to
Course Contents & Topics	Among the many environmental issues, the most serious is the increasingly rairreversible on a human timescale and will reduce the options available to Conservation Biology/Ecology is the science of preserving biological diversity. The many benefits and services that nature offers and explores strategies for ecological integrity and production. It is an inexact, applied, mission-orientated, medicine, has built-in values: to a conservation biologist, as to a doctor, it matter it is also a very new science, bringing together elements from ecology, enviror management and many other fields.	o all future hum his course also pr r management o multidisciplinary so rs whether the pa	nan generations. ovides insights to ptions to sustain cience which, like tient lives or dies.
	The course is designed to provide the knowledge, theories, and research relate teaching focuses on biodiversity conservation, conservation issues associat theoretical underpinning of biodiversity conservation and an introduction to cons We emphasis on the integration of knowledge, skills and abilities that are require problem based learning approach will require students to actively participate debate by researching.	ed with climate of ervation legislation uired to practice of	change, the key n and economics. conservation. Our
Course Learning	On successful completion of this course, students should be able to:		

	CLO 1 de	1 develop a framework for critical thinking about biodiversity, environment and human interaction					
			9	predict which ones will be most vuli			
			· · ·	al deforestation, marine and coas			
	habitat fragmentation in species extinction, and explain the main forces behind habitat and biodiversity loss						
	CLO 4 ur	nderstand the princi	ples of population viability	analysis, the basis of single-sp	ecies conservation		
	m	nanagement and the re	ole of ex situ conservation, e	cological restoration and reintroduc	ction in conservation		
	CLO 5 or	utline the legal and ac	Iministrative basis for conser	vation in Hong Kong and the world			
		ppreciate the roles an f biodiversity	d relationships of economic,	social and environmental science	s in the conservation		
Pre-requisites (and Co-requisites and Impermissible	Pass in B	IOL2306					
combinations)							
Offer in 2021 - 2022		d sem Offer in 2022		Examination	,		
Grade Descriptors (A+ to F)	<b>A</b>	outcomes. Show strong and synthesize informat highly effective presenta	analytical and critical abilities and ion, and ability to apply knowledge tional skills. Strong evidence of clea	ensive knowledge and skills required for at logical thinking, with evidence of original that to a wide range of complex, familiar and user attention to thoughtful and reflective think	nought, ability to integrate nfamiliar situations. Applying.		
	В	learning outcomes. Sho apply knowledge to far attention to thoughtful ar	w evidence of analytical and critica miliar and some unfamiliar situation nd reflective thinking	owledge and skills required for attaining at al abilities and logical thinking, integration ons. Demonstrate effective presentational	of materials and ability to skills. Evidence of clear		
	C	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective presentational skills. Little evidence of clear attention to thoughtful and reflective thinking.					
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities and little attempt at integration. Show limited ability to apply knowledge to solve problems. Apply limited effectiveness in presentational skills. Lack of attention to thoughtful and reflective thinking.					
	Fail	of analytical and critical		e and skills required for attaining the course inking. Show very little or no ability to a illy effective or ineffective.			
Communication- intensive Course	N						
Course Type	Lecture w	vith laboratory compor					
			nent course				
Course Teaching	Activities	S	Details		No. of Hours		
•	Lectures				No. of Hours		
•							
•	Lectures	rk			24		
•	Lectures Field wor	rk ork			24 10		
•	Lectures Field wor Group wo Tutorials	rk ork			24 10 8		
& Learning Activities  Assessment Methods	Lectures Field wor Group wo Tutorials	rk ork / Self study		Weighting in final course grade (%)	24 10 8 14		
& Learning Activities  Assessment Methods	Lectures Field wor Group wo Tutorials Reading	rk ork / Self study	Details		24 10 8 14 100 Assessment Methods		
& Learning Activities  Assessment Methods	Lectures Field wor Group wo Tutorials Reading	rk ork / Self study	Details	course grade (%)	24 10 8 14 100 Assessment Methods to CLO Mapping		
& Learning Activities  Assessment Methods	Lectures Field wor Group wo Tutorials Reading Methods  Essay Examinat	rk ork / Self study	Details	course grade (%)	24 10 8 14 100 Assessment Methods to CLO Mapping CLO 1,2,3,6		
& Learning Activities  Assessment Methods	Lectures Field wor Group wo Tutorials Reading Methods  Essay Examinat	rk ork / Self study s	Details	course grade (%)  10  50	24 10 8 14 100 Assessment Methods to CLO Mapping CLO 1,2,3,6 CLO 1,2,3,4,5,6		
Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Lectures Field wor Group wo Tutorials Reading Methods  Essay Examinat Laborator Test R. B. Prim	rk ork / Self study s ttion ory reports mack: Essentials of Co	Details  Details  onservation Biology (Sinauer,	course grade (%)  10 50 30 10 , 2006, 4th ed.)	24 10 8 14 100 Assessment Methods to CLO Mapping CLO 1,2,3,6 CLO 1,2,3,4,5,6 CLO 1,2,3,4,5,6 CLO 1,2,3		
& Learning Activities  Assessment Methods and Weighting	Lectures Field wor Group wo Tutorials Reading Methods  Essay Examinat Laborator Test R. B. Prim V. D. Frec M.L. Hunt	rk ork / Self study s ttion ory reports mack: Essentials of Cod: Conservation biologter and J.P. Gibbs: Fu	Details  Details  Details  onservation Biology (Sinauer, gy [electronic resource]: foundamentals of Conservation	course grade (%)  10  50  30  10	24 10 8 14 100 Assessment Methods to CLO Mapping CLO 1,2,3,6 CLO 1,2,3,4,5,6 CLO 1,2,3,4,5,6 CLO 1,2,3		

BIOL3305	Tropical and temperate marine ecology field course (6 credits)	Academic Year	2021
Offering Department	Biological Sciences	Quota	22
Course Co-ordinator	Dr B Russell, Biological Sciences (brussell@hku.hk)		
Teachers Involved	(Dr B Russell,Biological Sciences) (Dr S Cannicci,Biological Sciences)		
Course Objectives	This course uses a field-based approach to provide students with an advestuarine ecology in both tropical and temperate regions. Students will learn and then apply them to compare these ecosystems in Australia, experiencing course culminates with students developing field-based research projects to creative and innovative thinking to overcome problems for successful outcome	n scientific technique their similarities and answer ecological	es in Hong Kong d differences. The
Course Contents & Topics	The course will cover the structure and function of mangrove forests, reefs (both tropical and temperate regions. Students will be introduced to the concelectures and field trips in Hong Kong before travelling to northern and secosystems in the field. The lectures will provide students with background known they will encounter, the structure and function of the systems and how hum techniques, logical experimental design, and good report writing practices. The field with students quantifying species richness, observing system is experiments that they design themselves.	epts in the course the outhern Australia to owledge about the e an activities degrade hese concepts will b	rough a series of experience the ecosystems which e them, sampling be drawn together
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 demonstrate an understanding of the complexity and function of marin CLO 2 explain the role of physical and biological processes in shaping the marine ecosystems tropical and temperate regions.  CLO 3 demonstrate skills for field sampling in marine and estuarine habitats.  CLO 4 demonstrate knowledge in hypothesis testing and experimental design CLO 5 identify a range of marine species and their role in ecosystems.	e similarities and dif	ferences among
Pre-requisites	Pass in "C" or above in BIOL2306 or BIOL3301 or BIOL3303 or ENVS2001		

(and Co-requisites and Impermissible					
combinations)					
Offer in 2021 - 2022	N O	ffer in 2022 - 2023 : Y		Examination	n
Grade Descriptors (A+ to F)	A	familiarity with relevant ba skills. Ample evidence of comparative perspective	asp of the subject and relevant research tech ckground reading and case studies. Exempla independent critical thought with excellent us to draw insightful and logical conclusions. S cellent analytical argumentation. Excellent o	ary handling of field data collect se of a broad range of fundame Show outstanding abilities of in	ion and excellent analytica ental concepts and broader dependent work, effective
	B Evidence of a good grasp of the subject and relevant research techniques. Interest in learning and good-to-moderate familiarity with relevant background reading and case studies. Good handling of field data collection and commendable analytical skills. Good evidence of critical thought (although not always independent), with an appreciable use of fundamental concepts and consideration of broader comparative perspective in drawing logical conclusions. Good abilities of independent work, effective presentation skills with logical and analytical argumentation. Work more than sufficient for what is required at degree level.				
	С	Demonstrate an adequate relevant background readi critical thinking (although	e, but incomplete grasp of the subject and ng and case studies, but no interest in learnir not always independent), with mostly good ut with mostly correct argumentation, but limite	relevant research techniques ng beyond the adequate averaguse of fundamental concepts to	Moderate familiarity with le level. Evidence of logical o draw logical conclusions.
	D	Demonstrate some grasp research techniques. Son abilities of critical indepen	of the subject, but only partial and with line familiarity with relevant case studies, but ident thinking. Ineffective presentation skills ate conclusions. Work barely meets what is re	insufficient evidence of backg with generally weak logical arg	round reading and limited
	Fail	No evidence of basic a background reading and	minimum grasp of the subject and the m no familiarity with any relevant examples an ntation skills with poor argumentation and n	ninimum relevant research tec nd case studies. Inadequate ev	idence of coherent logical
Communication- intensive Course	N	_ · _ ·			
Course Type	Field car	mps			
Course Teaching	Activitie	es	Details	No. of Hours	
& Learning Activities	Lectures		Pre-course lectures and field trips	20	
	Field work		80 hourse + travel time	80	
	Reading	g / Self study		40	
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignm	nents	Presentation	20	CLO 1,2,3,4,5
	Report		Field report (20%) + Project report (55%)	75	CLO 1,2,3,4,5
	Test		Pre-trip quiz	5	CLO 1
Required/recommended reading and online materials	Students	s will be directed to relev	ant scientific literature and websites		·
Course Website	http://mo	odle.hku.hk			
Additional Course	This cou	irse involves a two-wee	k field course to Australia, one wee	ek in the Sydney (tempe	erate region) and one
Information	week on Orpheus Island (tropical region). Students will be exposed to some harsh environmental conditions including working in contact with seawater, potentially cold and rainy weather. Orpheus Island can have an abundance of biting insects (mosquitos and sand flies).				
	There w costs.	ill be extra costs involv	ed in the course, including but not	limited to airfares, acco	mmodation and mea
	Enrollme		ose at the end of the add/drop period to be booked in advance.	d of the second semester	because airfares and

Freshwater ecology (6 credits)	Academic Year	2021		
Biological Sciences	Quota	30		
TBC, Biological Sciences ()				
(TBC,School of Biological Sciences)				
This course introduces freshwater science by integrating the physical and biological components of rivers and the drainage basins in the context of sustaining human livelihoods and biodiversity. Conservation and management clakes and maintenance of water quality are considered also. Case studies are used to illustrate the principles or river science and human use of drainage basins. Emphasis will be placed upon conservation of freshwate biodiversity in Asia in the context of increasing human modification of ecosystems, habitat degradation and water scarcity.				
hosts 10% of the Earth's species. Global water use has increased 300% Earth's population; many people in Asia already face water stress. The processes involved in the hydrological cycle and flow of water in drafluctuations, and describes the main longitudinal changes that occur flows in freshwater ecosystems are described with particular reference and land and the relative importance of aquatic primary production verse the land. The range of organisms associated with Asian fresh water explained, and students will become familiar with some common Hong sessions. The dependence of humans on freshwater ecosystems and the explained, together with the causes and consequences of human modififor conservation of aquatic biodiversity. Finally the range of managements and the strength of the streng	is since 1950 and is growing course introduces the ainage basins, as well a along rivers and their floato the transfer of materia was energy derived from does is introduced and their Kong species in field tripher role they play in sustain cation of fresh waters, and their transfer of the transfer of t	ng faster than the physicochemical street seasonal odplains. Energy labeled between water that inputs from functional roles and laborator hing livelihoods in the implication.		
	ways of energy in fresh	waters, and the		
	Biological Sciences TBC, Biological Sciences () (TBC,School of Biological Sciences) This course introduces freshwater science by integrating the physical ardrainage basins in the context of sustaining human livelihoods and bioc lakes and maintenance of water quality are considered also. Case sturiver science and human use of drainage basins. Emphasis will be biodiversity in Asia in the context of increasing human modification of escarcity.  The amount of water on Earth is fixed. Less than 0.01% of the world's hosts 10% of the Earth's species. Global water use has increased 300% Earth's population; many people in Asia already face water stress. The processes involved in the hydrological cycle and flow of water in driluctuations, and describes the main longitudinal changes that occur flows in freshwater ecosystems are described with particular reference and land and the relative importance of aquatic primary production vers the land. The range of organisms associated with Asian fresh water explained, and students will become familiar with some common Hong sessions. The dependence of humans on freshwater ecosystems and the explained, together with the causes and consequences of human modern human impacts on freshwater ecosystems and maintain water quality is On successful completion of this course, students should be able to:  CLO 1 describe the global water cycle, the main sources and path	Biological Sciences TBC, Biological Sciences () (TBC,School of Biological Sciences) This course introduces freshwater science by integrating the physical and biological components drainage basins in the context of sustaining human livelihoods and biodiversity. Conservation and lakes and maintenance of water quality are considered also. Case studies are used to illustrate river science and human use of drainage basins. Emphasis will be placed upon conservation biodiversity in Asia in the context of increasing human modification of ecosystems, habitat degra scarcity.  The amount of water on Earth is fixed. Less than 0.01% of the world's water is in lakes and rive hosts 10% of the Earth's species. Global water use has increased 300% since 1950 and is growing Earth's population; many people in Asia already face water stress. This course introduces the processes involved in the hydrological cycle and flow of water in drainage basins, as well as fluctuations, and describes the main longitudinal changes that occur along rivers and their floflows in freshwater ecosystems are described with particular reference to the transfer of materia and land and the relative importance of aquatic primary production versus energy derived from detection that the sum of the land. The range of organisms associated with Asian fresh waters is introduced and their explained, and students will become familiar with some common Hong Kong species in field trip sessions. The dependence of humans on freshwater ecosystems and the role they play in sustair explained, together with the causes and consequences of human modification of fresh waters, and for conservation of aquatic biodiversity. Finally the range of management strategies used to rehuman impacts on freshwater ecosystems and maintain water quality is introduced.  On successful completion of this course, students should be able to:  CLO 1 describe the global water cycle, the main sources and pathways of energy in fresh		

	ecosystems, and identify some of the common animals that occur in Hong Kong fresh waters						
	CLO 3 d	lescribe the results of	modification of freshwa Asia, explain why fresh	ater ecosystems by humans, list the vater biota are vulnerable to human in	ne main threats to		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	Pass in BIOL2102 and BIOL2306					
Offer in 2021 - 2022	N Of	fer in 2022 - 2023 : N		Examination			
Grade Descriptors (A+ to F)	A	demonstrated by background reading and excellent use of named (organism) examples. Show excellent presentation analytical skills and/or lab/field skills, and substantial knowledge of general freshwater biodiveristy or selected taxa. Excellent outstanding (for A+) work relative to what is required at degree level.					
		B Evidence of analytical (or critical) abilities and logical (or coherent) - but not necessarily original - thinking, a good subject as demonstrated by background reading and use of named (organism) examples. Show good presentation and/or lab/field skills, and knowledge of general freshwater biodiversity or selected taxa. Work more than sufficier required at degree level.					
	С	subject, but little or no evid Show fair presentational, a	dence of original thinking, witl	cal (or coherert) thinking with an adequate (bu h limited background reading and use of nam s, and some knowledge of general freshwate	ed (organism) examples.		
	D	·					
	Fail  Evidence of poor or inadequate knowledge and understanding of the subject, and a lack of coherence, poor organization and/or excessive irrelevancy. Little or no evidence of familiarity with relevant reading material and lab/field techniques, or any knowledge of freshwater biodiversity. Work fails to reach degree level.						
Communication- intensive Course	N	· ·	·				
Course Type	Lecture v	vith laboratory compone	nt course				
Course Teaching	Activitie	s	Details	No. of Hours			
& Learning Activities	Lectures	3		26			
	Laboratory		project and laborator and wetlands	40			
	Reading	/ Self study			100		
Assessment Methods and Weighting	Method	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignm	ents		30	CLO 2		
	Examina	ntion		60	CLO 1,2,3		
	Laborato	ory reports		10	CLO 3		
Required/recommended reading and		,	,				
online materials	An onlin information health.	e training tool develop on on the physical and	ed by an international biological features of riv	nekong.org/RAK/html/rak_frameset.ht team (including the course coording vers, and shows how human liveliho and for each lecture on the course web	nator) that contains ods depend on river		
Course Website		odle.hku.hk					
Additional Course	Offer in a	alternate year from 2017-		ent number and availability of teachers			

BIOL3314	Plant str	Plant structure and evolution (6 credits)  Academic Year 2021							
Offering Department	Biological	Biological Sciences Quota 30							
Course Co-ordinator	Prof R M K	Prof R M K Saunders, Biological Sciences (saunders@hku.hk)							
Teachers Involved	(Prof R M I	(Prof R M K Saunders, Biological Sciences)							
Course Objectives	significanc	To survey the form and function of the vascular plant body, with particular emphasis on the evolutionary significance of structures. This course forms a basis for understanding plant physiology, ecology, systematics and phylogenetics.							
Course Contents & Topics	explanation Information taxonomic	The course will investigate various cell, tissue and organ types in the vascular plant body, with functional explanations for their diversity and discussions of the value of such knowledge in understanding plant phylogeny. Information on plant structure will be integrated with our current understanding of developmental genetics and taxonomic relationships derived from molecular phylogenetic research. Topics such as food storage, strength, water conduction, growth and development, pollination, fertilization, fruit and seed dispersal, germination, etc., will							
Course Learning	On successful completion of this course, students should be able to:								
Outcomes	CLO 1 recognise the main plant cell types and explain how cells are integrated to form specific primary tissues (such as the xylem and phloem)								
	CLO 2 describe the developmental changes that occur in primary tissues with the onset of secondary growth								
	CLO 3 describe the structure, function and development of secondary vegetative structures (wood and bark)								
	CLO 4 inte	CLO 4 integrate knowledge of the genetic control of floral development with the evolution of organ diversity							
	CLO 5 describe the structure of fruits from a functional perspective, and recognise how these structures are derived from the flower								
	CLO 6 explain how seeds develop after fertilization of the ovule, and how differences in seed structure influences germination patterns								
Pre-requisites (and Co-requisites and Impermissible combinations)		Pass in BIOL1309; and Any level 2 BIOL course							
Offer in 2021 - 2022	N Offe	er in 2022 - 2023 : N			Examination				
Grade Descriptors (A+ to F)	Α		stery at an advanced level of idence of extensive background						

Information				er in alternative year from 2018-2019 s course will be offered subject to a minimum enrollment number and availability of teachers.				
Additional Course		dle.hku.hk ternative year from 2018	2010					
reading and online materials Course Website	P.H. Rave A list of ac	en, R.F. Évert & S.E. Éicl dditional reading materia	nhorn: Biology of Plan	ts, 7th ed. Freemar				
Required/recommended	Laborator	y reports  Anatomy of Flowering P	lants 3rd ed Cambrid	lae I Iniv. Press (20		CLO 1,2,3,4,5,6		
	Examinat				70 30	CLO 1,2,3,4,5,6		
Assessment Methods and Weighting	Methods		Details		leighting in final ourse grade (%)	Assessment Methods to CLO Mapping		
	0	Self study	 			100		
	Laborator	,				36		
& Learning Activities	Lectures					24		
Course Teaching	Activities	3	Details			No. of Hours		
Course Type	Lecture w	ith laboratory component	t course					
Communication- intensive Course	N							
	Fail	Demonstrate little or no evid no evidence of background in Presentational skills are mini	reading or use of named ex	amples. Show little or n	o evidence of critical abi	lities and logical thinking.		
	D	Demonstrate partial but limit with insufficient evidence of logical thinking. Apply limite insightful conclusions.	background reading and did presentation skills. Demo	use of named example onstrate limited ability t	s. Show evidence of lim to use data and results	nited critical abilities and to draw appropriate and		
		Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes, with evidence of limited background reading and use of named examples. Show evidence of some critical abilities and logical thinking. Apply moderately effective presentation skills. Demonstrate mostly correct use of data and results to draw appropriate and insightful conclusions.						
	Demonstrate substantial command of knowledge required for attaining most of the course learning outcomes, with evidence of some background reading and use of named examples. Show evidence of critical abilities and logical thinking. Apply effective presentation skills. Demonstrate use of data and results to draw appropriate and insightful conclusions.							
		critical abilities and logical thinking. Apply highly effective presentation skills. Demonstrate effective use of data and results to draw appropriate and insightful conclusions.						

BIOL3318	Experim	ental intertidal ecology (6 credits	s)	Academic Year	2021			
Offering Department		Biological Sciences Quota 20						
Course Co-ordinator	Prof G A	Prof G A Williams, Biological Sciences (hrsbwga@hku.hk)						
Teachers Involved	(Prof G A	(Prof G A Williams, School of Biological Sciences)						
Course Objectives	them. The determinis	To examine the communities of coastal systems: their distribution, composition and the factors which regulate them. This course will examine, using an experimental approach, patterns exhibited by a range of shores and the deterministic and stochastic processes that create and sustain them. Hong Kong shores will be used as examples but comparisons will be drawn from the coastlines of the world.						
Course Contents & Topics	on them. hydrologic animals a examples manipulat herbivory;	The first part of this course describes shores of the marine to brackish water continuum and the communities found on them. Lectures will cover the physical environment of the intertidal (e.g. tides; waves; geological and hydrological processes) the resultant variations in exposure and shore types and consequent distribution of animals and algae on these shores (vertical and horizontal zonation patterns) with specific Hong Kong examples. The second part of the course uses an experimental approach (e.g. sampling methodology; manipulative techniques; experimental design and data analysis) to investigate the factors (e.g. predation; herbivory; competition; disturbance; succession; patchiness and recruitment; supply side ecology) that structure these shores, with particular focus on rocky intertidal shores.						
Course Learning	On succe	sful completion of this course, students	should be able to:					
Outcomes	th CLO 2 ur ap	scribe the physical environmental factor by interact with geographic features to p derstand the factors limiting species preciate methods to measure and invess	roduce different kinds of shore distribution patterns on the tigate these patterns	es (e.g., sandy sho e vertical intertida	res, mangroves) al gradient and			
	CLO 3 identify and quantify the distribution of a variety of local species on different Hong Kong shores							
	CLO 4 review, critique and design experimental studies to investigate patterns (e.g., zonation) and processes							
	(e.g., herbivory, competition) in intertidal areas  CLO 5 explain the role of biological processes (e.g., predation, succession) and their interaction with the physical environment in shaping intertidal communities							
	CLO 6 plan, design, execute, analyse and present a simple experimental study on intertidal ecology							
Pre-requisites (and Co-requisites and Impermissible combinations)		OL2102 or BIOL3301	,		<b>0</b> 7			
Offer in 2021 - 2022	Y 2nd	sem Offer in 2022 - 2023 : N		Examination	May			
Grade Descriptors (A+ to F)	A	Evidence of original, logical (or coherent) thought, strong analytical and critical abilities and a thorough grasp of the subject as demonstrated by background reading and excellent use of named (organism) examples. Show excellent presentational, analytical skills and/or lab/field skills, and demonstrate substantial knowledge of general intertidal ecology and excellent experimental design and analysis skills.						
	В	Evidence of analytical (or critical) abilities and logical (or coherent), but not necessarily original, thinking, a good grasp of the subject as demonstrated by background reading and use of named (organism) examples. Show good presentational, analytical and/or lab/field skills, and demonstrate knowledge of general intertidal ecology and good experimental design and analysis skills.						
	С							
	D	Evidence of retention of a minimum of releva organizational, analytical or presentational skills techniques. Poor knowledge of general intertidal	s. Show insufficient evidence of back ecology and misunderstanding of ex	kground reading, or fai perimental design and	miliarity with lab/field analysis.			
	Fail	Evidence of poor or inadequate knowledge and excessive irrelevancy. Limited or no evidence of general intertidal ecology, and misuse of expe	familiarity with relevant reading mat					
Communication- intensive Course	N							

Course Type	Lecture with laboratory component course					
Course Teaching	Activities	No. of Hours				
& Learning Activities	Lectures					
	Field work	field trip/project work	field trip/project work			
	Project work					
	Tutorials			4		
	Reading / Self study			100		
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments		40	CLO 1,2,3,4,5,6		
	Examination		60	CLO 1,2,3,4,5		
Required/recommended reading and online materials			ong (Hong Kong University Press, 1 of Rocky Shores (Oxford University			
Course Website	http://moodle.hku.hk					
Additional Course	Offer in alternate year from	2017-2018				
Information	This course will be offered	subject to a minimum enrollmen	nt number and availability of teachers	3.		

BIOL3319	Tropica	al terrestrial ecolog	y (6 credits)	Academic Yea	r 2021			
Offering Department		al Sciences	,	Quota	30			
Course Co-ordinator	Dr B Gue	enard, Biological Scienc	ces (bguenard@hku.hk)					
Teachers Involved	(Dr B Gu	(Dr B Guenard,Biological Sciences)						
Course Objectives	To enable ecology.	To enable motivated students to acquire the knowledge and skills needed to solve real problems in terrestrial ecology.						
Course Contents & Topics	This course focuses on the ecology of terrestrial habitats providing an overview of patterns and processes at global and regional scale. Students will learn about the evolution of climate and topography over geological times and their roles in shaping current biodiversity and ecosystems distribution. The course also focuses on the taxonomic functional and ecological composition of organisms within terrestrial ecosystems of Tropical East Asia with emphasis on the major processes regulating communities. An introduction to several global major threats on terrestrial ecosystems and their mechanisms is provided. Finally, the study of habitats recovery through ecological succession using particular examples in Hong Kong is provided.							
	and write literature discussion	e a short scientific pape and present data effi ons to stimulate critica	ct, collecting and analysing their er. Particular emphasis will be g ciently. Attendance and particip I thinking on chosen topics in presentation, a final term paper	given on how to efficiently read pation in class are encouraged terrestrial ecology. Assessmen	and write scientific through series of t includes problem			
Course Learning Outcomes	CLO 1 u	understand evolution o different geographic and	s course, students should be able f biodiversity patterns and sha I time scales patterns that sustain biodiversity	ping processes within terrestri				
	CLO 3 understand the various threats to terrestrial ecosystems and some of the methods to evaluate and reduce the impacts of those threats CLO 4 plan and conduct baseline study of terrestrial biodiversity							
		•	n active learner through the prob	lem-based learning exercises				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	BIOL1309 and BIOL230	16					
	Y 2n	nd sem Offer in 2022 -	- 2023 : Y	Examination	May			
Grade Descriptors (A+ to F)	A							
				ntion to thoughtful and reflective thinking				
` '	В	highly effective presentati Demonstrate substantial learning outcomes. Show apply knowledge to fam	onal skills. Strong evidence of clear atter command of a broad range of knowled or evidence of analytical and critical abili iliar and some unfamiliar situations. D	ge and skills required for attaining at le ties and logical thinking, integration of	ast most of the course materials and ability to			
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Communication- ntensive Course Course Type Course Teaching & Learning Activities  Assessment Methods	C D Fail N Lecture v Activitie Lectures Laborato Tutorials	highly effective presentati Demonstrate substantial learning outcomes. Show apply knowledge to fam attention to thoughtful an Demonstrate general bu outcomes. Show evidenc familiar situations. Apply thinking. Demonstrate partial but if Show evidence of some integration. Show limited attention to thoughtful and Demonstrate little or no e of analytical and critical problems. Organization a  with laboratory componences soory Soy / Self study	onal skills. Strong evidence of clear atter command of a broad range of knowledy or evidence of analytical and critical abilitiar and some unfamiliar situations. Did reflective thinking. It incomplete command of knowledge as see of some analytical and critical abilities moderately effective presentational skills imited command of knowledge and skills are coherent and logical thinking, but wit ability to apply knowledge to solve probled reflective thinking, vidence of command of knowledge and abilities, logical and coherent thinking and presentational skills are minimally efferent course  Details	ge and skills required for attaining at leties and logical thinking, integration of emonstrate effective presentational sk and skills required for attaining most as and logical thinking, and ability to aps. Little evidence of clear attention to the sequired for attaining some of the count in the count of the count o	ast most of the course materials and ability to ills. Evidence of clear of the course learning ply knowledge to most noughtful and reflective rse learning outcomes. s and little attempt at entational skills. Lack of earning outcomes. Lack by knowledge to solve  No. of Hours  24  24			

	Assignments		10	CLO 1,2,3,4,5
	Examination		40	CLO 1,2,3,4,5
	Presentation		25	CLO 1,2,3,4,5
	Project report		25	CLO 1,2,3,4,5
Required/recommended reading and online materials		cal East Asia (Oxford University Pro- logy and Biodiversity of Hong Kong		y Parks, Hong Kong)
Course Website	http://moodle@hku.hk			
Additional Course Information	This course will be offered subject	to a minimum enrollment number a	and availability of teach	ers.

BIOL3320	The biol	ogy of marine man	nmals (6 credits)	Academic Yea	ır 2021		
Offering Department	Biological			Quota	30		
Course Co-ordinator	, Biologica	al Sciences ()					
Teachers Involved							
Course Objectives	and dolph mammals (sirenians environme threats to	Few other groups of animals have captured the public's imagination the way marine mammals, especially whales and dolphins have. This course covers the evolutionary biology, ecology, behaviour, and conservation of marine mammals: whales, dolphins and porpoises (cetaceans), seals and walruses (pinnipeds), manatees and dugongs (sirenians) and sea otters. Students will learn to understand the ecology of mammalian life in the aquatic environment, their role in the marine ecosystem, their behavioural complexity and socio-ecology, and the curren threats to these animals in the human-dominated world.					
Course Contents & Topics	discusses highlightin followed It ranging b cognition, of human and a rev knowledge of marine discussior undertake skills in co	of the various adaptations that have evolved to meet the challenges of the marine environment. Next, the course discusses the life history, reproductive strategies, ecology and population dynamics of marine mammals, highlighting the similarities and differences between species in this taxonomically diverse group of animals. This is followed by sessions on behaviour and behavioural ecology; here we discuss animal movement, diving and ranging behaviour, foraging strategies, ecology of group living and social behaviour, behavioural complexity, cognition, and social strategies that guide the daily lives of these animals. The course concludes with a discussion of human influences on the fate of marine mammals, examples of critically endangered species and populations, and a review of conservation and management strategies; our emphasis is on the importance of applying the knowledge of population ecology, behaviour and behavioural ecology in ensuring long-term effective conservation of marine mammal populations. This course is designed for 3rd and 4th year students; it includes field trips, discussions of current scientific research, innovative research techniques and recent discoveries. Students will undertake independent literature-searches and will discuss their projects during classroom debates, training their skills in conceptual and analytical approaches to science.  On successful completion of this course, students should be able to:					
Course Learning		•					
Outcomes	CLO 2 ur ec CLO 3 ur	nderstand how mamma cosystem nderstand and apprecia	nal diversity and biogeography als adapt and function in an aquation ate the complexity of interactions between	veen environmental selec			
	marine mammal behaviour, population structure and demography CLO 4 appreciate the socio-ecological diversity and behavioural complexity of marine mammals						
	CLO 5 th		logical diversity and behavioural comp s of marine mammal ecology and an				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Bl	IOL2306					
Offer in 2021 - 2022	N Off	er in 2022 - 2023 : N		Examination			
Grade Descriptors (A+ to F)	A	Evidence of a thorough gra excellent use of named ex of fundamental concepts to	asp of the subject in a broader comparative pe amples and case studies. Evidence of indepen o draw insightful and logical conclusions. Show s with excellent analytical argumentation. Exce	erspective as demonstrated by budent critical thought with excelled eagerness to learn, great abiliti	nt use of a broad range es of independent work		
	B Evidence of a good grasp of the subject as demonstrated by some background reading and appropriate use of named examples and some case studies. Evidence of good critical thought, although not necessarily original. Good and very good (but not outstanding) abilities of independent work, effective presentation skills with good analytical and logical argumentation. Good general command of acquired knowledge to draw meaningful and logical conclusions. Work more than sufficient for what is required at degree level.						
	С	Demonstrate an adequate, but not coherent and incomplete grasp of the subject, with limited background reading and limited use of named examples and case studies. Some abilities of logical critical thinking, but not insightful and/or independent; only partial abilities to use acquired knowledge and work independently to draw meaningful conclusions. Fair presentation skills, with mostly correct argumentation, but limited (or no) abilities to integrate broader concepts. Work sufficient for what is required for degree level.					
	D						
	Fail  No evidence of basic minimum knowledge and understanding of the subject. No evidence of background reading and no familiarity with any relevant examples and case studies. Inadequate evidence of coherent logical thought; ineffective presentation skills with poor argumentation and no abilities to draw meaningful conclusions. Work fails to reach degree level.						
Communication- intensive Course	N						
Course Type		ith laboratory compone					
Course Teaching	Activities	8	Details		No. of Hours		
& Learning Activities	Lectures	ry	including field trips, research site		24 32		
			research techniques, interactive cla	assidoili debates	0		
	Project w		project work review		8 60		
Assessment Methods and Weighting	Methods	/ Self study	Details	Weighting in final course grade (%)	Assessment Methods to CLO		

	Assignments	including active participation/continuous assessment/presentation	55	CLO 1,2,3,4,5
	Examination		45	CLO 1,2,3,4,5
Required/recommended reading and online materials	Reynolds JE & Rommel SA (eds). Perrin WF, Wursig B & Thewissen	biology: An evolutionary approach (Bi Biology of marine mammals (Smithso JGM (eds). Encyclopedia of marine i Whitehead H (eds). Cetacean societie	onian Institution Press 199 mammals (Academic Pres	s 2008)
Course Website	http://moodle.hku.hk			
Additional Course Information	This course is offered in alternate This course will be offered subject	year. to a minimum enrollment number and	availability of teachers.	

	Marine invertebrate zoology (6 credits)  Academic Y				ır 2021			
Offering Department		al Sciences		Quota	30			
Course Co-ordinator		nnicci, Biological Science						
Teachers Involved		nnicci,Biological Science						
Course Objectives	introduce marine in benthic a	This course introduces the students to the diversity, biology and ecology of marine invertebrates. Students will be introduced to various aspects of the systematics, anatomy, physiology and functional ecology of the major phyla o marine invertebrates to appreciate the diversity of body plans and ecological roles these animals play in costal benthic and pelagic ecosystems. The course will particularly focus on the South East Asian seas, which are the most diverse marine systems in the world.						
Course Contents & Topics	environm worms), the seas of all marelatives This cou structure relations pathway: students of the fu Asian se	Invertebrates make up 95% of all animal species. While insects dominate the terrestrial landscapes, marine environments have a much broader phyletic diversity, with taxa such as Porifera (sponges), Polychaetes (marine worms), Coelenterata (corals and sea anemones) and Echinoderms (sea urchins and starfish) entirely confined to the seas. Together with marine molluscs and crustaceans, these groups play fundamental roles in the functioning of all marine ecosystems, and are a fundamental focus of evolutionary studies of extant taxa and their fossil relatives.  This course will lead the students through the discovery of the amazing variety of body plans, adaptations, structure and function of marine invertebrates. In the first part of the course, the study of the phylogenetic relationships and the body plans of marine invertebrates groups, together with the associated evolutionary pathways, will be described to provide students with an evolutionary grand tour of life on Earth. In the second part, students will learn the mechanisms underpinning the ecological functions of marine ecosystems, through the study of the functional biology and ecology of the dominant groups. The diversity of invertebrates present in South East Asian seas will be introduced, and students will become familiar the commonest Hong Kong taxa and species in field trips and laboratory sessions.						
Course Learning		•		e able to:				
Outcomes	CLO 1 ic CLO 2 c CLO 3 c t CLO 4 c	On successful completion of this course, students should be able to:  CLO 1 identify major taxa of marine invertebrates  CLO 2 describe the evolutionary history of the different taxa, understanding their relationships  CLO 3 describe the composition of the invertebrates communities and their roles in marine ecosystems, and learn to identify common species and taxa typical of Hong Kong coastal waters  CLO 4 understand the functional biology of marine invertebrates and their contribution to ecological functioning of						
Pre-requisites and Co-requisites and Imperior	_	marine ecosystems BIOL2306						
combinations)	N 0	" ' 0000 0000 N						
		ffer in 2022 - 2023 : N		Examination				
Offer in 2021 - 2022 Grade Descriptors (A+ to F)	A	familiarity with relevant bac skills. Ample evidence of ir	ence of a thorough grasp of the subject and relevant research techniques. Eagerness and enthusiasm to learn and excellent iarity with relevant background reading and case studies. Exemplary handling of field data collection and excellent analytical . Ample evidence of independent critical thought with excellent use of a broad range of fundamental concepts and broader parative perspective to draw insightful and logical conclusions. Show outstanding abilities of independent work, effective entation skills with excellent analytical argumentation. Excellent or outstanding work relative to what is required at degree ence of a good grasp of the subject and relevant research techniques. Interest in learning and good-to-moderate familiarity relevant background reading and case studies. Good handling of field data collection and commendable analytical skills. I evidence of critical thought (although not always independent), with an appreciable use of fundamental concepts and					
	В	presentation skills with exc level.  Evidence of a good grasp with relevant background a Good evidence of critical	cellent analytical argumentation. I of the subject and relevant resea reading and case studies. Good thought (although not always inc	Excellent or outstanding work relative to what rch techniques. Interest in learning and good handling of field data collection and commendependent), with an appreciable use of fund	pendent work, effectivat is required at degre d-to-moderate familiarit ndable analytical skills damental concepts an			
	В	presentation skills with exc level.  Evidence of a good grasp with relevant background I Good evidence of critical consideration of broader c presentation skills with logi Demonstrate an adequate relevant background readir	of the subject and relevant resea reading and case studies. Good thought (although not always incomparative perspective in drawin cal and analytical argumentation. but no interesting and case studies, but no interesting and case studies.	Excellent or outstanding work relative to what rich techniques. Interest in learning and good handling of field data collection and commedependent), with an appreciable use of funding logical conclusions. Good abilities of inder Work more than sufficient for what is required ubject and relevant research techniques. Most in learning beyond the adequate average learning and good and good the adequate average learning and good	pendent work, effectivat is required at degre I-to-moderate familiarit ndable analytical skills damental concepts an pendent work, effectivat at degree level. oderate familiarity wit evel. Evidence of logic			
	C	presentation skills with exclevel. Evidence of a good grasp with relevant background in Good evidence of critical consideration of broader or presentation skills with loging Demonstrate an adequate relevant background readifficitical thinking (although in Fair presentation skills, with sufficient for what is require	cellent analytical argumentation. If of the subject and relevant resea reading and case studies. Good thought (although not always incomparative perspective in drawin cal and analytical argumentation. It is not always incomplete grasp of the stag and case studies, but no interest to talways independent), with most it mostly correct argumentation and for degree level.	Excellent or outstanding work relative to what rich techniques. Interest in learning and good handling of field data collection and commet dependent), with an appreciable use of funding logical conclusions. Good abilities of inder Work more than sufficient for what is required ubject and relevant research techniques. Must in learning beyond the adequate average lestly good use of fundamental concepts to dr., but limited (or no) abilities to integrate br	pendent work, effectivat is required at degre I-to-moderate familiarit ndable analytical skills damental concepts an pendent work, effectivat dat degree level. oderate familiarity with evel. Evidence of logic aw logical conclusions roader concepts. Wor			
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Communication- intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting	Fail  N  Lecture v  Activitie Lectures Laborate Field wc Project v	presentation skills with exclevel.  Evidence of a good grasp with relevant background of Good evidence of critical consideration of broader of presentation skills with loging Demonstrate an adequate relevant background readir critical thinking (although of Fair presentation skills, with sufficient for what is required Demonstrate some grasp research techniques. Som abilities of critical independability of drawing appropriation No evidence of basic and background reading and in thought; ineffective present reach degree level.  With laboratory componences  Sorry  ork  work  g / Self study  s	cellent analytical argumentation. If of the subject and relevant researeading and case studies. Good thought (although not always incomparative perspective in drawin cal and analytical argumentation. It is the case of the second of the second of the second of the subject, but only partial are familiarity with relevant case seems thinking. Ineffective presentate conclusions. Work barely meet minimum grasp of the subject is to familiarity with any relevant expension of the subject, but only partial are familiarity with relevant case is dent thinking. Ineffective presentate conclusions. Work barely meet minimum grasp of the subject is familiarity with any relevant expensions. Work barely meet minimum grasp of the subject is familiarity with any relevant expensions.	Excellent or outstanding work relative to what roth techniques. Interest in learning and good handling of field data collection and commelependent), with an appreciable use of funcing logical conclusions. Good abilities of inder Work more than sufficient for what is requiredubject and relevant research techniques. Mest in learning beyond the adequate average lestly good use of fundamental concepts to droth, but limited (or no) abilities to integrate broad with limited understanding of relevant retudies, but insufficient evidence of backgrouation skills with generally weak logical argums what is required at degree level. and the minimum relevant research technicamples and case studies. Inadequate evidence	pendent work, effectivat is required at degre I-to-moderate familiarit ndable analytical skills damental concepts an apendent work, effectivat degree level.  Oderate familiarity with evel. Evidence of logical conclusions roader concepts. Wor research concepts an and reading and limite nentation with restricte ques. No evidence of coherent logical collisions. Work fails to the concepts work of the concepts on the concepts of the concepts of the concepts on the concepts of th			

	Examination		50	CLO 1,2,4		
	Laboratory reports		20	CLO 1,3		
Required/recommended reading and online materials	R. S. K. Barnes, Peter P. Calow, P. J. W. Olive, D. W. Golding, J. I. Spicer. 2001 The Invertebrates: A Synthesis, 3rd Edition, Wiley-Blackwell. Ruppert, Edward E.; Fox, Richard S.; Barnes, Robert D. Invertebrate Zoology: A Functional Evolutionary Approach. 2004. Belmont, CA: Thomas-Brooks/Cole. Students will be directed to relevant scientific literature and websites					
Course Website	http://moodle.hku.hk					
Additional Course	Offer in alternate year from 2017-2	018				
Information	This course will be offered subject	to a minimum enrollment number a	nd availability of teachers			

BIOL3328	Nearsho	re marine and es	stuarine ecology (6 credits)	Academic Yea	r 2021		
Offering Department	Biological	Sciences		Quota	10		
Course Co-ordinator	Prof. G.A.	Williams, Biological	Sciences (hrsbwga@hku.hk)	·			
Teachers Involved	(Prof. G.A	. Williams, School of	Biological sciences)				
Course Objectives	relevant e communiti This will b	Jsing a comparative approach between Hong Kong and South African shores, students will learn to identify the elevant environmental gradients which define the intertidal zone, and the species interactions which mould these communities.  This will be achieved through an intensive field-based approach, visiting and working in different intertidal habitate in both Hong Kong and, during a residential fieldcamp, in South Africa.					
Course Contents & Topics	Students v residential (1) Intertid	will learn the abiotic fieldcamp, different al biodiversity and s	and biotic factors that structure inter South African intertidal communities.	tidal communities in Hong k	0 ,		
	(3) Specie (4) Trophio (5) Larger- HKU Stud South Afric reports on	(3) Species interactions and behaviour (4) Trophic interactions and connectivity between local terrestrial and marine communities. (5) Larger-scale connectivity from freshwaters to marine systems HKU Students will work in groups with students from the University of Johannesburg and North West Universit South Africa to collect data; design and carry out experiments; present their findings; and write up formal scientification the different topics.  Note individual topics may change in different years and are weather dependent.					
Course Learning Outcomes			nis course, students should be able to: t the shallow water coastal environn		ne Fastern Cane		
Catoomics	Pr	ovince of South Afric	ca		TO Edition Odpo		
	CLO 3 un	derstand the abiot stribution of species	cies and their roles and relationships i ic conditions defining the intertidal over relevant environmental gradients nalyse experiments to investigate spe-	environment and quantify	and interpret the		
					ertidal hahitats		
	CLO 5 integrate abiotic and biotic interactions to determine patterns of connectivity between intertidal habitats  CLO 6 analyse, interpret and present data using a variety of media to demonstrate scientific understanding of topics						
Pre-requisites (and Co-requisites and Impermissible combinations)		OL2306 or BIOL330	01				
Offer in 2021 - 2022	N Offe	er in 2022 - 2023 : Y		Examination			
Grade Descriptors	A		e grasp of the subject. Strong analytical and cri		ith evidence of original		
(A+ to F)	thought. Excellent lab / fieldwork skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions. Excellent organizational and presentational skills  B Good and near-complete grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Competent lab /						
	fieldwork skills and techniques. Correct use of data of results to draw appropriate conclusions. Good organizational and presentational skills.  C Adequate (but incomplete) grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Adequate						
	lab / fieldwork skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Fair organizational and presentational skills.  D Limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Barely adequate lab / fieldwork skills and techniques. Limited ability to use data and						
	results to draw appropriate conclusions. Barely satisfactory organizational and presentational skills.  Fail Poor or inadequate knowledge and understanding of the subject. Lack of analytical and critical abilities, logical and coherent thinking, Inadequate lab / fieldwork skills and techniques. Misuse of data and results and/or unable to draw appropriate						
			t organization and poor presentational skills.	or add did roomb did or dido.	to aran appropriate		
Communication- intensive Course	N						
Course Type	Field camp						
Course Teaching & Learning Activities	Activities		Details		No. of Hours		
& Learning Activities	Lectures		Pre-course modules		8		
	Field work	(	Due course coolemnante		60		
	Tutorials Reading /	Self study	Pre-course assignments		10 50		
Assessment Methods and Weighting	Methods	,	Details	Weighting in final course grade (%)	Assessment Methods		
	Assignmo	nto	Croup propertation	30	to CLO Mapping		
	Assignme Report	iiis	Group presentation	60	CLO 3,4,5,6 CLO 1,2,3,4,5,6		
	Test		Pre-course	10	CLO 1,2,6		
Required/recommended reading and		will be directed to rel	levant scientific literature, websites and				
online materials	http://www	dla bler ble					
Course Website Additional Course		dle.hku.hk who have taken BIO	L3318 will be at an advantage.				
Information			iste students from the University of	Johannashurg and North M	laatara University		
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second Reading Week (Second Semester). Students will be expected to live in tented accommodation and contribute to daily camp activities as well as conduct fieldwork in potentially harsh environmental conditions. Extra costs may be involved in the course, which may include airfares. Accommodation, meal costs and internal travel in South Africa are covered by South African hosts.

BIOL3401	Molecul	ar biology (6 credits	s)	Academic Yea	r 2021		
Offering Department		Sciences	-	Quota	130		
Course Co-ordinator		ai, Biological Sciences (2	zhai @hku.hk)	· ·			
Teachers Involved		nai,Biological Sciences)	,				
Course Objectives	To provid	To provide students with recent knowledge in molecular biology with special emphasis on the study of gene structure and function at the molecular level.					
Course Contents & Topics	replication regulation oligonucle	The course includes a detailed account of the molecular processes in eukaryotic and prokaryotic cells, from DNA replication, RNA transcription, protein translation, to post-translational modifications with special emphasis on the regulation of prokaryotic and eukaryotic gene expression. Recently developed biochemical techniques including oligonucleotide synthesis, DNA sequencing, complementary screening and DNA cloning, site-directed mutagenesis, polymerase chain reaction and transgenic technology will also be discussed.					
Course Learning Outcomes	CLO 1 kr		course, students should be ab of DNA, RNA and protein, an	ole to: and how DNA is package in the nu	cleus of eukaryotic		
			cal processes involved in D in prokaryotes and eukaryote	NA replication, transcription, tra es	enslation and post		
	CLO 3 ex	oplain and describe the r	egulation of gene transcription	n in prokaryotes and eukaryotes			
			and understanding of the under t, site-directed mutagenesis, D	erlying concepts associated with DNA sequencing	recently developed		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in B	IOC2600 or BIOL2103 o	or BIOL2220 or MEDE2301 or	BMED2301			
Offer in 2021 - 2022	Y 1st	sem Offer in 2022 - 20	023 : Y	Examination	Dec		
Grade Descriptors	Α	Demonstrate thorough mas	stery at an advanced level of exter	nsive knowledge required for attaining a	all the course learning		
(A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills.						
	B Demonstrate substantial command of a broad range of knowledge required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.						
	С	C Demonstrate general but incomplete command of knowledge required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilitities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.					
	D						
	Fail  Demonstrate little or no evidence of command of knowledge required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Apply minimally effective or ineffective lab skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.						
Communication- intensive Course	N	·					
Course Type	Lecture w	ith laboratory componen	nt course				
Course Teaching	Activities	S	Details		No. of Hours		
& Learning Activities	Lectures			24			
	Laborator	ry			20		
	Tutorials	•			6		
	Reading / Self study						
	Reading				100		
Assessment Methods			Dotaile	Waighting in final	100		
	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
			Details 2 quizzes	course grade (%)	Assessment		
	Methods	ents		course grade (%)	Assessment Methods to CLO Mapping		
	Methods Assignme	ents		course grade (%)	Assessment Methods to CLO Mapping CLO 1,2,3,4		
Assessment Methods and Weighting	Assignme Examinat Laborator	ents tion ry reports		course grade (%) 30 50	Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4		
and Weighting  Required/recommended	Assignme Examinat Laborator R. Weave	ents tion ry reports rr: Molecular Biology (M	2 quizzes  cGraw-Hill, 2005 or 2008)	30 50 20	Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4		
and Weighting	Assignme Examinat Laborator R. Weave J. Watson B. Lewin: Selected j	ents tion ry reports rr: Molecular Biology (M	2 quizzes  cGraw-Hill, 2005 or 2008) y of the Gene (Benjamin Cumrlett, 2008)	30 50 20	Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4		
and Weighting Required/recommended reading and	Assignme Examinat Laborator R. Weave J. Watson B. Lewin: Selected j	ents tion ry reports er: Molecular Biology (Mo n et al.: Molecular Biology Gene IX (Jones and Ber	2 quizzes  cGraw-Hill, 2005 or 2008) y of the Gene (Benjamin Cumrlett, 2008)	30 50 20	Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4		

BIOL3402	Cell biology and cell technology (6 credits)	Academic Year	2021
Offering Department	Biological Sciences	Quota	120
Course Co-ordinator	Prof A S T Wong, Biological Sciences (awong1@hku.hk)		
Teachers Involved	(Dr W Y Lui,Biological Sciences) (Prof A S T Wong,Biological Sciences) (Prof. M L Chye,Biological Sciences)		
Course Objectives	To provide a coherent understanding of the structure and function of cells, and cell culture and instrumentation in biology and biotechnology	d the principles ar	nd applications of
Course Contents & Topics	I. Cell Biology Cell membranes. Organelles. Cellular transport: ions transport and ions chall Membrane potentials, Action potentials. Cell junctions. Extracellular Matrix.		

	interaction	ns.					
	Mammalia formulatio	II. Techniques in animal cell culture  Mammalian cells in culture. Primary and continuous cell lines. Cell types and cell growth parameters. Medi formulation, growth factors and design of serum-free media. Culture lab facilities and sterilization. Mechanism of cryopreservation.					
		Techniques in plant cell culture oot and shoot cultures. Explant regeneration. Protoplasts. Secondary metabolites.					
Course Learning Outcomes		n successful completion of this course, students should be able to:  CLO 1 acquire fundamental knowledge on cell biology and cell technology  CLO 2 demonstrate basic laboratory techniques on cell culture					
Pre-requisites (and Co-requisites and Impermissible combinations)			r BIOL2220 or MEDE2301	, and connecting			
Offer in 2021 - 2022	Y 1st	sem Offer in 2022 - 20		Examination			
Grade Descriptors (A+ to F)	В	outcomes. Show strong and knowledge to a wide range consistently demonstrate int Demonstrate substantial co	alytical and critical abilities and lo of complex, familiar and unfami formed, thoughtful intellectual eng ommand of a broad range of kno	ktensive knowledge required for attaining gical thinking, with evidence of original the liar situations. Apply highly effective orga agement with broad range of relevant con- wledge required for attaining at least mo	ought, and ability to apply anizational skills. Writings cepts. est of the course learning		
		outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational skills. Writings mostly demonstrate informed, thoughtful intellectual engagement with broad range of relevant concepts.					
	Demonstrate general but incomplete command of knowledge required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational skills. Writings mostly indicate informed, intellectual engagement with concepts or theories but not always with sufficient depth, breadth or understanding.						
	D						
	Fail	analytical and critical abilities	es, logical and coherent thinking. nimally effective or ineffective. W	ge required for attaining the course lea Show very little or no ability to apply knov ritings reveal an absence of intellectual er	vledge to solve problems.		
Communication-	N						
intensive Course							
Course Type		ith laboratory componer					
Course Teaching	Activities		Details				
& Learning Activities	12		Details		No. of Hours		
⊾earning Activities	Lectures		Details		24		
α Learning Activities	Laborator	-у	Details		24 24		
α Learning Activities	Laborator Tutorials		Details		24 24 12		
_	Laborator Tutorials Reading	Self study		Walter	24 24 12 100		
Assessment Methods	Laborator Tutorials	Self study	Details	Weighting in final course grade (%)	24 24 12		
Assessment Methods	Laborator Tutorials Reading	/ Self study			24 24 12 100 Assessment Methods		
Assessment Methods	Laborator Tutorials Reading / Methods	/ Self study		course grade (%)	24 24 12 100 Assessment Methods to CLO Mapping		
Assessment Methods	Laborator Tutorials Reading / Methods	/ Self study		course grade (%)	24 24 12 100 Assessment Methods to CLO Mapping CLO 1,3		
& Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	Laborator Tutorials Reading / Methods Examinat Laborator Test Textbooks Alberts, B Mather, J.	ion y reports s: . et al.: Molecular Biolog P.: Introduction to Cell	<b>Details</b> y of the Cell (Garland, 201	course grade (%)  50 30 20  4, 6th ed.) and Techniques (Plenum, 1998)	24 24 12 100 Assessment Methods to CLO Mapping CLO 1,3 CLO 2,3		
Assessment Methods and Weighting Required/recommended reading and	Laborator Tutorials Reading / Methods Examinat Laborator Test Textbooks Alberts, B Mather, J.	ion ry reports s: . et al.: Molecular Biolog P.: Introduction to Cell .A. & Edwards, G.S.: Pla	Details  y of the Cell (Garland, 201) and Tissue Culture, Theory	course grade (%)  50 30 20  4, 6th ed.) and Techniques (Plenum, 1998)	24 24 12 100 Assessment Methods to CLO Mapping CLO 1,3 CLO 2,3		

BIOL3403	Immunology (6 credits)	Academic Year	2021		
Offering Department	Biological Sciences	Quota	100		
Course Co-ordinator	Dr Chaogu Zheng, Biological Sciences (cgzheng@hku.hk)				
Teachers Involved	(Dr Chaogu Zheng,Biological Sciences) (Dr W B L Lim,Biological Sciences)				
Course Objectives	To provide a broad understanding of the animal immune system with a focu immune reactions against pathogens. Topics will also include the application to research and disease diagnosis.				
Course Contents & Topics	Cells and organs in the immune systems and their functions in vertebrates. Structures and biological properties of antibodies. Generation of diverse antibodies through somatic recombination. Innate and adaptive immunity. Humoral and cell-mediated immunity. T-cell receptor signalling. Major histocompatibility complex and antigen presentation. Emergence and characteristics of lymphoid tissues. Complement pathways. Immunity against bacteria, viruses and parasites. AIDS, COVID-19, Vaccination, hypersensitivity, and autoimmunity. Immunological tests and immunochemical techniques using antibodies and their application to various biological problems in				
	research and clinic.	ation to various biolog			
Course Learning		ation to various biolog			
Course Learning Outcomes	research and clinic.	hich are involved in th	ical problems in		
	research and clinic.  On successful completion of this course, students should be able to:  CLO 1 describe the structure and function of the immune molecules where the structure and function of the immune molecules.	hich are involved in th	ical problems in e body defense s		
	research and clinic.  On successful completion of this course, students should be able to:  CLO 1 describe the structure and function of the immune molecules where mechanisms, including antibody, T-cell receptor, cytokines, MHC and the structure and function of the immune molecules where the structure and function of the immune molecules where the structure and function of the immune molecules where the structure and function of the immune molecules where the structure and function of the immune molecules where the structure and function of the immune molecules where the structure and function of the immune molecules where the structure and function of the immune molecules where the structure and function of the immune molecules where the structure and function of the immune molecules where the structure and function of the immune molecules where the structure and function of the immune molecules where the structure and function of the immune molecules where the structure and function of the immune molecules where the structure and function of the immune molecules where the structure and function of the immune molecules where the structure and function of the immune molecules where the structure and function of the immune molecules where the structure and the structure	hich are involved in th nd complement protein ns of genes, cells and t	e body defenses sissues		

	CLO 5	understand antigen-	antibody interaction and the pr	inciple of immunoassays		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BIOC2600 or BIOL2103 or BIOL2220 or MEDE2301 or BMED2301					
Offer in 2021 - 2022	Y 2r	nd sem Offer in 20	22 - 2023 : Y	Examination	May	
Grade Descriptors (A+ to F)	Α	analysis into the scie	ntific literatures. 3. Superior writing, pr	ehensive understanding of the subject matter resentation and group communication skills.		
	В	literatures. 3. Good v	vriting, presentation and group commu		•	
	С	literatures. 3. Adequa	ate writing and communication skills.	derstanding of the subject matter. 2. Some	•	
	D	literatures. 3.Limited	writing and communication skills.	ding of basic subject matter. 2. Some abil	•	
	Fail	Poor understandi communicate.	ng of subject matter. 2. Little to no	insight into use of the scientific literatures	s. 3. Unable to write or	
Communication- intensive Course	N					
Course Type	Lecture	with laboratory com	oonent course			
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures					
	Laboratory		during reading week	during reading week		
	Tutorials					
	Reading / Self study				100	
Assessment Methods and Weighting	Method	ls	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Examin	ation		50	CLO 1,2,3,4,5	
	Laborat	ory reports		20	CLO 1,2,3,4,5	
	Test		Mid term	30	CLO 1,2,3,4,5	
Required/recommended reading and conline materials	Benjami	J. Kuby: Immunology (Freeman and Company, 2003 or 2007-6thd ed., or 2013-7th ed.) Benjamin & Leskowitz: Immunology: A Short Course (Wiley-Liss, 2007, 6th edition. Or the latest edition)  I. Roitt, J. Brostoff and D. Male: Immunology (Mosby, latest 2 editions)				
Course Website	http://mo	oodle.hku.hk/		·		
Additional Course Information	This cou	ırse will be offered s	ubject to a minimum enrollmen	t number and availability of teachers	3.	

BIOL3404	Protein	structure and funct	ion (6 credits)	Academic Year	2021		
Offering Department	Biologica	al Sciences	•	Quota	70		
Course Co-ordinator	Dr Y L ZI	hai, Biological Sciences (	(zhai @hku.hk)				
Teachers Involved	(Dr Y L Z	(Dr C M Qian,Biomedical Sciences) (Dr Y L Zhai,Biological Sciences)					
Course Objectives	methods	To provide students with a good understanding of protein structure, how structure subserves function, and the methods for study of both. This course provides a strong foundation for advanced courses in biochemistry and biotechnology.					
Course Contents & Topics	quaterna The relat specificit Methods microsco How pro function; Protein p separatic purity, op and devi	Elements of macromolecular structure: sequencing, prediction and determination of secondary, tertiary and quaternary structures;  The relationship of protein structure and function: molecular motifs, binding and recognition, enzyme catalysis and specificity;  Methods for protein structure determination: X-ray crystallography, nuclear magnetic resonance and cryo electror microscopy;  How protein works: protein flexibility and dynamics, protein interaction, protein complex, and control of protein function;  Protein purification and characterization: various liquid chromatographical methods and their uses in combination separation techniques, methods of determination of molecular mass, activity and purity, optical methods in protein determination, ultracentrifugation, protein polishing, stability and storage, methods and devices for protein delivery.					
Course Learning Outcomes	CLO 1 CLO 2 CLO 3 CLO 4	On successful completion of this course, students should be able to:  CLO 1 fundamental understanding of principles of protein structure  CLO 2 demonstrate a basic understanding of the relationship between protein structure and function  CLO 3 have a basic understanding of major methods for macromolecular structure determination  CLO 4 understand the principles regulating protein function in vivo  CLO 5 learn about the ways to purify protein and the many industrial uses of proteins					
Pre-requisites (and Co-requisites and Impermissible combinations)		, ,	or MEDE2301 or BMED2301				
Offer in 2021 - 2022	Y 2n	nd sem Offer in 2022 - 2	2023 : Y	Examination	May		
Grade Descriptors (A+ to F)	A 1. Exceptionally good performance demonstrating comprehensive understanding of the subject matter. 2. Critical insight into the scientific literature. 3. Superior writing and group communication skills.						
(AT IO F)	B 1. Good performance demonstrating full understanding of the subject matter. 2. Coherent insight into the scientific literature. 3. Good writing and group collaboration skills.						
	C 1. Satisfactory performance demonstrating adequate understanding of the subject matter. 2. Some insight into the scientific literature. 3. Adequate writing and group collaboration skills.						
	<ol> <li>Limited performance demonstrating some understanding of basic subject matter. 2. Some ability to use the scientific literature.</li> <li>Limited writing and group collaboration skills.</li> </ol>						
	Fail 1. Poor understanding of subject matter. 2. Little to no insight into use of the scientific literature. 3. Unable to write or collaborate.						
Communication- intensive Course	N						
Course Type	Lecture-k	based course					
Course Teaching	Activitie	es	Details		No. of Hours		
& Learning Activities							

	Tutorials			12
	Reading / Self study			100
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments		30	CLO 1,2,3,4,5
	Examination		55	CLO 1,2,3,4,5
	Presentation		15	CLO 1,2,3,4,5
Required/recommended reading and conline materials	None prescribed To be announced.			
Additional Course Information	This course will be offered s	subject to a minimum enrollme	nt number and availability of teachers	<b>5.</b>

BIOL3405	Moiecu	ılar microbiology (	(6 credits)	Academic Ye	ear 2021		
Offering Department		al Sciences	·	Quota	30		
Course Co-ordinator	, Biolo	gical Sciences ()					
Teachers Involved	(,Biolo	gical Sciences)					
Course Objectives	modern	This course is intended for biology, biotechnology and biochemistry students who would like to understand the modern fundamentals of microbiology. At the end of the course the students are expected to know the physiological, biochemical and molecular aspects of microbiology.					
Course Contents					e growth of microbe		
& Topics	in the en changes consider	The basic biochemistry of microorganisms will be described. The intrinsic factors that affect the growth of microbes in the environment will be examined. The adaptation of the microbes to the environment by means of physiological changes and genetical alterations will be illustrated. The molecular biology of bacteria and viruses will be considered. The molecular biology of plasmids and transposable elements and their association with medical aspect will be discussed. The use of modern technology in studying microorganisms will be explored.					
Course Learning	On succe	essful completion of th	nis course, students should be abl	e to:			
Outcomes	CLO 1	understand the intrins	sic reorganization of microbes in re	esponse to the changing enviro	nments		
			or modes of regulation in the micro	bbe			
			bacteriophages and plasmids				
	CLO 4	realize the importance	e of transposable elements in the	survival of the microbes			
	CLO 5	appreciate the develo	pment of modern techniques in st	udying microorganisms			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	BIOL2103					
Offer in 2021 - 2022	N O	ffer in 2022 - 2023 : N		Examination			
Grade Descriptors (A+ to F)	В	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking with evidence of original thought. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills.  Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Demonstrate substantial grasp of the subject. Show evidence of analytical and critical abilities and logical					
	С	thinking. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.  Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw					
		thinking. Apply moderat	tely effective lab skills and techniques. Mo	stly correct but some erroneous use of	critical abilities and logic		
	D	thinking. Apply moderat appropriate conclusions Demonstrate partial but Demonstrate partial but logical thinking, but with		stly correct but some erroneous use of all and presentational skills. is required for attaining some of the contain and information, of the subject. Evident ply partially effective lab skills and tections.	critical abilities and logic f data and results to dra course learning outcome ace of some coherent an hniques. Limited ability		
	D Fail	thinking. Apply moderat appropriate conclusions Demonstrate partial but Demonstrate partial but logical thinking, but with use data and results to Demonstrate little or no Demonstrate evidence analytical and critical ai	tely effective lab skills and techniques. Mo s. Apply moderately effective organizationa t limited command of knowledge and skill l. limited grasp, with retention of some relev n limited analytical and critical abilities. Ap	stly correct but some erroneous use of all and presentational skills. s required for attaining some of the corant information, of the subject. Eviden ply partially effective lab skills and tect d or barely effective organizational and nd skills required for attaining the co- ond understanding of the subject. Evi-	critical abilities and logic f data and results to dra course learning outcome loc of some coherent are finited ability different at the course learning outcome learning outcome dence of little or lack of ab skills and technique		
		thinking. Apply moderat appropriate conclusions Demonstrate partial but Demonstrate partial but logical thinking, but with use data and results to Demonstrate little or no Demonstrate evidence analytical and critical ai	tely effective lab skills and techniques. Mo s. Apply moderately effective organizationa t limited command of knowledge and skill l. limited grasp, with retention of some relevant in limited analytical and critical abilities. Ap draw appropriate conclusions. Apply limite to evidence of command of knowledge a of little or no grasp of the knowledge a bilities, logical and coherent thinking. Ap	stly correct but some erroneous use of all and presentational skills. s required for attaining some of the corant information, of the subject. Eviden ply partially effective lab skills and tect d or barely effective organizational and nd skills required for attaining the co- ond understanding of the subject. Evi-	critical abilities and logic f data and results to dra course learning outcome loc of some coherent ar hiniques. Limited ability did presentational skills, surse learning outcomes dence of little or lack of ab skills and technique:		
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intensive Course Course Type Course Teaching	Fail	thinking. Apply moderat appropriate conclusions Demonstrate partial but Demonstrate partial but logical thinking, but with use data and results to Demonstrate little or no Demonstrate evidence analytical and critical a Misuse of data and result effective or ineffective.	tely effective lab skills and techniques. Mo s. Apply moderately effective organizationa t limited command of knowledge and skill limited grasp, with retention of some relevant in limited analytical and critical abilities. Ap draw appropriate conclusions. Apply limite o evidence of command of knowledge a of little or no grasp of the knowledge a bilities, logical and coherent thinking. Ap ults and/or unable to draw appropriate co	stly correct but some erroneous use of all and presentational skills. s required for attaining some of the corant information, of the subject. Eviden ply partially effective lab skills and tect d or barely effective organizational and nd skills required for attaining the co- ond understanding of the subject. Evi-	critical abilities and logic f data and results to dra course learning outcome loc of some coherent ar hiniques. Limited ability did presentational skills, surse learning outcomes dence of little or lack of ab skills and technique:		
intensive Course Course Type Course Teaching	Fail N Lecture	thinking. Apply moderat appropriate conclusions Demonstrate partial but Demonstrate partial but logical thinking, but with use data and results to Demonstrate little or no Demonstrate evidence analytical and critical a Misuse of data and results of the conclusion	tely effective lab skills and techniques. Mo  s. Apply moderately effective organizationa  limited command of knowledge and skill  limited grasp, with retention of some relevation limited analytical and critical abilities. Ap  draw appropriate conclusions. Apply limite  o evidence of command of knowledge a  of little or no grasp of the knowledge a  of little or no grasp of the knowledge a  bilities, logical and coherent thinking. Ap  ults and/or unable to draw appropriate comment  organization.	stly correct but some erroneous use of all and presentational skills. s required for attaining some of the corant information, of the subject. Eviden ply partially effective lab skills and tect d or barely effective organizational and nd skills required for attaining the co- ond understanding of the subject. Evi-	critical abilities and logic f data and results to dra course learning outcome to some coherent arniques. Limited ability in different and presentational skills. The control of the contr		
intensive Course Course Type Course Teaching	Fail  N  Lecture v	thinking. Apply moderat appropriate conclusions Demonstrate partial but Demonstrate partial but logical thinking, but with use data and results to Demonstrate little or no Demonstrate little or no Demonstrate evidence analytical and critical a Misuse of data and results of data and results or ineffective or ineffective.	tely effective lab skills and techniques. Mo  s. Apply moderately effective organizationa  limited command of knowledge and skill  limited grasp, with retention of some relev  limited analytical and critical abilities. Ap  draw appropriate conclusions. Apply limite  o evidence of command of knowledge a  of little or no grasp of the knowledge a  of little or no grasp of the knowledge a  bilities, logical and coherent thinking. Ap  ults and/or unable to draw appropriate co	stly correct but some erroneous use of all and presentational skills. s required for attaining some of the corant information, of the subject. Eviden ply partially effective lab skills and tect d or barely effective organizational and nd skills required for attaining the co- ond understanding of the subject. Evi-	ritical abilities and logic f data and results to dra ourse learning outcome not of some coherent ar hinques. Limited ability in the definition of the control of the contr		
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intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail  N  Lecture v  Activitie  Lectures  Laborato  Tutorials	thinking. Apply moderat appropriate conclusions Demonstrate partial but Demonstrate partial but logical thinking, but with use data and results to a Demonstrate evidence analytical and critical and Misuse of data and resultical effective or ineffective.  with laboratory composes sory Self Self study	tely effective lab skills and techniques. Mo  s. Apply moderately effective organizationa  limited command of knowledge and skill  limited grasp, with retention of some relev  limited analytical and critical abilities. Ap  draw appropriate conclusions. Apply limite  o evidence of command of knowledge a  of little or no grasp of the knowledge a  of little or no grasp of the knowledge a  bilities, logical and coherent thinking. Ap  ults and/or unable to draw appropriate co	stly correct but some erroneous use of all and presentational skills. Is required for attaining some of the covernation of the subject. Evider ply partially effective lab skills and tect of or barely effective organizational and skills required for attaining the cond understanding of the subject. Eviply minimally effective or ineffective lanclusions. Organization and presental weight of the course of the	ritical abilities and logic f data and results to dra ourse learning outcome one of some coherent are hinques. Limited ability d presentational skills. ourse learning outcome dence of little or lack day skills and technique tional skills are minimal skills are minimal skills are minimal dence of little or lack do skills and technique tional skills are minimal dence of little or lack do skills are minimal skills are minimal dence of little or lack do skills are minimal dence of little or lack dence or lack d		
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intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail  N  Lecture v  Activitie Lectures Laborate Tutorials Reading Method	thinking. Apply moderat appropriate conclusions. Demonstrate partial but Demonstrate partial but logical thinking, but with use data and results to a Demonstrate little or not Demonstrate evidence analytical and critical Misuse of data and result effective or ineffective.  with laboratory componess or yes a demonstrate with the properties of the proper	tely effective lab skills and techniques. Mo s. Apply moderately effective organizationa t limited command of knowledge and skill limited grasp, with retention of some relev i limited analytical and critical abilities. Ap draw appropriate conclusions. Apply limite o evidence of command of knowledge a of little or no grasp of the knowledge a of little or no grasp of the knowledge a unitary of the strength of the	stly correct but some erroneous use of all and presentational skills. Is required for attaining some of the covernation of the subject. Evider ply partially effective lab skills and tect of or barely effective organizational and skills required for attaining the cond understanding of the subject. Eviply minimally effective or ineffective lanclusions. Organization and presental weight of the course of the	ritical abilities and logic f data and results to dra ourse learning outcome loc of some coherent ar ninques. Limited ability di presentational skills. In the learning outcomes dence of little or lack of ab skills and technique tional skills are minimal.  No. of Hours  24  20  6  100  Assessment Methods to CLO Mappin. CLO 1,2,3,4 CLO 3,4,5		
Intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail  N  Lecture v  Activitie Lectures Laborate Tutorials Reading Method	thinking. Apply moderat appropriate conclusions. Demonstrate partial but Demonstrate partial but logical thinking, but with use data and results to a Demonstrate little or not Demonstrate evidence analytical and critical and Misuse of data and results effective or ineffective.  with laboratory composes sory Self Self study is a discount of the self	tely effective lab skills and techniques. Mo s. Apply moderately effective organizationa t limited command of knowledge and skill limited grasp, with retention of some relev i limited analytical and critical abilities. Ap draw appropriate conclusions. Apply limite o evidence of command of knowledge a of little or no grasp of the knowledge a of little or no grasp of the knowledge a unitary of the strength of the	stly correct but some erroneous use of all and presentational skills. Is required for attaining some of the covernation of the subject. Evider ply partially effective lab skills and tect of or barely effective organizational and skills required for attaining the cond understanding of the subject. Eviply minimally effective or ineffective lanclusions. Organization and presental weight of the subject of the su	ritical abilities and logic f data and results to dra ourse learning outcome noe of some coherent ar ninques. Limited ability did presentational skills. The properties of the		
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Fail  N  Lecture of Activities Lectures Laborate Tutorials Reading Method  Examina Laborate Presents TBC Maloy S. Willey, S. Watson,	thinking. Apply moderat appropriate conclusions. Demonstrate partial but Demonstrate partial but logical thinking, but with use data and results to a Demonstrate evidence analytical and critical and Misuse of data and resi effective or ineffective.  with laboratory composes soory sology / Self study station ory reports attion attion ory reports attion a.R., Cronan J.E. & Fresherwood & Woolverto Baker, Bell, Gann, Le	tely effective lab skills and techniques. Mo s. Apply moderately effective organizationa t limited command of knowledge and skill limited grasp, with retention of some relev i limited analytical and critical abilities. Ap draw appropriate conclusions. Apply limite o evidence of command of knowledge a of little or no grasp of the knowledge a of little or no grasp of the knowledge a unitary of the strength of the	stly correct but some erroneous use of all and presentational skills. Is required for attaining some of the covernation of the subject. Evider ply partially effective lab skills and ted or barely effective organizational and skills required for attaining the cond understanding of the subject. Eviply minimally effective or ineffective lanclusions. Organization and presental course grade (%)  Weighting in final course grade (%)  70 20 10 es & Bartlett 1994, 2nd ed.) blogy (McGraw Hill 2009) of the Gene (CSHL Press 2006)	ritical abilities and logic f data and results to dra ourse learning outcome noe of some coherent are hinques. Limited ability difference of little or lack of the company		
Communication- intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials  Course Website	Fail  N  Lecture v Activitie Lectures Laborate Tutorials Reading Method  Examina Laborate Presents TBC Maloy S. Willey, S Watson, Madigan	thinking. Apply moderat appropriate conclusions. Demonstrate partial but Demonstrate partial but logical thinking, but with use data and results to a Demonstrate evidence analytical and critical and Misuse of data and result effective or ineffective.  with laboratory composes sory self-self-self-self-self-self-self-self-	lely effective lab skills and techniques. Mo s. Apply moderately effective organizations it limited command of knowledge and skill it limited grasp, with retention of some relevant ilmited analytical and critical abilities. Ap draw appropriate conclusions. Apply limite of evidence of command of knowledge a of little or no grasp of the knowledge a of little or no grasp or little	stly correct but some erroneous use of all and presentational skills. Is required for attaining some of the covernation of the subject. Evider ply partially effective lab skills and ted or barely effective organizational and skills required for attaining the cond understanding of the subject. Eviply minimally effective or ineffective lanclusions. Organization and presental course grade (%)  Weighting in final course grade (%)  70 20 10 es & Bartlett 1994, 2nd ed.) blogy (McGraw Hill 2009) of the Gene (CSHL Press 2006)	virtical abilities and logic f data and results to dra data and results to dra course learning outcome loce of some coherent an hiniques. Limited ability different presentational skills. Some service of little or lack a baskills and technique tional skills are minimal skills are minimal skills are minimal dence of little or lack a baskills and technique tional skills are minimal skills are minimal dence of little or lack a baskills and technique tional skills are minimal dence dence of little or lack a baskills and technique tional skills are minimal dence d		
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Fail  N  Lecture v Activitie Lectures Laborate Tutorials Reading Method  Examina Laborate Presents TBC Maloy S. Willey, S Watson, Madigan http://mo	thinking. Apply moderat appropriate conclusions. Demonstrate partial but Demonstrate partial but logical thinking, but with use data and results to a Demonstrate little or not Demonstrate evidence analytical and critical a Misuse of data and result effective or ineffective.  with laboratory composes of James and Ja	lely effective lab skills and techniques. Mo s. Apply moderately effective organizations it limited command of knowledge and skill it limited grasp, with retention of some relevant ilmited analytical and critical abilities. Ap draw appropriate conclusions. Apply limite of evidence of command of knowledge a of little or no grasp of the knowledge a of little or no grasp or little	stly correct but some erroneous use of all and presentational skills. Is required for attaining some of the covernation of the subject. Evider ply partially effective lab skills and tect of or barely effective organizational and skills required for attaining the cond understanding of the subject. Eviply minimally effective or ineffective lanclusions. Organization and presental course grade (%)  Weighting in final course grade (%)  70 20 10 es & Bartlett 1994, 2nd ed.) ploggy (McGraw Hill 2009) of the Gene (CSHL Press 2006) nisms (Pearson 2009, 12th ed.)	ritical abilities and logic f data and results to dra data and results to dra course learning outcome co of some coherent an hingues. Limited ability di presentational skills. surse learning outcome dence of little or lack data skills and technique tional skills are minimal dence of little or lack data skills are minimal dence of little or lack data skills are minimal dence of little or lack data skills are minimal dence of little or lack data skills are minimal dence of little or lack data skills are minimal dence of little or lack data dence dence of little or lack data dence dence of little or lack data dence denc		

BIOL3406 Reproduction and reproductive biotechnology (6 credits)	Academic Year	2021
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Offering Department		Sciences	10-1	Quota	35		
Course Co-ordinator Teachers Involved			Sciences (olwong@hku.hk)				
Course Objectives	•	L Wong,Biologica le a comprehensi	ive overview on modern concepts a	and recent advances in rep	roductive biology &		
Course Contents			in human and animal models. ction, evolution of sex, human & anima				
& Topics	-Molecula -Neuroend feedback -Environm reproduct -Recent a	r mechanisms for docrinology of reportance of the contract of	sex determination, developmental asponductive system and recent advantal circuit.  disruptors and recent advances in vonic stem cells & induced pluripotent	pects of gametogenesis and races in kisspeptin & GnRH biotechnology for fertility	eproductive systems system and steroic control & assisted		
	-New tech	therapeutic cloning anology for genom	g. le editing by TALENT & CRISPR/Cas antation in animal models.	9 systems and gene therapy	, animal cloning and		
Course Learning			f this course, students should be able	to:			
Outcomes	CLO 1 H	ave a broad unde rategies & sexua evelopment of repr	rstanding of reproductive biology rangle behaviors in animals to the regroductive systems.  Too of the recent advances on neur	ging from evolution of sex, d ulatory mechanisms for se	x determination &		
	re m	productive cycle, odels.	sexual behavior, parental care, and	pregnancy & parturition in hu	ıman & mammalian		
	po	ossible causes of h	standing on the adverse effects of envi numan infertility & treatment with assis e range of modern technologies for g	sted reproduction.	•		
		•	and the applications of embryonic ne/therapeutic cloning.	stem cells/induced pluripo	tent stem cells in		
Pre-requisites (and Co-requisites and Impermissible combinations)		•	220 or BIOC2600 or MEDE2301				
Offer in 2021 - 2022	Y 1st	sem Offer in 20	22 - 2023 : Y	Examination	Dec		
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive knowledge required for attaining all the course learni outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to ap knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective lab skills and techniques. Critiuse of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentationskills.					
	В	Demonstrate substantial command of a broad range of knowledge required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.					
	С	Demonstrate general but incomplete command of knowledge required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.					
	D	Demonstrate partial but limited command of knowledge required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.  Demonstrate little or no evidence of command of knowledge required for attaining the course learning outcomes. Lack of					
	Fail	analytical and critical Apply minimally effe	or no evidence of command of knowledge re il abilities, logical and coherent thinking. Show active or ineffective lab skills and techniques. Ne tation and presentational skills are minimally ef	very little or no ability to apply know lisuse of data and results and/or ur	ledge to solve problems		
Communication- intensive Course	N						
Course Type Course Teaching		ith laboratory com			No. of Hours		
Sourse Teaching  Learning Activities	Activities Lectures	5	Details	Details			
<b>J</b>	Laborato	ry					
	Tutorials	/ Self study			24 6 100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Examinat	ion		50	CLO 1,2,3,4		
	Test		Continuous Assessment	50	CLO 1,2,3,4		
,	I 1 RIOTACH	<ol> <li>Biotechnology of Animal Reproduction (e-book) by M. M. Seneda, K. C. Silva-Santos &amp; L. S. R. Martinho, Nova Science Publishers (2016).</li> <li>Human Reproductive Biology (4th edition, e-Book) by R.E. Jones &amp; Kristin H. Lopez, Academic Press (2015) (Winner of 2015 Textbook Excellence Award).</li> </ol>					
Required/recommended reading and online materials	Science F 2. Human (Winner o	Reproductive Éid f 2015 Textbook E			demic Press (2015)		
reading and	Science F 2. Human (Winner o 3. Reprod	Reproductive Bion f 2015 Textbook Eluction System at a	xcellence Award).	t, Wiley-Blackwell (2014).			
reading and	Science F 2. Human (Winner o 3. Reprod 4. Yen an http://moo	Reproductive Bion f 2015 Textbook E luction System at a d Jaffe Reproduct dle.hku.hk/	xcellence Award). a Glance by L.J. Heffner & D.J. Schus	t, Wiley-Blackwell (2014).			

BIOL3408	Genetics (6 credits)	Academic Year	2021
Offering Department	Biological Sciences	Quota	50
Course Co-ordinator	Dr G Y W Chan, Biological Sciences (gywchan@hku.hk)		
Teachers Involved	(Dr C Schunter,Biological Sciences)		
	(Dr G Y W Chan,Biological Science)		
Course Objectives	This course aims to provide students with fundamental knowledge of classical, n	nolecular and popi	ulation genetics
Course Contents	Topics will include cellular reproduction, principles and chromosomal basis of M		
& Topics	and mapping, concept and definition of the gene, molecular mechanism	s of mutation, D	NA repair and

	recombination, DNA transposition, extranuclear inheritance, transcription and translation, epigenetics, genomics, transcriptomics and proteomics as well as population genetics.						
Course Learning			this course, students should be able to:				
Outcomes			y of genetic organizations in nature				
			principles to explain hereditary traits obse	erved in nature and labor	atories		
		CLO 3 apply qualitative and quantitative experimental methodologies for genetic analysis at individual population levels					
Pre-requisites		Pass in BIOL1110 or BIOC1600; and BIOL2102 or BIOL2103.					
(and Co-requisites and Impermissible combinations)	. 455						
Offer in 2021 - 2022	Y 1s	st sem Offer in 202	22 - 2023 : Y	Examination	Dec		
Grade Descriptors (A+ to F)	A	learning outcomes. S to apply knowledge theories, principles, e	gh mastery at an advanced level of extensive kno show strong analytical and critical abilities and logic to a wide range of complex, familiar and unfamilia svidence and techniques	al thinking, with evidence of or ir situations. Integration of the	iginal thought, and ability full range of appropriate		
	В	., , .					
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Some partial integration of theories, principles, evidence and techniques						
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Limited integration of theories, principles, evidence and techniques						
	Fail	Demonstrate little or of analytical and cri	no evidence of command of knowledge and skills retical abilities, logical and coherent thinking. Show or inapt integration of theories, principles, evidence	equired for attaining the course v very little or no ability to ap			
Communication- intensive Course	N						
Course Type	Lecture	with laboratory comp	ponent course				
Course Teaching	Activitie	es	Details	Details			
& Learning Activities	Lectures	S					
	Laborat	•		24			
	Tutorials	S	tutorials & laboratories		6		
	Reading	g / Self study			100		
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignn	nents	laboratory reports, assignments	50	CLO 1,2,3		
	Examina	ation		50	CLO 1,2,3		
Course Website	http://mc	odle.hku.hk/					
Additional Course Information	This cou	rse will be offered s	ubject to a minimum enrollment number a	nd availability of teachers	5.		

BIOL3409	Business aspects of biotechnology (6 credits)	Academic Year	2021				
Offering Department	Biological Sciences	Quota	40				
Course Co-ordinator	Dr W B L Lim, Biological Sciences (bllim @hku.hk)						
Teachers Involved	(Dr K W Y Yuen,School of Biological Sciences) (Dr Ng,Guest Lecture) (Dr W B L Lim,Biological Science)						
Course Objectives	The course will give an overview of the innovative developments in biotech industry and provide the students with useful tools in learning how an exciting research idea can be turned into a viable business.						
Course Contents & Topics	useful tools in learning how an exciting research idea can be turned into a viable business.  The purpose of the course is to introduce you to the entrepreneurial process with a focus on the biotechnology industry. The course will provide a thoughtful, practical guide to the process of successfully launching an entrepreneurial venture. We place a special emphasis on the decision to become a biotech entrepreneur and how to develop successful business ideas, however we will also discuss the process of moving from an idea to a biotech firm. Topics on intellectual properties, patent laws, patent application process, licensing and fundraising will be covered as well. Throughout the course, guest entrepreneurs, managers and directors of the biotech industry will be presenting case studies and explain their involvement in various biotech and pharmaceutical companies. Topics:  1. Introduction to Biotechnology Industry: 4 P in Biotechnology Business (3 hours)  2. IP rights: Patent application, Patent system, USPTO, SIPO, PCT (6 hours)  3. Licensing of IP rights (3 hours)  4. Technology Transfer Office and HKSTP (3 hours)  5. How to raise fund for startup companies (3 hours)?  6. Agrobiotechnology and Green Tech (Monsanto, Novozymes, etc) (4.5 hours)  7. Drug development and clinical trials (Gilead Sciences, Wuxi PharmaTech, etc). (6 hours)  8. Diagnostics business (BGI, Diagcor, etc) (4.5 hours)  9. Company analysis (3 hours)  10. Company Visit  11. Company analysis						
Course Learning Outcomes  On successful completion of this course, students should be able to:  CLO 1 understand and demonstrate knowledge of the development and management of biotect closes and inventions are commercialized.  CLO 3 navigate the various steps in the development of a biotechnology derived product: from to market.  CLO 4 gain technical and business knowledge of the biotechnology and bioprocessing industries.							
Pre-requisites (and Co-requisites and Impermissible combinations)	CLO 5 participate and contribute to the business side of scientific enterprises  Pass in any level 3 BIOL or BIOC or BBMS course; NOT for students who have passed in BIOL2409.  This course is only for students admitted in 2017-2018 or before.						

Offer in 2021 - 2022	N Of	ffer in 2022 - 2023	* * * *	Examination		
Grade Descriptors (A+ to F)	Α	Students acquire exceptional skills and knowledge from the course and are capable of independently analyzing the business and technological developments of various biotechnology ventures.				
	В	Students demonstrate a broad and in-depth understanding of the current developments in biotechnology industry a capable of analyzing the business and technological developments of various biotechnology ventures under guidance.				
	С	Students demonstra	y industry.			
	D	Students demonstra				
	Fail	Students fail to dem	dustry.			
Communication- intensive Course	N					
Course Type	Lecture-based course					
Course Teaching & Learning Activities	Activities		Details	Details		
	Lectures					
	Field work				6	
	Group work		Presentation	Presentation		
	Reading / Self study					
	Assessment		Assignment	Assignment		
Assessment Methods	Methods		Details	Weighting in final	Assessment	
and Weighting				course grade (%)	Methods to CLO Mapping	
	Assignm	nents		60	CLO 1,2,3,4,5	
	Presentation			20	CLO 1,2,3,4,5	
	Test			20	CLO 1,2,3,4,5	
Required/recommended reading and	McGraw Hill					
online materials	Online m	y annual reports aterials				
Course Website	http://moodle.hku.hk/					
Additional Course Information	This course will be offered subject to a minimum enrollment number and availability of teachers.  Priority will be given to students majoring or minoring in MBB					

BIOL3419	Insect ecology: the little things that run the world (6 credits)	Academic Year	2021				
Offering Department	Biological Sciences	Quota	25				
Course Co-ordinator	Dr B Guenard, Biological Sciences (bguenard@hku.hk)						
Teachers Involved	(Dr B Guenard, School of Biological Siences)						
Course Objectives	This course introduces the students with the biology of terrestrial arthropods. With a main focus on insects an arachnids, students will be introduced to various aspects of their anatomy and physiology, systematics, and ecology to understand the fundamental roles that arthropods play in natural and human-shaped ecosystems. The course will focus particularly on the diversity and importance of insects in South East Asia.						
Course Contents & Topics	With about 1.1 million and 110,000 species described respectively, insects and arachnids represent nearly 80% of all species known on the planet. A diversity also reflected in the diversity of behaviours, evolutionary adaptations or ecological interactions played at all trophic levels within ecosystems. As herbivores, pollinators, seed-dispersal agents, predators, parasitoids, disease vectors or decomposers, arthropods are major components in the stability and functioning of most ecosystems. Yet their importance is often underestimated by many fields of biology to the profit of larger "charismatic" vertebrates. However, arthropods offer incredible opportunities for scientific discoveries, revealing sometimes attributes in morphology, reproduction or behaviour beyond the most prolific imagination, and challenging existing paradigms in ecology and evolution.  This course will propose an introduction to these extremely successful organisms and give them the value they deserve. A first step to the study of arthropods is to learn how to identify them correctly. Part of this course will present the main criteria to recognize major insects and arachnids groups. The second part will focus on their diversity, distribution and ecological functions within ecosystems. Finally the last part of the course will present the impacts of human activities on arthropods, how they have been used historically and nowadays, and what kind of problems or solution they represent for human societies?						
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 identify major groups of insects and arthropods						
	CLO 2 understand and use the main collecting methods to sample arthropod diversity						
	CLO 3 understand the ecological diversity of arthropod groups and their importance in ecosystems						
	CLO 4 understand the biotic and abiotic factors that drive terrestrial arthropod species richness and abundance						
	CLO 5 understand how human activities modify insect diversity						
	CLO 6 describe the multiple roles played by insects on human activities						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BIOL1309 and BIOL2306						
Offer in 2021 - 2022	N Offer in 2022 - 2023 : Y Examination						
Grade Descriptors (A+ to F)	A Demonstration of an excellent understanding of the biological concepts and theo identification skills and use of taxonomic keys of the different groups of arthropoc attitude in class. Curation and identification of the collection reaching internation course.	s studied. Present an ac	ctive and participative				
	B Demonstration of a good understanding of the biological concepts and theories de	Demonstration of a good understanding of the biological concepts and theories developed during the course. Master most of the identification skills and use of taxonomic keys of the different groups of arthropods. Participation in class more limited. Curation					
	Identification skills and use of taxonomic keys of the different groups of arthropod	Demonstration of a general but incomplete understanding of the biological concepts and theories developed during the course. Identification skills and use of taxonomic keys of the different groups of arthropods insufficient to provide reliable identification. Participation in class very limited or irrelevant. Curation and identification of the collection not reaching academic level.					
		Fail to provide evidence of knowledge on the biological concepts and theories developed during the course. No identification skills and lack of knowledge on how to use taxonomic keys. No participation in class or unsettling. Curation and identification highly unsatisfactory or work not delivered on time.					
Communication- intensive Course	N						

Course Type	Lecture with laboratory component course				
Course Teaching	Activities	Details		No. of Hours	
& Learning Activities	Lectures			24	
	Laboratory		This part includes 4 hours of lectures about identification and curation of arthropod collection.		
	Project work	Students will collect independently their own insect collection, curate and identify the specimen collected		48	
	Reading / Self study			50	
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignments		30	CLO 1,2,3,5,6	
	Examination		40	CLO 1,2,3,4,5,6	
	Laboratory reports		30	CLO 1,2,3	
Required/recommended reading and online materials	USA. 801 pages.	71 1	d communities. Cambridge Universioach. Elsevier, China. 633 pages.	ty Press, New York,	
Course Website	http://moodle.hku.hk	· · · · ·	· · ·		
Additional Course Information	Offer in alternate year from 2 This course will be offered s		t number and availability of teachers		

BIOL3501		on (6 credits)			Academic Yea	r  2021	
Offering Department	Biological Sciences Quo				Quota	50	
Course Co-ordinator	Dr M Sun	, Biological Scien	nces (meisun@hku.hk)				
Teachers Involved		-					
Course Objectives	contempo adaptation	Evolution is the cornerstone of modern biology. The course aims to introduce students to the major themes contemporary evolutionary biology, including the history of evolutionary biology, evolutionary processes adaptation, speciation, and evolution as an explanatory framework at all levels of biological organization.  The course emphasizes the interplay between theory and empirical tests of hypotheses, thus acquainting studentiate the process of sciences.					
Course Contents & Topics	with the process of science.  Introduction to Evolution  - The relevance of evolution to everyday life  - Cases for evolutionary thinking Evolution as Fact  - Patterns of evolutionary change  - The evidence for evolution Evolution as Theory  - Before Darwin  - Darwinism  - The Modern Synthesis & beyond The Mechanisms of Evolution  - The origin of genetic variation: mutation  - Genetic drift: evolution at random.  - Natural selection, sexual selection, and adaptation.  - Migration Evolution and Biodiversity  - Species  - Speciation  - Evolution and development  - The history of life						
Course Learning Outcomes	CLO 1 fa CLO 2 de le CLO 3 ha	amiliar with the factoribe Darwin's ead to speciation ave an advanced	understanding of the m	tion natural selection and h nodern evolutionary theo	ory		
Duo vonulait			umiking to real world p	roblems in agriculture, r	neulcine, and blodivers	ity conservation	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in B	IULZ3U0					
Offer in 2021 - 2022	N Off	fer in 2022 - 2023	3 : N		Examination		
Grade Descriptors (A+ to F)	A Exceptionally good performance demonstrating excellent understanding of the subject matter, extensive knowledge over a wide range of topics covered by the course, and skillful applications of concepts/theories in solving new or unfamiliar problems, showing strong abilities in critical thinking and logical reasoning, with evidence of significant insight and original thought in dealing with the critical issues in the field.						
	<b>B</b> Good performance demonstrating capacity to use the appropriate concepts, a good understanding of the subject matter, and an ability to handle the problems and materials encountered in the subject, showing evidence of attaining most of the course learning outcomes.						
	Adequate performance demonstrating some understanding of the subject matter, an ability to handle relatively simple problems, but showing incomplete command of knowledge required for attaining most of the expected course learning outcomes.						
	<ul> <li>but showing incomplete command of knowledge required for attaining most of the expected course learning outcomes.</li> <li>Minimally acceptable performance demonstrating at least partial familiarity with the subject matter and some capacity to deal with relatively simple problems, but also demonstrating serious deficiencies in knowledge required for attaining most of the expected course learning outcomes.</li> </ul>						
	Fail course learning outcomes.  Poor performance in all aspects of the course, showing little evidence of learning, lacking real understanding of the subject matter, demonstrating deficiencies serious enough to make it inadvisable to proceed further without additional course work.						
Communication-	N						
	Lecture-based course						
Course Type							
intensive Course Course Type Course Teaching & Learning Activities	Activities		Details			No. of Hours	

	Tutorials			12
	Project work			12
	Reading / Self study			100
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments		10	CLO 1,2,3,4
	Essay		5	CLO 1,2,3,4
	Examination		50	CLO 1,2,3,4
	Presentation		10	CLO 1,2,3,4
	Project reports	including computer lab	15	CLO 1,2,3,4
	Test		10	CLO 1,2,3,4
Required/recommended	J.C. Herron and S. Freeman: E	volutionary Analysis (5th ed. Pear	son, 2013)	
reading and online materials	Douglas J. Futuyma: Evolution, eBooks available.	(3rd Edition, Sinauer Associates,	2013)	
Course Website	http://moodle.hku.hk/			
Additional Course Information	This course will be offered subje	ect to a minimum enrollment numb	per and availability of teachers	5.

BIOL3502	Conserv	vation genetics (6 credits)	Academic Year	2021			
Offering Department	Biological	Sciences	Quota	50			
Course Co-ordinator	Dr M Sun	, Biological Sciences (meisun@hku.hk)					
Teachers Involved							
Course Objectives	The theo amphibiar	The course aims to familiarize students with fundamental principles and recent advances in conservation genetic. The theories and methods will be taught with a balanced range of examples - mammals, birds, reptiles amphibians, fish, invertebrates, as well as plants - to demonstrate how genetic data can be used to answer a range of important questions in real world conservation practice.					
Course Contents & Topics	Introduction	on to conservation genetics.					
	- genetic of character conditions of character conditions of characters	erizing genetic diversity: single loci and quantitative venary impacts of natural selection, mutation, migration consequences of small population sizes; ance of genetic diversity; on genomics.		lations;			
	Part II. Effects of Population Size Reduction: - loss of genetic diversity in small populations; - inbreeding; - inbreeding depression; - population fragmentation; - genetically viable populations.						
	Part III. From Theory to Practice: - resolving taxonomic uncertainties and defining management units; - genetic management of wild populations; - genetic issues in introduced and invasive species; - genetic management of captive populations; - genetic management for reintroduction; - use of molecular genetics in forensics and understanding species biology.						
Pauros I sarnina							
Course Learning Outcomes		ssful completion of this course, students should be a					
Jutcomes	CLO 2 ur	emonstrate an advanced understanding of the conce nderstand the criteria for determining the conservat pecies	tion status of endangered, vulnerable	le, or threatene			
	CLO 3 know the methods for characterizing genetic diversity at population and species levels  CLO 4 comprehend the relationships between genetic diversity, inbreeding, reproductive fitness, and evolutionary potential in wild populations  CLO 5 describe the effects of habitat fragmentation and population size reduction on genetic diversity and the						
	implications in managing nature reserves  CLO 6 gain ability to integrate genetic information in resolving taxonomic uncertainties, in understanding species						
	bi	ain ability to integrate genetic information in resolvin ology, in setting conservation priorities, and in devi opulations	•	• .			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in B	IOL2306 or BIOL3303 or BIOL3408					
Offer in 2021 - 2022	N Off	er in 2022 - 2023 : N	Examination				
Grade Descriptors (A+ to F)	A	Exceptionally good performance demonstrating excellent under range of topics covered by the course, and skillful applications showing strong abilities in critical thinking and logical reason dealing with the critical issues in the field.	ons of concepts/theories in solving new or	unfamiliar problems			
	В	Good performance demonstrating capacity to use the appropriability to handle the problems and materials encountered in learning outcomes.	the subject, showing evidence of attaining	most of the cours			
	С						
	D	but showing incomplete command of knowledge required for attaining most of the expected course learning outcomes.  Minimally acceptable performance demonstrating at least partial familiarity with the subject matter and some capacity to deal with relatively simple problems, but also demonstrating serious deficiencies in knowledge required for attaining most of the expected					
		course learning outcomes.	inclinices in knowledge required for attaining	most of the expecte			

Communication- intensive Course	N			
Course Type	Lecture with laboratory con	nponent course		
Course Teaching	Activities	Details		No. of Hours
& Learning Activities	Lectures			24
	Laboratory			12
	Project work			12
	Tutorials			12
	Reading / Self study			100
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments		10	CLO 1,3,4,5,6
	Essay		5	CLO 1,2,3,4,5
	Examination		50	CLO 1,4,5,6
	Laboratory reports		10	CLO 3
	Presentation		10	CLO 1,4,5,6
	Project report		5	CLO 1,4,6
	Test		10	CLO 1,4,5,6
Required/recommended reading and online materials	Frankham et al: Introductio e-book available	n to Conservation Genetics (Ca	imbridge University Press, 2009, 2nd	l ed.)
Course Website	http://moodle.hku.hk/			
Additional Course	Website - to be listed			
Information	This course will be offered	subject to a minimum enrollmen	nt number and availability of teachers	3.

BIOL3503	Endocr	inology: human physiology II (6 credits)	Academic Yea	r 2021			
Offering Department	Biologica	I Sciences	Quota	60			
Course Co-ordinator	Dr C B C	han, Biological Sciences (chanch@hku.hk)					
Teachers Involved	(Dr Y L Z	Chan,Biological Sciences) hai,Biological Sciences)  ( C Chow,Biological Sciences)					
Course Objectives		To provide an advanced course on hormones and how they regulate metabolism/growth, reproduction and water/salt homeostasis in our body.					
Course Contents & Topics	Water/salt homeostasis in our body.  History: discovery of blood borne factor or hormone. Chemical nature of hormones. Mechanisms of consignaling. Secondary messengers. Responsivity and hormonal effects.  The hypothalamic pituitary axis.  The GHRH-GH-IGF axis. The TRH-TSH-thyroid hormone axis. The CRH-ACTH-cortisol axis. Cortisol and Catecholamine effects and their pathways.  The gastrointestinal system. The cephalic phase, stomach phase and intestinal phase of food digent Regulation of acid secretion. Regulation of pancreatic exocrine and endocrine secretion. Gut hormones: gray GIP, CCK, secretin, GLP-1, GLP-2 and motilin. Regulation of feeding, energy balance and food intake. Insulin and glucagon.  Reproduction  The GnRH-gonadotropin-sex hormone axis. Regulation of LH and FSH release. Male reproductive syllnteraction of hormones produced by various cells in the testis to regulate spermatogenesis. Biological active testosterone. The erection reflex. Female reproductive system. Development of ovarian follicles. The met cycle: hormonal control: Ovulation, fertilization and implantation. The placenta as an endocrine organ. Endocrepulation of parturition. Hormonal control of milk secretion. Prolactin and broodiness.  Osmoregulation  Posterior pituitary hormone, ADH. Aldosterone and sodium balance. Angiotensin's effect on the signal secretion in the production of the placenta and sodium balance. Angiotensin's effect on the signal secretion in the placenta and sodium balance.						
Course Learning Outcomes	CLO 1 u CLO 2 e CLO 3 d CLO 4 e	essful completion of this course, students should be able to: nderstand the definition and natures of hormones xplain and describe secondary messenger pathways for hormo escribe the connection between pituitary the master gland with xplain and describe hormones involved in the regulation of ( netabolism/growth, reproduction and water/salt homeostasis	higher brain centers and				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in B	BIOL2103					
Offer in 2021 - 2022		d sem Offer in 2022 - 2023 : Y	Examination	May			
Grade Descriptors (A+ to F)	В	Demonstrate thorough mastery at an advanced level of extensive know outcomes. Show strong analytical and critical abilities and logical thinking, knowledge to a wide range of complex, familiar and unfamiliar situations. A Demonstrate substantial command of a broad range of knowledge require outcomes. Show evidence of analytical and critical abilities and logical th some unfamiliar situations. Apply effective organizational skills.	with evidence of original though pply highly effective organization red for attaining at least most	ght, and ability to apply onal skills. of the course learning			
	Demonstrate general but incomplete command of knowledge required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational skills.						
	D	Demonstrate partial but limited command of knowledge required for atta evidence of some coherent and logical thinking, but with limited analytic knowledge to solve problems. Apply limited or barely effective organizations. Demonstrate little or no evidence of command of knowledge required for the properties of the command of the properties of the prope	cal and critical abilities. Show al skills.	limited ability to apply			
Communication	Fail	perioristrate little or no evidence of command of knowledge required analytical and critical abilities, logical and coherent thinking. Show very litt Organizational skills are minimally effective or ineffective.					
Communication- intensive Course	N						

Course Type	Lecture with laboratory component course				
Course Teaching	Activities Details			No. of Hours	
& Learning Activities	Lectures			24	
	Laboratory	a 5-hour laboratory session per	week for 5 weeks	25	
	Tutorials			6	
	Reading / Self study			100	
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Examination		80	CLO 1,2,3,4	
	Laboratory reports	lab performance & report	20	CLO 1,3,4	
Required/recommended reading and online materials		ogy, (Elsevier, 11th Edition, 2009). An Integrated Approach (Pearson,			
Course Website	http://moodle.hku.hk/				
Additional Course Information	This course will be offered subjection	ect to a minimum enrollment numbe	er and availability of teachers	S.	

BIOL3505	Oyster aquaculture and restoration (6	credits)	Academic Year 2021		
Offering Department	Biological Sciences		Quota 20		
Course Co-ordinator	Dr T Vengatesen, Biological Sciences (rajan@	hku.hk)			
Teachers Involved					
Course Objectives	Introduce larval biology and hatchery technology; Provide scientific basis for coastal aquaculture through field demonstrations and laboratory exercises; Enable students to design, construct and maintain larval hatchery for production of seeds for aquaculture an restoration of wild oysters; Understand the reasons for restoration of marine, estuarine and coastal ecosystems; Facilitate transfer of academic knowledge to aquaculture for sustainable food production.				
Course Contents & Topics	This experiential learning course is to enhance students' knowledge in applied larval biology techniques and advanced coastal aquaculture production systems that will enable them to design, construct, operate and maintai oyster aquaculture facilities for food production and restoration of wild population. This is an interdisciplinary endeavor encompassing larval hatchery technology and aquaculture. After reading about basic oyster biology and coastal aquaculture, we will focus on hatchery technology and aquaculture. Environmental issues, legislation pertaining to coastal aquaculture will also be covered using oyster farming in Hong Kong as an example. Student will learn why oyster habitat is declining in HK and would also explore scientific and management ways to restor oyster habitat. Students will be exposed to few aquaculture facilities in Hong Kong & will be taken to Penang (Malaysia) to learn practical skills of oyster farming. This course is designed to meet the needs of an expandin sustainable aquaculture in Hong Kong. Students will be exposed to a unique learning environment involving no only HKU but also teachers from Universiti Sains Malaysia (USM), bringing with them diverse range of expertise culture, and learning opportunities. Career and small scale business opportunities in aquaculture industry will b discussed. Thus, students will be provided adequate knowledge & analytical capabilities for a successful career i larval biology research and aquaculture.				
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 examine the influence of environmental variables on larval development and recruitment, and consider potential effects of these variables on hatchery and farming  CLO 2 acquire skills and experiential learning opportunities (e.g. hands-on experiences at laboratories and farming opportunities (e.g. hands-on experiences)  CLO 3 explain the importance of oyster farming in coastal habitat restoration  CLO 4 plan and execute a commercially important research project in larval biology and aquaculture				
	CLO 2 acquire skills and experiential learning in oyster hatchery and farming CLO 3 explain the importance of oyster farmin	opportunities (e.g. hands-on ex g in coastal habitat restoration	'		
(and Co-requisites and Impermissible	CLO 2 acquire skills and experiential learning in oyster hatchery and farming CLO 3 explain the importance of oyster farmin	opportunities (e.g. hands-on ex g in coastal habitat restoration tant research project in larval b	'		
Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2021 - 2022	CLO 2 acquire skills and experiential learning in oyster hatchery and farming CLO 3 explain the importance of oyster farmin CLO 4 plan and execute a commercially impor	opportunities (e.g. hands-on ex g in coastal habitat restoration tant research project in larval b	'		
(and Co-requisites and Impermissible combinations)	CLO 2 acquire skills and experiential learning in oyster hatchery and farming CLO 3 explain the importance of oyster farmin CLO 4 plan and execute a commercially impor Pass in BIOL2103 or BIOL2306 or BIOL3301 or BIOL2306 or BIOL3301 or BIOL2103 or BIOL2306 or BIOL3301 or BIOL2103 or BIOL2306 or BIOL3301 o	opportunities (e.g. hands-on ex g in coastal habitat restoration tant research project in larval b r BIOL3303  analysis of larval biology issues. Ubject. Extensive knowledge and skills apply what you have learned in the claional, presentational and field trip skills during the analysis of marine life scie king about the study subject. Good knowled ability to apply what you have learner organizational, presentational and field driginal thought during the analysis be learning outcomes. Demonstrate fair ne life science issues. Show consideral file. It knowledge is very incomplete) are and skills required for attaining all the class room to critically analyze the re kills.  ge and understanding of marine life scie learning outcomes. Demonstrate no ne life science issues. Show no eviden	Examination  Show evidence of analytical, critical and required for attaining all the course learning as room to critically analyze the larval biology.  Ence issues. Show some evidence of some evidedge and skills required for attaining all the red in the class room to critically analyze the ledt trip skills.  In the class room to critically analyze the ledt trip skills.  In the class room to critically analyze the ledt trip skills.  In the class room to critically analyze the ledt trip skills.  In the class room to critically analyze the ledt trip skills.  In the class room to critically analyze the led trip skills.  In the class room to critically analyze the learned in the course learning outcomes. Demonstrate pool and marine life science issues. Show very little ence issues. Show no evidence of knowledge ability to apply what you have learned in the loce of familiarity with relevant reading materia.		
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)	CLO 2 acquire skills and experiential learning in oyster hatchery and farming CLO 3 explain the importance of oyster farmin CLO 4 plan and execute a commercially impor Pass in BIOL2103 or BIOL2306 or BIOL3301 or o	opportunities (e.g. hands-on ex g in coastal habitat restoration tant research project in larval b r BIOL3303  analysis of larval biology issues. Ubject. Extensive knowledge and skills apply what you have learned in the claional, presentational and field trip skills during the analysis of marine life scie king about the study subject. Good knowled ability to apply what you have learner organizational, presentational and field driginal thought during the analysis be learning outcomes. Demonstrate fair ne life science issues. Show consideral file. It knowledge is very incomplete) are and skills required for attaining all the class room to critically analyze the re kills.  ge and understanding of marine life scie learning outcomes. Demonstrate no ne life science issues. Show no eviden	Examination  Show evidence of analytical, critical and required for attaining all the course learning as room to critically analyze the larval biology.  Ence issues. Show some evidence of some evidedge and skills required for attaining all the red in the class room to critically analyze the ledt trip skills.  In the class room to critically analyze the ledt trip skills.  In the class room to critically analyze the ledt trip skills.  In the class room to critically analyze the ledt trip skills.  In the class room to critically analyze the ledt trip skills.  In the class room to critically analyze the led trip skills.  In the class room to critically analyze the learned in the course learning outcomes. Demonstrate pool and marine life science issues. Show very little ence issues. Show no evidence of knowledge ability to apply what you have learned in the loce of familiarity with relevant reading materia.		
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)  Communication-intensive Course Course Type	CLO 2 acquire skills and experiential learning in oyster hatchery and farming CLO 3 explain the importance of oyster farmin CLO 4 plan and execute a commercially impor Pass in BIOL2103 or BIOL2306 or BIOL3301 o  N Offer in 2022 - 2023 : N  A Evidence of original thought during the multidimensional thinking about the study s outcomes. Demonstrate excellent ability to a project data. Show highly effective organizat B Show substantial knowledge and thought analytical, critical and multidimensional think course learning outcomes. Demonstrate go real marine life science issues. Show effectives and skills required for attaining all the course class room to critically analyze the real marins skills.  D Evidence to show a minimum knowledge ability to apply what you have learned in the organizational, presentational and field trip sevidence of meager or inadequate knowledge and skills required for attaining all the course class room to critically analyze the real maring all the course class room to critically analyze the real maring the course class room to critically analyze the real maring and field trip demonstrations, or any knowledgent and field trip demonstrations, or any knowledg	opportunities (e.g. hands-on ex g in coastal habitat restoration tant research project in larval b r BIOL3303  analysis of larval biology issues. Ubject. Extensive knowledge and skills apply what you have learned in the claional, presentational and field trip skills during the analysis of marine life scie king about the study subject. Good knowled ability to apply what you have learner organizational, presentational and field driginal thought during the analysis be learning outcomes. Demonstrate fair ne life science issues. Show consideral file. It knowledge is very incomplete) are and skills required for attaining all the class room to critically analyze the re kills.  ge and understanding of marine life scie learning outcomes. Demonstrate no ne life science issues. Show no eviden	Examination  Show evidence of analytical, critical and required for attaining all the course learning as room to critically analyze the larval biology.  Ence issues. Show some evidence of some evidedge and skills required for attaining all the red in the class room to critically analyze the ledt trip skills.  In the class room to critically analyze the ledt trip skills.  In the class room to critically analyze the ledt trip skills.  In the class room to critically analyze the ledt trip skills.  In the class room to critically analyze the ledt trip skills.  In the class room to critically analyze the led trip skills.  In the class room to critically analyze the learned in the course learning outcomes. Demonstrate pool and marine life science issues. Show very little ence issues. Show no evidence of knowledge ability to apply what you have learned in the loce of familiarity with relevant reading materia.		
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)  Communication-intensive Course Course Type	CLO 2 acquire skills and experiential learning in oyster hatchery and farming CLO 3 explain the importance of oyster farmin CLO 4 plan and execute a commercially impor Pass in BIOL2103 or BIOL2306 or BIOL3301 or BIOL2306 or BIOL3301 or BIOL2103 or BIOL2306 or BIOL3301 o	opportunities (e.g. hands-on ex g in coastal habitat restoration tant research project in larval b r BIOL3303  analysis of larval biology issues. Ubject. Extensive knowledge and skills apply what you have learned in the claional, presentational and field trip skills during the analysis of marine life scie king about the study subject. Good knowled ability to apply what you have learner organizational, presentational and field driginal thought during the analysis be learning outcomes. Demonstrate fair ne life science issues. Show consideral file. It knowledge is very incomplete) are and skills required for attaining all the class room to critically analyze the re kills.  ge and understanding of marine life scie learning outcomes. Demonstrate no ne life science issues. Show no eviden	Examination  Show evidence of analytical, critical and required for attaining all the course learning as room to critically analyze the larval biology.  Ence issues. Show some evidence of some evidedge and skills required for attaining all the red in the class room to critically analyze the ledt trip skills.  In the class room to critically analyze the ledt trip skills.  In the class room to critically analyze the ledt trip skills.  In the class room to critically analyze the ledt trip skills.  In the class room to critically analyze the ledt trip skills.  In the class room to critically analyze the led trip skills.  In the class room to critically analyze the learned in the course learning outcomes. Demonstrate pool and marine life science issues. Show very little ence issues. Show no evidence of knowledge ability to apply what you have learned in the loce of familiarity with relevant reading materia.		
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(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)  Communication-intensive Course Course Type Course Teaching	CLO 2 acquire skills and experiential learning in oyster hatchery and farming CLO 3 explain the importance of oyster farmin CLO 4 plan and execute a commercially impor Pass in BIOL2103 or BIOL2306 or BIOL3301 or o	opportunities (e.g. hands-on ex g in coastal habitat restoration tant research project in larval b r BIOL3303  analysis of larval biology issues. Ubject. Extensive knowledge and skills apply what you have learned in the claional, presentational and field trip skills during the analysis of marine life scie king about the study subject. Good knowled ability to apply what you have learner organizational, presentational and field driginal thought during the analysis be learning outcomes. Demonstrate fair ne life science issues. Show consideral file. It knowledge is very incomplete) are and skills required for attaining all the class room to critically analyze the re kills.  ge and understanding of marine life scie learning outcomes. Demonstrate no ne life science issues. Show no eviden	Examination Show evidence of analytical, critical and required for attaining all the course learning serious of a required for attaining all the course learning serious of serious serious of the course learning as room to critically analyze the larval biology.  The course issues. Show some evidence of some wiledge and skills required for attaining all the red in the class room to critically analyze the led trip skills.  The course learning is serious issues. Fair knowledge a billity to apply what you have learned in the course learning outcomes. Demonstrate pool and marine life science issues. Show very little ence issues. Show no evidence of knowledge ability to apply what you have learned in the course learning outcomes. The course learning outcomes are successed in the course learning outcomes. Show very little ence issues. Show no evidence of knowledge ability to apply what you have learned in the course learning with relevant reading material is skills.  No. of Hours		
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)  Communication-intensive Course Course Type Course Teaching	CLO 2 acquire skills and experiential learning in oyster hatchery and farming CLO 3 explain the importance of oyster farmin CLO 4 plan and execute a commercially impor Pass in BIOL2103 or BIOL2306 or BIOL3301 o	opportunities (e.g. hands-on ex g in coastal habitat restoration tant research project in larval b r BIOL3303  analysis of larval biology issues. Ubject. Extensive knowledge and skills apply what you have learned in the claional, presentational and field trip skills during the analysis of marine life scie king about the study subject. Good knowled ability to apply what you have learner organizational, presentational and field driginal thought during the analysis be learning outcomes. Demonstrate fair ne life science issues. Show consideral file. It knowledge is very incomplete) are and skills required for attaining all the class room to critically analyze the re kills.  ge and understanding of marine life scie learning outcomes. Demonstrate no ne life science issues. Show no eviden	Examination Show evidence of analytical, critical and required for attaining all the course learning serious to critically analyze the larval biology.  In the class room to critically analyze the larval biology and skills required for attaining all the need in the class room to critically analyze the led trip skills.  In the class room to critically analyze the led trip skills.  In the class room to critically analyze the led trip skills.  In the class room to critically analyze the led trip skills.  In the class room to critically analyze the led trip skills.  In the class room to critically analyze the led trip skills.  In the class room to critically analyze the led trip skills.  In the class room to critically analyze the led trip skills.  In the class room to critically analyze the led trip skills.		
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)  Communication-intensive Course Course Type Course Teaching	CLO 2 acquire skills and experiential learning in oyster hatchery and farming CLO 3 explain the importance of oyster farmin CLO 4 plan and execute a commercially impor Pass in BIOL2103 or BIOL2306 or BIOL3301 or BIOL2306 or BIOL3301 or BIOL2103 or BIOL2306 or BIOL3301 o	opportunities (e.g. hands-on ex g in coastal habitat restoration tant research project in larval b r BIOL3303  analysis of larval biology issues. Ubject. Extensive knowledge and skills apply what you have learned in the claional, presentational and field trip skills during the analysis of marine life scie king about the study subject. Good knowled ability to apply what you have learner organizational, presentational and field driginal thought during the analysis be learning outcomes. Demonstrate fair ne life science issues. Show consideral file. It knowledge is very incomplete) are and skills required for attaining all the class room to critically analyze the re kills.  ge and understanding of marine life scie learning outcomes. Demonstrate no ne life science issues. Show no eviden	Examination Show evidence of analytical, critical and required for attaining all the course learning as room to critically analyze the larval biology.  Ence issues. Show some evidence of some wiedge and skills required for attaining all the need in the class room to critically analyze the led trip skills.  If marine life science issues. Fair knowledge rability to apply what you have learned in the ble organizational, presentational and field trip and thought during the analysis of marine life course learning outcomes. Demonstrate pool and marine life science issues. Show very little ence issues. Show no evidence of knowledge ability to apply what you have learned in the coor of familiarity with relevant reading material skills.  No. of Hours  25 25 25		
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	CLO 2 acquire skills and experiential learning in oyster hatchery and farming CLO 3 explain the importance of oyster farmin CLO 4 plan and execute a commercially impor Pass in BIOL2103 or BIOL2306 or BIOL3301 o	opportunities (e.g. hands-on ex g in coastal habitat restoration tant research project in larval b r BIOL3303  analysis of larval biology issues. Ubject. Extensive knowledge and skills apply what you have learned in the claional, presentational and field trip skills during the analysis of marine life scie king about the study subject. Good knowled ability to apply what you have learner organizational, presentational and field driginal thought during the analysis be learning outcomes. Demonstrate fair ne life science issues. Show consideral file. It knowledge is very incomplete) are and skills required for attaining all the class room to critically analyze the re kills.  ge and understanding of marine life scie learning outcomes. Demonstrate no ne life science issues. Show no eviden	Examination Show evidence of analytical, critical and required for attaining all the course learning serious to critically analyze the larval biology.  In the class room to critically analyze the larval biology and skills required for attaining all the need in the class room to critically analyze the led trip skills.  In the class room to critically analyze the led trip skills.  In the class room to critically analyze the led trip skills.  In the class room to critically analyze the led trip skills.  In the class room to critically analyze the led trip skills.  In the class room to critically analyze the led trip skills.  In the class room to critically analyze the led trip skills.  In the class room to critically analyze the led trip skills.  In the class room to critically analyze the led trip skills.		

	Reading / Self study			20
	Assessment			10
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments		25	CLO 3,4
	Report	Presentation: developing innovative ideas for sustainable and economically viable aquacultre in Hong Kong	50	CLO 4
	Test		25	CLO 1,2
Required/recommended reading and online materials	Shellfish Aquaculture and the	e Larvae (Larry McEdward, CRC Press) Environment (S.E. Shumway, John Wiley & Brian Spencer, John Wiley & Sons)	k Sons)	
Course Website	http://www.biosch.hku.hk/ecol-	ogy/lsc/		
Additional Course Information	This course is offered in close Tentative duration: 1-15 June, In Part 1 - First 5 days at HKI aquaculture facilities; Few USM (Malaysia) students Fund for the Penang visit will selective meals for 7 days).	J for lectures, practicals and field visits - the may join the course; be collected from students (about 6000 H spect to a minimum enrollment number and	o); nen flight to Penang to v	isit various oyster

BIOL3506	Evolution	nary biology (	(6 credits)			Academic Year	2021
Offering Department	Biological	Biological Sciences Quota				50	
Course Co-ordinator	C Schunte	C Schunter, Biological Sciences (Schunter @hku.hk)					
Teachers Involved	(Dr C Schunter, School of Biological Sciences) (Dr J D Gaitan-Espitia, School of Biological Sciences)						
Course Objectives	1. The course aims to introduce students to the major themes of contemporary evolutionary biology, including the history of evolutionary biology, evolutionary processes, adaptation, speciation, and evolution as an explanator framework at all levels of biological organization.  2. The course emphasizes the interplay between theory and empirical tests of hypotheses, thus acquaintin students with the process of science.						
Course Contents	- Introduc	tion to Evolutiona	ary Biology Theo	ry			
& Topics	- Genetic - Gene FI - Natural - Sexual - Speciati - Species - Phenoty - Evolutio	- Mechanisms of evolution - Genetics Drift - Gene Flow - Natural Selection - Sexual Selection - Speciation - Speciation - Species concept - Phenotypic evolution - Evolution of genes and genomes - Evolutionary Development (Evo-Devo)					
Course Learning			of this course st	udents should be ab	le to:		
Outcomes	CLO 1 ide CLO 2 de lea CLO 3 ur CLO 4 ap	entify the facts or escribe Darwin's ad to speciation derstand mechal	n theory of evolutheory of evolutinisms involved in thinking to real was	tion ion by natural select in the modern evolution world problems in agr	tion and how the		
D			about evolution	ary processes			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Bl Not for stu	idents who have	passed in BIOL	3501			
Offer in 2021 - 2022	Y 1st	sem Offer in 20	022 - 2023 : Y			Examination	Dec
Grade Descriptors (A+ to F)	A Exceptionally good performance demonstrating excellent understanding of the subject matter, extensive knowledge over a wide range of topics covered by the course, and skillful applications of concepts/theories in solving new or unfamiliar problems, showing strong abilities in critical thinking and logical reasoning, with evidence of significant insight and original thought in dealing with the critical issues in the field.  B Good performance demonstrating capacity to use the appropriate concepts, a good understanding of the subject matter, and are						
	ability to handle the problems and materials encountered in the subject, showing evidence of attaining most of the course learning outcomes.  C Adequate performance demonstrating some understanding of the subject matter, an ability to handle relatively simple problems,						
	but showing incomplete command of knowledge required for attaining most of the expected course learning outcomes.  Minimally acceptable performance demonstrating at least partial familiarity with the subject matter and some capacity to deal with relatively simple problems, but also demonstrating serious deficiencies in knowledge required for attaining most of the expected						
	Fail Poor performance in all aspects of the course, showing little evidence of learning, lacking real understanding of the subject matter, demonstrating deficiencies serious enough to make it inadvisable to proceed further without additional course work.						
Communication- intensive Course	N	,, Jonistian	J				
Course Type	Lecture w	ith laboratory con	nponent course				
Course Teaching	Activities		Details				No. of Hours
& Learning Activities	Lectures						24
<del>-</del>	Laborator	<b>y</b>					24

	Tutorials			6
	Reading / Self study			100
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments		60	CLO 1,2,3,4,5
	Examination		40	CLO 1,2,3,4
Required/recommended reading and online materials	J.C. Herron and S. Freeman: Evo Douglas J. Futuyma: Evolution, (3 eBooks available			
Course Website	http://moodle.hku/hk			
Additional Course Information	This course will be offered subject	t to a minimum enrollm	ent number and availability of teachers	<b>5.</b>

BIOL3508	Microbia	al physiology and b	oiotechnology (6 credits)	Academic Yea	ar 2021		
Offering Department	Biological	Sciences		Quota	60		
Course Co-ordinator	Dr A Yan,	Or A Yan, Biological Sciences <i>(ayan8</i> @hku.hk)					
Teachers Involved		(Dr A Yan,Biological Sciences)					
Course Objectives	pharmace Biotechno application such as e knowledge	Microbes are amazing and important entities on earth. Knowledge of microbes is widely applied in food, pharmaceutics, biotechnologies, diseases control, and biogeochemical processes. Microbial Physiology and Biotechnology provides both molecular basis for understanding of these important processes and up-to-date applications in modern Biotechnology, and to serve as essential foundations for sub-disciplines of Microbiology, such as environmental, food, and medicinal Microbiology. Upon completion, students will acquire fundamental knowledge about microorganisms, gain laboratory skills on methodologies for microbial studies, and be able to apply the knowledge in Microbial Biotechnologies.					
Course Contents	Serving a	erving as a course which blends fundamental knowledge about the world of microorganisms with app					
& Topics	Breath', a interesting methodolo control', 'E biofuels a	Microbial Biotechnology, This course is organized and presented in three themes: 'Microbial Rules', 'Microbial Breath', and 'Microbial Biotechnology'. Under these three themes, a broad range of highly educational and interesting topics are presented including: 'Microorganisms and their position in the living world', 'Fundamental methodologies for the study of microbes', 'Microbial structures and functions', 'Microbial growth and control', 'Energy Generation', 'Central metabolism', and 'Microbial biotechnological applications in biodegradation, biofuels and synthetic biology '. Topics are taught in a coherent manner with a highly interactive tutorial session ollowing each of the topics such that students will achieve a high quality, stimulating, and problem-based learning					
Course Learning	On succes	ssful completion of this	course, students should be able to	:			
Outcomes	CLO 1 CLO 2 CLO 3	appreciate the diversity comprehend the principgain laboratory skills or	of microbial metabolisms and app ples underlying the dynamic nature n methodologies for microbial studi actical application of microbes in in-	lications in biotechnology of microbial physiology es			
Pre-requisites	Pass in BI	OL2103 or BIOL2220 o	or BIOC2600 or BIOC3604;				
(and Co-requisites and Impermissible combinations)		idents who have passe idents who have passe					
Offer in 2021 - 2022	Y 2nd	sem Offer in 2022 - 2	2023 : Y	Examination	May		
Grade Descriptors (A+ to F)	B C D	Demonstrate thorough mastery at an advanced level of extensive knowledge required for attaining all the course learn outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apk knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational skills.  Demonstrate substantial command of a broad range of knowledge required for attaining at least most of the course learn outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar assome unfamiliar situations. Apply effective organizational skills.  Demonstrate general but incomplete command of knowledge required for attaining most of the course learning outcomes. Stevidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situation Apply moderately effective organizational skills.  Demonstrate partial but limited command of knowledge required for attaining some of the course learning outcomes. She evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apkly knowledge to solve problems. Apply limited or barely effective organizational skills.  Demonstrate little or no evidence of command of knowledge required for attaining the course learning outcomes. Lack analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems.					
Communication-	N						
ntensive Course							
Course Type		th laboratory componer			N511		
Course Teaching & Learning Activities	Activities Lectures	5	Details		No. of Hours		
. Loaining Activities		V			24 24		
	Laborator Project w	•			12		
		Self study			100		
Assessment Methods and Weighting	Methods	,	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Examinat	ion		50	CLO 1,2,4		
	Laboratory reports		30	CLO 1,3,4			
	Test			20	CLO 1,2		
Required/recommended reading and online materials	Prescott, Woolverto Suppleme Brock Biol Pearson F	Test 20 CLO 1, Primary Text Book: Prescott, Harley, and Klein's Microbiology, by Joanne M. Willey, Linda M. Sherwood, and Christoph Moolverton, published by McGraw-Hill Supplementary Reading: Brock Biology of Microorganisms, by Michael Madigan, John Martinko, Kelly Bender, Daniel Buckley, David Pearson Publisher On-line textbook of Bacteriology: Kenneth Tobar, U. of Wisconsin-Madison, Department of Bacteriology					

Course Website	http://moodle.hku.hk/
Additional Course Information	This course will be offered subject to a minimum enrollment number and availability of teachers.

	Diet and	l disease (6 credits	)	Academic Y	ear 2021		
Offering Department	Biological		-	Quota	70		
Course Co-ordinator		Dr J C Y Lee, Biological Sciences (jettylee@hku.hk)					
Teachers Involved		(Dr J C Y Lee,School of Biological Sciences)					
Course Objectives	This course aims to provide understanding and insight into diseases associated with diet and basic dietetics, specifically to:  1. Explain the relationships between diet and disease.  2. Describe the role of diet in the development and prevention of common chronic diseases such as diabetes, obesity and anorexia, cardiovascular disease, cancer, immune deficiency and renal failure.  3. Differentiate risk factors that influence dietary choice.						
		4. Describe the rationales for postoperative nutritional support for hospitalized patients.					
Course Contents & Topics	The basic prevention cardiovas	4. Describe the rationales for postoperative nutritional support for nospitalized patients. The basics of nutrition for health and fitness and medical nutrition therapy. The role of diet in the development and prevention of chronic diseases such as cancer, diabetes, obesity and anorexia as well as bulimia nervosa, cardiovascular diseases, renal failure, etc. Malnutrition. Nutrition and immune function. Medical nutrition therapy for ideal provided intolerance. Nutrition in pregnancy and lactation.					
Course Learning	On succe	ssful completion of this	course, students should be able to:				
Outcomes	CLO 2 de ca CLO 3 cle	escribe the role of d ardiovascular disease, o early differentiate and i	tionships between diet and disease iet in the development and prev cancer, immune deficiency, and rena nterpret risk factors that influence di	al failure etary choice	esity and anorexia		
	CLO 4 de	escribe the rationales for	or postoperative nutritional support f	or hospitalized patients			
Pre-requisites (and Co-requisites and Impermissible combinations)		IOL2220 or BIOC2600 udents who have passe	or BIOL3202 or BIOL3203 or BIOL3 d in BIOL3206	204 or BIOL3205			
Offer in 2021 - 2022	Y 2nd	d sem Offer in 2022 -	2023 : Y	Examination	n No Exam		
(A+ to F)	B C D Fail	of original thought, and al effective organizational an data and results to draw al Demonstrate substantial clearning outcomes. Substability to apply knowledge Apply effective laboratory effective organizational an Demonstrate general but outcomes. General but in thinking, and ability to app skills. Apply moderately effective to draw appropriate Demonstrate partial but limited graspo and logical thinking, but w Apply limited or barely e techniques. Limited abilit organizational and present Demonstrate little or no evor no grasp of the knowle thinking. Show very little offective or ineffective. Ap	incomplete command of knowledge and s complete grasp of the subject. Show evide ly knowledge to most familiar situations. App fective laboratory / fieldwork skills and techn conclusions. Apply moderately effective org nited command of knowledge and skills required the subject, retention of some relevant inforth limited analytical and critical abilities. Strective organizational and presentational sy to use data and results to draw appr	complex, familiar and unfamili laboratory/fieldwork skills and ighly effective organizational ard skills required for attaining a of analytical and critical abilities. Apply effective organizational of data of results to draw appr skills required for attaining monence of some analytical and coly moderately effective organizational and presentational suired for attaining some of the formation of the subject. Show e tow limited ability to apply know kitlls. Apply partially effective opriate conclusions. Apply lir required for attaining the cours k of analytical and critical ability companies. Organization and present ory / fieldwork skills and technical or field work skills and tech	ar situations. Apply high techniques. Critical use do presentational skills. It least most of the cours and logical thinking, ar and presentational skill opriate conclusions. Appest of the course learnin ritical abilities and logicational and presentation erroneous use of data ariskills. Course learning outcome vidence of some cohere widedge to solve problem lab / fieldwork skills an ited or barely effective learning outcomes. Litt ittes, logical and cohere		
Communication	IN				iques. Misuse of data ar		
	1 - 4				iques. Misuse of data ar		
ntensive Course	Lecture w	ith laboratory compone	nt course		iques. Misuse of data ar		
ntensive Course Course Type	Lecture w	ith laboratory compone s	nt course  Details		iques. Misuse of data ar nally effective or ineffectiv		
ntensive Course Course Type Course Teaching					iques. Misuse of data ar		
ntensive Course Course Type Course Teaching	Activities Lectures	S			No. of Hours		
ntensive Course Course Type Course Teaching	Activities Lectures Laborator	s ry			No. of Hours 24 36		
ntensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Activities Lectures Laborator	ry / Self study		Weighting in final course grade (%)	No. of Hours 24 36 50 Assessment Methods		
Communication- intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting	Activities Lectures Laborator Reading	s ry / Self study	Details		No. of Hours 24 36 50 Assessment		
Intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Activities Lectures Laborator Reading Methods  Assignme Laborator	ry / Self study ents ry reports	Details  Details  Assignment & Presentation (Individual)	50 30	No. of Hours 24 36 50 Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,3		
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Activities Lectures Laborator Reading Methods  Assignme Laborator Presental Selected is Rodwe	s ry / Self study ents ry reports tion readings will also be av	Details  Details  Assignment & Presentation (Individual)  Group work ailable on the class website. and Diet Therapy (7th ed.) Suitor &	course grade (%)  50  30  20  Hunter: Nutrition: Principle	No. of Hours 24 36 50 Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,3 CLO 1,2,3,4		
ntensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	Activities Lectures Laborator Reading Methods  Assignme Laborator Presental Selected is Rodwe Health Pro	ry / Self study ents ry reports tion readings will also be avell Williams: Nutrition aromotion Wardlaw Gord	Details  Details  Assignment & Presentation (Individual)  Group work ailable on the class website.	course grade (%)  50  30  20  Hunter: Nutrition: Principle	No. of Hours 24 36 50 Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,3 CLO 1,2,3,4		
ntensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting	Activities Lectures Laborator Reading Methods  Assignme Laborator Presentat Selected I S. Rodwe Health Pro	ry / Self study ents ry reports tion readings will also be av ell Williams: Nutrition ar comotion Wardlaw Gord	Details  Details  Assignment & Presentation (Individual)  Group work ailable on the class website. and Diet Therapy (7th ed.) Suitor &	course grade (%)  50  30  20  Hunter: Nutrition: Principl	No. of Hours 24 36 50 Assessment Methods to CLO Mappin; CLO 1,2,3 CLO 1,2,3,4 des and Application		

BIOL3608	Food commodities (6 credits)	Academic Year	2021
Offering Department	Biological Sciences	Quota	30
Course Co-ordinator	Dr L Zhang, Biological Sciences (Izhang@hku.hk)		
Teachers Involved	(Dr J C Y Lee,School of Biological Sciences) (Dr L Zhang,School of Biological Sciences)		
Course Objectives	To give students a broad understanding of modern practice and technologies us	ed in agriculture p	roducts including

		iry and grain production				
Course Contents				selection and breeding of farm an		
& Topics		carcass inspection; meat preservation and safety; sensory quality of meat. Dairy processing emphasizing fermented products such as cheese and yogurt; probiotics and health effects. Grain production related to milling				
	dough rhe	eology; the baking proc	ess and quality. Meat, dairy a	and grain product marketing.		
Course Learning	On succe	essful completion of this	course, students should be	able to:		
Outcomes	CLO 1 u	inderstand modern prac	tices in meat, dairy and grair	n production		
			e and understanding of meat on or improvement of meat a	t and dairy sensory quality, and th	e technologies used	
		J 7 1	of selected issues related to	, · · · · · · · · · · · · · · · · · · ·		
				, ,		
Pre-requisites		LO 4 understand the technology behind the production of grain-based foods				
and Co-requisites		ot for students who have passed in BIOL3210;				
and Impermissible		tudents who have passe				
combinations)		tudents who have passe				
Offer in 2021 - 2022		d sem Offer in 2022 -		Examination	May	
Grade Descriptors	Α 211			Show strong analytical and critical abilities	,	
(A+ to F)		evidence of creative abilit	y and competence in professional- ts to draw appropriate and insightfu	level problem solving. Critically use lab s al conclusions to real-world problems. Der	kills and techniques and	
	В	Demonstrate substantial	grasp of the subject matter covere	ed. Show evidence of analytical and crit		
		thinking with some evidence of competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw generally appropriate conclusions to real-world problems. Demonstrate effective team-based				
	organizational and presentational skills.  C Demonstrate general but incomplete grasp of the subject matter covered. Show some evidence of analytical and critical abilities					
	and logical thinking with limited competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw moderately appropriate but sometimes erroneous conclusions to real-world problems. Demonstrate					
		uada anu testuiis to travi inoderately appropriate out sometimes enometous condusions to real-world problems. Demonstrate moderately effective team-based organizational and presentational skills.				
	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Show some					
		evidence of coherent and logical thinking, but lacking competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw sometimes appropriate but often erroneous conclusions to real-world				
		econiques and analysis of data and results to that sometimes appropriate but often enforced condustrions to rear-world problems. Demonstrate team-based organizational and presentational skills of limited effectiveness.				
	Fail	Fail Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of coherent				
		and logical thinking, and minimal competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results ineffectively, leading generally to inappropriate and usually erroneous conclusions to real-world problems.				
Communication- ntensive Course	N	<u>'</u>	Demonstrate ineffectiveness team-based organizational and presentational skills.			
Course Type					to real world problems.	
JUNIOR I VUR	Lecture w	vith laboratory compone	ent course		to real world problems.	
		vith laboratory compone			· · · · · · · · · · · · · · · · · · ·	
Course Teaching	Activitie	es	ent course  Details		No. of Hours	
Course Teaching	Activitie Lectures	es			No. of Hours	
Course Teaching	Activitie Lectures Laborato	es s pry			No. of Hours 24 24	
Course Teaching & Learning Activities	Activitie Lectures Laborato Reading	es s ory / Self study	Details	Weighting in final	No. of Hours 24 24 100	
Course Teaching & Learning Activities Assessment Methods	Activitie Lectures Laborato	es s ory / Self study		Weighting in final course grade (%)	No. of Hours 24 24 100 Assessment Methods	
Course Teaching & Learning Activities Assessment Methods	Activitie Lectures Laborato Reading Methods	es ory / Self study s	Details		No. of Hours  24  24  100  Assessment  Methods to CLO Mapping	
Course Teaching Learning Activities Assessment Methods	Activitie Lectures Laborato Reading	es s ory / Self study s	Details	course grade (%)	No. of Hours  24  24  100  Assessment Methods to CLO Mapping CLO 1,2,3	
Course Teaching Learning Activities Assessment Methods	Activitie Lectures Laborato Reading Methods  Assignm Examina	es ory / Self study s eents	Details	course grade (%)	No. of Hours 24 24 100 Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2,3,4	
Course Teaching & Learning Activities  Assessment Methods and Weighting	Activitie Lectures Laborato Reading Methods  Assignm Examina Laborato	es ory / Self study s eents stion ory reports	Details  Details	course grade (%) 30 40	No. of Hours  24  24  100  Assessment Methods to CLO Mapping CLO 1,2,3	
Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended	Activitie Lectures Laborato Reading Methods  Assignm Examina Laborato Lawrie's I	es sory / Self study s ments dition ory reports Meat Science. RA Lawr	Details  Details  ie (CRC Press, 2006)	course grade (%) 30 40	No. of Hours  24  24  100  Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2,3,4 CLO 1,2,3,4	
Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Activitie Lectures Laborato Reading Methods  Assignm Examina Laborato Lawrie's I Dairy Pro	es bory / Self study s ments stition bory reports Meat Science. RA Lawr bocessing and Quality As	Details  Details  ie (CRC Press, 2006)	course grade (%)  30 40 30 ara, N Shah (Eds) (Blackwell, 200	No. of Hours  24  24  100  Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2,3,4 CLO 1,2,3,4	
Course Type Course Teaching Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials Course Website	Activitie Lectures Laborato Reading Methods  Assignm Examina Laborato Lawrie's I Dairy Pro Encyclop	es bory / Self study s ments stition bory reports Meat Science. RA Lawr bocessing and Quality As	Details  Details  ie (CRC Press, 2006) surance. RC Chandan, A Kil	course grade (%)  30 40 30 ara, N Shah (Eds) (Blackwell, 200	No. of Hours  24  24  100  Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2,3,4 CLO 1,2,3,4	
Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	Activitie Lectures Laborato Reading Methods  Assignm Examina Laborato Lawrie's I Dairy Pro Encyclop http://moo	es bory / Self study s ments ments mory reports Meat Science. RA Lawr poessing and Quality As media of Grain Science, and	Details  Details  ie (CRC Press, 2006) surance. RC Chandan, A Kiledited by Wrigley CW, Corke	course grade (%)  30 40 30 ara, N Shah (Eds) (Blackwell, 200	No. of Hours  24  24  100  Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2,3,4 CLO 1,2,3,4 8)	

BIOL3951	Ecology	& biodiversity field course (6 credits)	Academic Year	2021		
Offering Department	Biological	Sciences	Quota	20		
Course Co-ordinator	Dr L Karcz	marski, Biological Sciences (leszek@hku.hk)				
Teachers Involved	(Dr L Karcz	zmarski,Biological Sciences)				
Course Objectives		This course is offered as a capstone experience and will require intense study of a topic relevant to the Ecology & Biodiversity Major during a field course, inside or outside Hong Kong.				
Course Contents & Topics	the topic a	Every year a number of different potential courses may be offered. The precise contents will be tailored to best suit the topic and locality involved and will therefore vary according to the specific course being held. The basic contents will involve lectures, seminars and extensive field and follow-up laboratory work. It is essential that students contact the course coordinator for further information on the courses available.				
Course Learning	On succes	sful completion of this course, students should be able to:				
Outcomes	CLO 1 und	derstand of the biodiversity and primary habitats in the ecosystem s	studied			
	CLO 2 establish the basic skills needed to identify target species associated with the field course					
	CLO 3 be knowledgeable about and able to implement sampling techniques for organisms in the particular ecosystems studied					
	CLO 4 understand the basic ecology of target species and how biotic and abiotic factors shape focal communities					
Pre-requisites (and Co-requisites and Impermissible	BIOL4XXX	least 24 credits of advanced level disciplinary core/elective biolog ) in the Ecology & Biodiversity Major. one course is for Ecology & Biodiversity Major students only.	gical sciences course	es (BIOL3XXX o		
combinations)		st that a student is allowed to take this capstone course is their year	r 3 study			
Offer in 2021 - 2022		r in 2022 - 2023 : N	Examination			
Grade Descriptors (A+ to F)	A	Evidence of a thorough grasp of the subject and relevant research techniques. Ea familiarity with relevant background reading and case studies. Exemplary handling skills. Ample evidence of independent critical thought with excellent use of a broa comparative perspective to draw insightful and logical conclusions. Show outstapresentation skills with excellent analytical argumentation. Excellent or outstandilevel.	of field data collection ar and range of fundamental c anding abilities of indepe	nd excellent analytica concepts and broader ndent work, effective		
	В	Evidence of a good grasp of the subject and relevant research techniques. Intere	est in learning and good-to	o-moderate familiarity		

	C D Fail	Good evidence of critical the consideration of broader copresentation skills with logic. Demonstrate an adequate, relevant background reading critical thinking (although no Fair presentation skills, with sufficient for what is required. Demonstrate some grasp or research techniques. Some abilities of critical independability of drawing appropriate. No evidence of basic ambackground reading and no	pading and case studies. Good handling of finought (although not always independent), we may arative perspective in drawing logical con all and analytical argumentation. Work more the but incomplete grasp of the subject and rego and case studies, but no interest in learning of always independent), with mostly good use in mostly correct argumentation, but limited of for degree level.  If the subject, but only partial and with limit familiarity with relevant case studies, but in ent thinking. Ineffective presentation skills with e conclusions. Work barely meets what is requisinimum grasp of the subject and the mini familiarity with any relevant examples and cation skills with poor argumentation and no action skills with poor argumentation and no action.	rith an appreciable use of fun clusions. Good abilities of inde an sufficient for what is require levant research techniques. No beyond the adequate average le of fundamental concepts to (or no) abilities to integrate be ed understanding of relevant sufficient evidence of backgro h generally weak logical argur irred at degree level. mum relevant research techn case studies. Inadequate evide	damental concepts and ppendent work, effective dat degree level. Moderate familiarity with level. Evidence of logical lraw logical conclusions, proader concepts. Work research concepts and und reading and limited mentation with restricted siques. No evidence of ence of coherent logical
Communication- intensive Course	N	readif degree level.			
Course Type	Field can	nps			
Course Teaching	Activitie	S	Details		No. of Hours
& Learning Activities	Field wo	rk			42
	Reading	/ Self study			100
Assessment Methods and Weighting	Methods	5	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignm	ients		35	CLO 1,2,3,4
	Report		project report (35%), group investigation & presenation (30%)	65	CLO 1,2,3,4
Required/recommended reading and online materials	Students	will be directed to relevan	nt scientific literautre and websites		
Course Website	http://ww	w.biosch.hku.hk/ecology/	lsc/		
Additional Course Information	Subclass Subclass Enrollmer The cours to submit (leszek@ 1. Persor 2. ID pho 3. Brief d 4. GPA 5. Pre-rec waiver) All applic	t a brief (maximum 1-page phku.hk) not later than 11 nal and academic details otograph lescription of academic in quisite courses taken and cations will be reviewed pr	I Course Id Course only during the add/drop period of the e) application letter (PDF file) via e-m January 2016. The application shall	e not met, a reasoned re	nator ·

BIOL3991	Directed studies in ecology & biodiversity (6 credits)	Academic Year	2021			
Offering Department	Biological Sciences	Quota				
Course Co-ordinator	Dr S W Y Sin, Biological Sciences (sinyw@hku.hk)					
Teachers Involved	(All academic staff in E&B Major / E&B Major (Intensive) Major, Biological	Sciences)				
	(All academic staff in E&B Major / E&B Major (Intensive) Major, Biological	Scineces)				
Course Objectives	Students will undertake a dissertation on a topic related to the field of ecology and biodiversity. The dissertation will not involve any practical research in terms of laboratory or fieldwork, but will take the form of a desk-top study. Conducting a dissertation is an independent learning experience and will enable students to develop skills including the use of library and Web-based resources; the logical development of scientific arguments; writter presentation skills; and personal time management.					
Course Contents & Topics	An appropriate dissertation topic will be selected from a predeterminted list and following discussion with a member of Ecology & Biodiversity staff, who will act as the student's supervisor. Formal teaching will be limited and aimed at introducing students to the techniques necessary for successful completion of their dissertation.					
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 identify a relevant scientific question or knowledge gap					
	CLO 2 establish a desk-top literature approach to test the question posed / address the knowledge gap					
	CLO 3 undertake the appropriate research to test the question / address the knowledge gap using sound scientific					
	principles; including statistical analyses where appropriate					
	CLO 4 draw appropriate scientific conclusions from their research					
	CLO 5 present their research as a scientific paper					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in at least 24 credits of advanced level disciplinary core / elective courses in the Ecology & Biodiversity Major / Ecology & Biodiversity (Intensive) Major.  This capstone course is for Ecology & Biodiversity Major / Ecology & Biodiversity (Intensive) Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.					
Offer in 2021 - 2022	Y 1st sem 2nd sem Offer in 2022 - 2023 : Y	Examination	No Exam			
Grade Descriptors (A+ to F)	A Evidence of complete or near-complete understanding and a thorough attainment of all learning outcomes. Excellent critique and knowledge of hypothesis. Well designed scientific approach to test research hypothesis. Demonstrate comprehensive, critical, assessment of findings and profession	f relevant literature and ident Show excellent organizational and al presentation of research worl	fication of research nd/or analytical skills.			
	B Evidence of near-complete understanding and a good grasp of the subject matter as demonstrated by attainment of the majority of learning outcomes. Good critique and knowledge of relevant literature and identification of research hypothesis. Appropriately designed scientific approach to test research hypothesis. Show good organizational and/or analytical skills. Demonstrate effective, critical, assessment of findings and good presentation of research work.					
	C Evidence of adequate understanding and grasp of the subject matter as de most of the learning outcomes. Acceptable critique and knowledge of relevant					

		Adequately designed scientific approach to test research hypothesis. Show fair organizational and/or analytical skills. Demonstrate adequate but not necessarily critical, assessment of findings and presentation of research work.			
	D	learning outcomes. Lin designed scientific appr	derstanding and grasp of the subject matter nited critique and knowledge of relevant I roach to test research hypothesis. Show fair ssessment of findings and limited presentatio	iterature and identification of rese organizational and/or analytical skil	earch hypothesis. Poorly
	Fail	attained. Poor critique a approach to test resear	dequate understanding and grasp of the sul and knowledge of relevant literature and ide rch hypothesis. Show little evidence of app and assessment of findings and poor presen	entification of research hypothesis. ropriate organizational and/or anal	Badly designed scientific
Communication- intensive Course	N				
Course Type	Project-b	ased course			
Course Teaching	Activities		Details	No. of Hours	
& Learning Activities	Reading	/ Self study	at least 120 hours on the dissertation or project		120
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Oral pre	sentation		30	CLO 1,2,3,4
	Researc	h report	Written report (<10000 words)	70	CLO 1,2,3,4,5
Course Website	http://mo	odle.hku.hk	· · · · · · · · · · · · · · · · · · ·		
Additional Course Information	and on h	•	e supervisor and student. Guidanc scientifically. Students should spend e assigned.	•	,

BIOL3992			d & nutritional science (6 credits)	Academic Yea	r 2021		
Offering Department		l Sciences		Quota			
Course Co-ordinator		, ,	ciences (jimmyl@hku.hk)				
Teachers Involved	(All acade	emic staff in Food 8	& Nutritional Science Major, Biological Science	ces)			
Course Objectives		is course aims to provide a stimulating capstone experience for all Food & Nutritional Science Major dergraduates to integrate and apply their knowledge and skills obtained from the Major.					
Course Contents & Topics	student's commitme course (a methodol	The directed study can be a review of literature on a specific topic, or a lab or field study that enhances the student's understanding of the topic in the field of food & nutritional science. The student should obtain the commitment of a supervisor in the area of the dissertation topic before submitting the registration form for the course (available from the General Office of School of Biological Sciences). Supervisor will introduce various methodologies/techniques and guide students to completion of the dissertation. Teaching will be informal and students will gain knowledge through discussion and feedback from their supervisors.					
Course Learning	On succe	ssful completion of	f this course, students should be able to:				
Outcomes	CLO 1	CLO 1 acquaint with the process of scientific enquiry					
	CLO 2	have a better under	erstanding of the nature of food & nutritional	science			
	CLO 3	apply scientific me	thods to address important issues in variou	s biological disciplines			
	CLO 4	develop the key in	tellectual skills that will be valubale for all so	cientific studies			
Pre-requisites	Pass in a	at least 24 credits	of advanced level disciplinary core/elective	biological sciences cour	ses (BIOL3XXX o		
(and Co-requisites			utritional Science Major.	-	•		
and Impermissible	This caps	tone course is for	Food & Nutritional Science Major students o	nly.			
combinations)	The earlie	est that a student is	s allowed to take this capstone course is the	ir year 3 study.			
Offer in 2021 - 2022	Y 1st		Offer in 2022 - 2023 : Y high level of scholarship and originality; virtually 1	Examination	No Exam		
(A+ to F)	В	of the research; com comprehensive and problems and their i well-connected and skills. The length of academic standard. Work showing some perspectives or prot study; adequate gra include an attempt a references included; ideas clearly and flu meet the specified re	iowing a thorough grasp of the topic from background in prehensive exploration of the topic, personal synthesis up-to-date references integrated into argument or logic solutions and implications; thought-provoking discussipresented logically with clarity of goals, demonstrating the dissertation meet the specified requirements. All se evidence of originality and insight in identifying, golem solving approaches; demonstrating substantial usip of the topic from background reading and analyst critical comment or appraisal; regular support provic main points fully elaborated; summary given in the fine ently, demonstrating good organizational, rhetorical an equirements. Most aspects conform to a high academic	of the issues with detailed sup- ral reasoning; critical evaluation ons; accurate summary. All cl- excellent organizational, rheto- other aspects of the dissertal enerating and communicating inderstanding of fundamental of isi; a systematic exploration of ed from the literature; compre- al chapter/paragraphs; communi- d presentational skills. The le- istandard.	port from the literature ns of the main points o napters/paragraphs are rical and presentationa tion conform to a high competing arguments, concepts of the field or of the topic which may hensive and up-to-date icating information and night of the dissertation and the dissertation of the topic which may hensive and up-to-date icating information and night of the dissertation		
	С	Work showing no evidence of originality and insight, but the presentation demonstrated adequate understanding and comprehension of most aspects of the dissertation topic; essential topic materials have been read and acknowledged; the main points presented in logically sequential paragraphs; reasonably balanced discussion of the major issues; acceptable interpretation of the topic, some explanation, illustration and support provided from the literature; summary given in the final chapter/paragraphs; most presentation details met (front page, margin, legibility, citations correctly reported and tabulated, etc.); few typos or grammatical errors; Most aspects conform to an acceptable academic standard.					
	Demonstrating superficial or partial or faulty understanding of the fundamental concepts of the field of study; showing the bare minimum of information, poorly digested and not very well organized in presentation; irrelevant material; showing no evidence of critical thinking; arguments undeveloped or inappropriate or unsupported; lack of clarity or structure in communicating information or ideas. dissertation topic not fully covered; discussion too brief or just repeating the data or findings; overuse quotations with little explanation; insufficient support from literature; reading not well incorporated into the text; limited acknowledgements and light bibliography; some major points missed. Minimum conform to an acceptable academic standard.						
	Fail  The dissertation topic was not covered acceptably; demonstrating evidence of poor knowledge, clear deficiencies in understanding fundamental concepts; materials largely irrelevant; incomplete or confusing communication of information or ideas; unreflective; incoherent argument; complete misinterpretation of the topic or data; no evidence of reading (no acknowledgements or bibliography); structure confused or not discernible; Fail to meet most or all of the basic requirements of the course. The written work is not of an academic standard.						
Communication- intensive Course	N						
Course Type	Project-ba	ased course					
Course Teaching	Activitie	S	Details		No. of Hours		
& Learning Activities		/ Self study	at least 120 hours on the dissertation	n or project	120		
Assessment Methods	Methods	•	Details	Weighting in final	Assessment		

	Oral presentation	15 minutes (Plus 5 minutes for questions and answers).	20	CLO 1,2,3,4
	Research report	Written report 6000-8000 words (excluding figures and references).	80	CLO 1,2,3,4
Course Website	http://moodle.hku.hl/			
Additional Course Information	Regular meetings between the supervisor and student. Guidance from the supervisor on the scientific methods, and on how to think and write scientifically. Students should spend at least 120 hours on the dissertation or project. Recommended reading may be assigned.			

BIOL3993	Directed credits)		lar biology & biotechnology (6	Academic Yea	2021	
Offering Department	Biologica	l Sciences		Quota		
Course Co-ordinator	Dr A Yan	, Biological Sciences (a)	yan8@hku.hk)			
Teachers Involved	(All acade	emic staff in Molecular E	Biology & Biotechnology Major,Biologic	al Sciences)		
Course Objectives		This course aims to provide a stimulating capstone experience for all Molecular Biology & Biotechnology Major undergraduates to integrate and apply their knowledge and skills obtained from the Major.				
Course Contents			view of literature on a specific topic,			
& Topics	commitm course (a methodol	student's understanding of the topic in the field of molecular biology & biotechnology. The student should obtain the commitment of a supervisor in the area of the dissertation topic before submitting the registration form for the course (available from the General Office of School of Biological Sciences). Supervisor will introduce various methodologies/techniques and guide students to completion of the dissertation. Teaching will be informal and students will gain knowledge through discussion and feedback from their supervisors.				
Course Learning	On succe	essful completion of this	course, students should be able to:			
Outcomes	CLO 1	acquaint with the proce	ss of science			
	CLO 2	have a better understar	nding of the nature of molecular biology	/ & biotechnology		
	CLO 3		s to address important issues in variou			
	CLO 4	develop the key intelled	ctual skills that will be valubale for all so	cientific studies		
Pre-requisites (and Co-requisites and Impermissible combinations)	Biotechno This caps	ology Major. stone course is for Molec	advanced level disciplinary core / elecular Biology & Biotechnology Major st wed to take this capstone course is the	udents only.	olecular Biology &	
Offer in 2021 - 2022	Y 1st	t sem 2nd sem Offer	in 2022 - 2023 : Y	Examination	No Exam	
Grade Descriptors (A+ to F)	A	dissertation topic, showing of the research; comprehe comprehensive and up-to- problems and their solutio well-connected and preser	level of scholarship and originality; virtually that the control of a thorough grasp of the topic from background in sive exploration of the topic, personal synthesis date references integrated into argument or loging and implications; thought-provoking discussified logically with clarity of goals, demonstrating issertation meet the specified requirements. Al	reading and analysis; clear star s of the issues with detailed sup cal reasoning; critical evaluatio ons; accurate summary. All cl excellent organizational, rheto	tement of the objectives oport from the literature; ns of the main points or napters/paragraphs are rical and presentational	
	В	Work showing some evidence of originality and insight in identifying, generating and communicating competing arguments, perspectives or problem solving approaches; demonstrating substantial understanding of fundamental concepts of the field of study; adequate grasp of the topic from background reading and analysis; a systematic exploration of the topic which may include an attempt at critical comment or appraisal; regular support provided from the literature; comprehensive and up-to-date references included; main points fully elaborated; summary given in the final chapter/paragraphs; communicating information and ideas clearly and fluently, demonstrating good organizational, rhetorical and presentational skills. The length of the dissertation meet the specified requirements. Most aspects conform to a high academic standard				
	С	Work showing no evidence of originality and insight, but the presentation demonstrated adequate understanding and comprehension of most aspects of the dissertation topic; essential topic materials have been read and acknowledged; the main points presented in logically sequential paragraphs; reasonably balanced discussion of the major issues; acceptable interpretation of the topic, some explanation, illustration and support provided from the literature; summary given in the final chapter/paragraphs; most presentation details met (front page, margin, legibility, citations correctly reported and tabulated, etc.); few typos or grammatical errors; Most aspects conform to an acceptable academic standard.				
	D					
	Fail	The dissertation topic wanderstanding fundamenta ideas; unreflective; incohacknowledgements or bibli	as not covered acceptably; demonstrating eal concepts; materials largely irrelevant; incomerent argument; complete misinterpretation ciography); structure confused or not discernible; rk is not of an academic standard.	vidence of poor knowledge, plete or confusing communic f the topic or data; no evic	clear deficiencies in ation of information or dence of reading (no	
Communication- intensive Course	N					
Course Type	Project-b	ased course				
Course Teaching	Activitie		Details		No. of Hours	
& Learning Activities		/ Self study	at least 120 hours on the dissertation	n or project	120	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Oral pres	sentation	15 minutes (Plus 5 minutes for questions and answers).	20	CLO 1,2,3,4	
	Researc	h report	Written report 6000-8000 words (excluding figures and references).	80	CLO 1,2,3,4	
Course Website	http://mod	odle.hku.hk/				
Additional Course Information	and on he		supervisor and student. Guidance fror entifically. Students should spend at le assigned.			

BIOL3994	Directed studies in biological sciences (6 credits)	Academic Year	2021
Offering Department	Biological Sciences	Quota	
Course Co-ordinator	Dr J Wu, Biological Sciences (jinwu@hku.hk)		

Teachers Involved	(All academic staff in Biological Sciences Major, Biological Sciences)							
Course Objectives	This course aims to provide a stimulating capstone experience for all Biological Sciences Major undergraduates to integrate and apply their knowledge and skills obtained from the Major.							
Course Contents & Topics	The directed study can be a review of literature on a specific topic, or a lab or field study that enhances the student's understanding of the topic in the field of biological sciences. The student should obtain the commitment o a supervisor in the area of the dissertation topic before submitting the registration form for the course (available from the General Office of School of Biological Sciences). Supervisor will introduce various methodologies/techniques and guide students to completion of the dissertation. Teaching will be informal and students will gain knowledge through discussion and feedback from their supervisors.							
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 acquaint with the process of science  CLO 2 have a better understanding of the nature of biological sciences  CLO 3 apply scientific methods to address important issues in various biological disciplines							
		1117						
Pre-requisites (and Co-requisites and Impermissible	BIOL4XX This caps	(X) in the Biological So stone course is for Bio	logical Sciences Major students only.	Ü	rses (BIOL3XXX or			
combinations)			lowed to take this capstone course is the					
Offer in 2021 - 2022		t sem 2nd sem Of		Examination	No Exam			
Grade Descriptors (A+ to F)	A  B  C	dissertation topic, showi of the research; compre comprehensive and upproblems and their solu well-connected and presskills. The length of the academic standard.  Work showing some experspectives or problems study; adequate grasp include an attempt at or references included; maideas clearly and fluentl meet the specified requi.  Work showing no evic comprehension of most points presented in lo interpretation of the top chapter/paragraphs; mo few typos or grammatice. Demonstrating superficition inimum of information, critical thinking; argum information or ideas. di quotations with little exacknowledgements and The dissertation topic understanding fundame ideas; unreflective; inc acknowledgements or be	In level of scholarship and originality; virtually ng a thorough grasp of the topic from background hensive exploration of the topic, personal synthesito-date references integrated into argument or logitions and implications; thought-provoking discuss sented logically with clarity of goals, demonstrating e dissertation meet the specified requirements. A vidence of originality and insight in identifying, goals solving approaches; demonstrating substantial of the topic from background reading and analy itical comment or appraisal; regular support provisin points fully elaborated; summary given in the finy, demonstrating good organizational, rhetorical a rements. Most aspects conform to a high academic bence of originality and insight, but the prese aspects of the dissertation topic; essential topic in gigically sequential paragraphs; reasonably bala ic, some explanation, illustration and support prost presentation details met (front page, margin, legal or partial or faulty understanding of the fundam poorly digested and not very well organized in pnents undeveloped or inappropriate or unsuppo secretation topic not fully covered; discussion too xplanation; insufficient support from literature; ilight bibliography; some major points missed. Mini was not covered acceptably; demonstrating ental concepts; materials largely irrelevant; inconcherent argument; complete misinterpretation oberent argument; complete misinterpretation oberent argument; complete misinterpretation dibliography); structure confused or not discernible work is not of an academic standard.	reading and analysis; clear stase of the issues with detailed sus cal reasoning; critical evaluatic ions; accurate summary. All content of the content of th	tement of the objectives pport from the literature; ons of the main points or thapters/paragraphs are orical and presentational atton conform to a high competing arguments, concepts of the field of the topic which may thensive and up-to-date nicating information and another of the dissertation and the understanding and acknowledged; the main or issues; acceptable many given in the final the dissertation that the dissertation that the dissertation that the dissertation or incommunicating the original produces of the dissertanding overset in communicating the original produces of the dissertanding of the disserta			
Communication-	N							
intensive Course								
Course Type		ased course	B 4.7		N			
Course Teaching	Activitie		Details		No. of Hours			
& Learning Activities  Assessment Methods		/ Self study	at least 120 hours on the dissertatio		120			
and Weighting	Methods	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Oral pres	sentation	15 minutes (Plus 5 minutes for questions and answers).	20	CLO 1,2,3,4			
	Researc	•	Written report 6000-8000 words (excluding figures and references).	80	CLO 1,2,3,4			
Course Website		odle.hku.hk/		<b>a</b>				
Additional Course Information	and on h	•	e supervisor and student. Guidance fron scientifically. Students should spend at le e assigned	•				

BIOL4201	Public health nutrition (6 credits)	Academic Year	2021
Offering Department	Biological Sciences	Quota	90
Course Co-ordinator	Dr J C Y Louie, Biological Sciences (jimmyl@hku.hk)		
Teachers Involved	(Dr J C Y Louie, Biological Science)		
Course Objectives	Public health nutrition unites social sciences and biomedical sciences in previous health through programs aimed at enhancing good nutritional practices. This the professional practice and essential skills required of a public health nutrition	course presents a b	
Course Contents & Topics	Public health nutrition: overview, nature and identification of problems. Planning cycle of public health nutrition programs. Dietary assessment methods. Development of dietary guidelines and dietary reference standards The epidemiological study of diet: disease associations. Malnutrition: definitions, prevalence, public health consequences, and interver Food regulations and labelling. Food security Public health advocacy	ntions.	
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 have a broad knowledge of the scope and methodologies of public hea	lth nutrition	

		سنخلصا المصم بينمانيي سالمماني	بغم متمانات المتعارب والخاميم الماريم فمسا						
		LO 2 critically review and interpret public health nutrition studies in the literature  LO 3 plan public health nutrition program according to the program planning cycle framework							
	CLO 4 explain the meaning and uses of Dietary Reference Intakes and dietary guidelines								
			•	, ,	no of those methods				
			•	ods, and the strengths of limitation nent tools, and choose the most					
	a	ssessment methods for	different purposes	, 	арргорпате питноп				
		CLO 7 understand the local and international food regulations							
Pre-requisites (and Co-requisites and Impermissible combinations)	PASS in I	ASS in BIOL3202							
Offer in 2021 - 2022	Y 2nd	d sem Offer in 2022 - 2	2023 · Y	Examination	No Exam				
Grade Descriptors (A+ to F)	A	Demonstrate thorough ma learning outcomes. Thorou of original thought, and ab effective organizational and	stery at an advanced level of exte gh grasp of the subject. Show stror ility to apply knowledge to a wide d presentational skills. Apply highly	ensive knowledge and skills required for ng analytical and critical abilities and logic range of complex, familiar and unfamilia effective laboratory/fieldwork skills and to s. Apply highly effective organizational and	attaining all the course al thinking, with evidence r situations. Apply highly echniques. Critical use of				
	В	learning outcomes. Substa ability to apply knowledge	ntial grasp of the subject. Show en to familiar and some unfamiliar si fieldwork skills and techniques. Co	rledge and skills required for attaining at vidence of analytical and critical abilities ituations. Apply effective organizational rrect use of data of results to draw appro	and logical thinking, and and presentational skills.				
	С								
	D								
	Fail	or no grasp of the knowle thinking. Show very little or effective or ineffective. App	dge and understanding of the sub no ability to apply knowledge to so by minimally effective or ineffective	and skills required for attaining the course oject. Lack of analytical and critical abilit olve problems. Organization and presenta e laboratory / fieldwork skills and techniq zation and presentational skills are minima	ies, logical and coherent tional skills are minimally ues. Misuse of data and				
Communication- intensive Course	N				·				
Course Type	Lecture w	vith laboratory componer	nt course						
Course Teaching	Activitie	s	Details						
· ·	Lectures			No. of Hours					
& Learning Activities					No. of Hours				
& Learning Activities	Laborato	ory							
& Learning Activities	Laborato	ory / Self study			36				
Assessment Methods	Laborato	/ Self study	Details	Weighting in final course grade (%)	36 24				
Assessment Methods	Laborato Reading	/ Self study	Details	5 5	36 24 90 Assessment Methods				
Assessment Methods	Laborato Reading <b>Methods</b> Assignment	/ Self study	Details	course grade (%)	36 24 90 Assessment Methods to CLO Mapping				
Assessment Methods	Laborato Reading <b>Methods</b> Assignment	/ Self study s ents	<b>Details</b> Mid-term	course grade (%)	36 24 90 Assessment Methods to CLO Mapping CLO 1,2,3,4				
Assessment Methods and Weighting  Required/recommended reading and	Laborato Reading Methods  Assignment Laborato Test Public He	/ Self study s ents ry reports	Mid-term tion Society Textbook Series	course grade (%)  50 30 20	36 24 90 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 4,5,6				
Assessment Methods and Weighting  Required/recommended reading and online materials	Assignmentaborato Test Public He MJ Gibne	/ Self study s ents ory reports ealth Nutrition (The Nutri	Mid-term tion Society Textbook Series	50 30 20	36 24 90 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 4,5,6				
Assessment Methods and Weighting  Required/recommended reading and	Laborato Reading Methods  Assignm Laborato Test Public He MJ Gibne http://moo	/ Self study sents ory reports ealth Nutrition (The Nutri ey, BM Margetts, JM Kea	Mid-term tion Society Textbook Series arney, L Arab (Eds)	50 30 20	36 24 90 Assessment Methods to CLO Mappin CLO 1,2,3,4 CLO 4,5,6 CLO 1,2,4,5,6,7				

BIOL4202	Nutrition and sports performance (6 credits)	Academic Year	2021				
Offering Department	Biological Sciences	Quota	20				
Course Co-ordinator	TBC, Biological Sciences ()						
Teachers Involved	(TBC,School of Biological Sciences)						
Course Objectives	To demonstrate evidence-based links between nutrition, exercise and in-depth understanding about how the metabolic demands of exfunctions and exercise performance. To focus on the role of major managements and hydration in sustaining and enhancing sports performance exercise.	ercise influence physiologica acronutrients, minerals, vitam	al and cognitive nins, antioxidants				
Course Contents & Topics	Nutrition aims and requirements differ during habitual exercise adaptations to developing metabolic efficiency to competition nuperformance through appropriate nutrition, following the recom Committee: "The amount, composition and timing of food intake (Maughan et al., 2004). The course will firstly examine the physiolog and/or habitual exercise to perform at its best. Secondly, it will investivary between different athlete groups, the difference between energy and anaerobic exercise. Putting exercise and sports performance in macronutrients; selected micronutrients; fluid balance and hydratio athletes, sport foods and supplements; position stands and new perequirements in exercise and sports, ergogenic aids and myths of sports.	utrition. Professional athletes mendations of the Interna- can profoundly affect spor- gical needs pre-, during and igate how and why nutrient ary metabolism and requiremer focus, the topics will include on strategies; weight loss and erspectives on sports nutrition	s enhance their ational Olympic ts performance" post-competitior not denergy intakes ts during aerobic energy balance d weight gain in				
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 critically examine and describe the need of energy, nutrients and fluid before, during and after the physical exercise in relation to different sports, individual athletes and performance situations						
	CLO 2 describe the impact of dietary macronutrients, vitamins and m	ninerals on physical performa	nce				
	CLO 2 describe the impact of detaily inactionations, vitamins and minerals on physical periormance.  CLO 3 provide an overview of the position stands on major misconceptions in sports nutrition. Being able to evaluate, explain and communicate current, evidence based epidemiological knowledge behind these position stands.						

	CLO 4 access and analyze the importance of meal frequency, energy source and supplements on the performance in different sports.						
		CLO 5 demonstrate convincing argument for importance of balanced nutrition for sports performance and go health.					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	BIOL3202					
Offer in 2021 - 2022	N O	ffer in 2022 - 2023 : Y		Examination			
Grade Descriptors (A+ to F)	A	evidence of creative abilitechniques and analysis highly effective team-bas	ity and competence in professiona of data and results to draw approped and organizational and presentation		y management skills and d problems. Demonstrate		
	В	thinking with some evider and analysis of data and based organizational and	nce of competence in professional results to draw generally appropr presentational skills	rered. Show evidence of analytical and cr level problem solving. Use quality manager iate conclusions to real-world problems. De	nent skills and techniques monstrate effective team-		
	С	and logical thinking with I and analysis of data and	limited competence in professional	natter covered. Show some evidence of ana l-level problem solving. Use quality manager poriate but sometimes erroneous conclusion al and presentational skills.	nent skills and techniques		
	D	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Show some vidence of coherent and logical thinking, but lacking competence in professional-level problem solving. Use quality management skills and techniques and analysis of data and results to draw sometimes appropriate but often erroneous conclusions to real-world problems. Demonstrate team-based organizational and presentational skills of limited effectiveness.					
	Fail  Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of coherent and logical thinking, and minimal competence in professional-level problem solving. Use quality management skills and techniques and analysis of data and results ineffectively, leading generally to inappropriate and usually erroneous conclusions to real-world problems. Demonstrate ineffectiveness team-based organizational and presentational skills.						
Communication- intensive Course	N			·			
Course Type	Lecture-l	pased course					
Course Teaching	Activitie	es	Details	No. of Hours			
& Learning Activities	Lectures	3	with practicals	36			
	Tutorials	3		10			
	Discussi				20		
	Reading	/ Self study			50		
Assessment Methods and Weighting	Method	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignm	nents		40	CLO 1,2		
	Presenta	ation		10	CLO 1,3,4,5		
	Project r	eports		50	CLO 1,4,5		
Required/recommended reading and online materials	book and -Sport N (2004). -Sports a	Most of the reading material will be provided on Moodle or given during lectures; however, do make use of took and journal resources in HKU's libraries including: Sport Nutrition. An introduction to Energy Production and Performance. Asker Jeukedrup & Michael Glees					
Course Website		odle.hku.hk	, (2.00) <u></u>				
Additional Course Information			ect to a minimum enrollmen	t number and availability of teacher	S.		

BIOL4204	Diet, br	ain function and behavior (6 credits)		Academic Year	2021			
Offering Department	Biologica	Biological Sciences Quota 30						
Course Co-ordinator	Dr E T S	Li, Biological Sciences (etsli@hku.hk)						
Teachers Involved	\ \	S Li,Biological Sciences) ′ Lee,Biological Sceinces)						
Course Objectives		To highlight the impact of nutrient provision on brain structure and function, and to discuss various effects of nutrition and diet on mental function and behaviour.						
Course Contents & Topics	Dietary 0	Fundamentals of the central nervous system; Nutrition & brain development; Diet, learning & memory function; Dietary CNS stimulants; Neurotransmitters, drugs & behaviour; Physiological and socio-cultural determinants of dietary behaviour.						
Course Learning	On succe	essful completion of this course, students should be ab	le to:					
Outcomes	CLO 1 u	understand the basic structure and functions of the bra	in and how nutrition	on influences its o	levelopment			
	CLO 2 be able to explain the consequences of malnutrition on cognition							
	CLO 3 Appreciate appetite control as a function of food-gut-brain interaction							
	CLO 4 understand the differences between bioactive food ingredients and drugs							
	CLO 5 critically evaluate and interpret the internal and external cues that determine dietary behaviour							
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	BIOL3204, or already enrolled in this course						
Offer in 2021 - 2022	N Of	fer in 2022 - 2023 : N		Examination				
Grade Descriptors (A+ to F)	Α	Demonstrate thorough grasp of the subject matter covered. Show exceptional ability on knowledge integration, problen identification and solving. Show outstanding ability to critically analyze and interpret scientific data and draw appropriate conclusions. Demonstrate highly effective presentation / writing skills.						
	B Demonstrate substantial grasp of the subject matter covered. Show full ability on knowledge integration, problem identification and solving. Show reasonable ability to critically analyze and interpret scientific data and draw appropriate conclusions. Demonstrate effective presentation / writing skills.							
	С	·						
	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered.  Misunderstanding of the materials is not uncommon. Show limited ability on knowledge integration, problem identification and							

		solving. Use elementary a Demonstrate basic organiza		nd interpret scientific	data and draw sometimes	erroneous conclusions.		
	Fail	Demonstrate little or no gra and logical thinking, and m	Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of cohe and logical thinking, and minimal competence in problem solving. Fail to integrate information and identify problems. Seric deficient in ability to analyze and interpret scientific data and draw conclusions. Demonstrate poor organization / writing skills					
Communication- intensive Course	N		·					
Course Type	Lecture-	based course						
Course Teaching & Learning Activities	Activitie	es	Details			No. of Hours		
	Lecture	S				36		
	Tutorial	S	tutorials/group disc	ussions/seminar	3	12		
	Project work		oral presentation			12		
	Reading / Self study					100		
Assessment Methods and Weighting	Method	İs	Details		Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments				20	CLO 1,2,4		
	Examination				60	CLO 1,2,3,4		
	Presentation				20	CLO 2,4		
Required/recommended reading and online materials	2003 Lieberm Nutrition Physiolo Appetite	J. R., Bloom F. E. & Rot an H. R., Kanarek R. B. & al Neuroscience (Journal ogy and Behavior (Journal (Journal) of Nutritional Biochemistr	k Prasad C.: Nutrition ) l)		,	ord University Press,		
Course Website		oodle.hku.hk/	, (-					
Additional Course Information		irse will be offered subjec	t to a minimum enroll	lment number an	d availability of teachers	5.		

	Food te	chnology (6 c	redits)				Academic Year	2021
Offering Department		Biological Sciences Quota 30						
Course Co-ordinator	Dr J C Y	Dr J Č Y Lee, Biological Sciences (jettylee@hku.hk)						
Teachers Involved		(Dr J C Y Lee,Biological Sciences) (Dr L Zhang,Biological Sciences)						
Course Objectives	cover key	To provide students with basic principles and methodologies of food processing and preservation technology. To cover key engineering principles relevant to the food industry. Students will gain hands-on experience with selected food processing and preservation techniques.						
Course Contents & Topics	properties productio equipmer nutritious methods	Food processing is a multidisciplinary field combining applied physical sciences with knowledge of product properties and requirements. This course introduces the technical knowledge required to implement cost-effective production and commercialization of food products and services. The design and development of processes, equipment and machinery used to convert raw agricultural materials and ingredients into safe, convenient, and untritious consumer food products are covered. We discuss the basic engineering principles and applications of methods in food processing and preservation. Techniques discussed will include those for high and low temperature processing, concentration, dehydration, baking and extrusion.						
Course Learning	On succe	ssful completion	of this cour	se, students	should be abl	e to:		
Outcomes	CLO 1 u	nderstand basic	orinciples of	f food process	sing methods	and preservati	ion technology	
	CLO 2 b	e able to apply th	eir knowled	lge and pract	cal skills to p	rocess and dev	velop food products	•
		emonstrate in-d reservation	epth under	rstanding of	selected me	ethods and p	roblems in food	processing and
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in B	BIOL3209						
Offer in 2021 - 2022	Y 2nd	d sem Offer in	2022 - 2023	3 : Y			Examination	No Exam
Grade Descriptors (A+ to F)	Α		ough grasp of	f the subject ma	tter covered S	how strong evider	nce of analytical and o	ritical abilities of the
(A+ to F)		and equipment for	r a variety of ent quality for	ty of food during food-specific pu specific food pur	preparation, pro	ocessing and stora strates advance s	ge. Identifies and uses kills in designing, prod echniques and analysis	advanced techniques
(A+ to F)	В	and equipment for solutions of excell draw appropriate Demonstrate subthat take place in variety of food-sp for specific food conclusions.	r a variety of ent quality for and insightful of stantial grasp of variety of food ecific purposes purposes. Usi	ty of food during food-specific puspecific food pur conclusions. of the subject m during preparatis. Demonstrates e lab skills and	preparation, prorposes. Demonoses. Critically atter covered. Son, processing a high-level skills techniques and	ocessing and stora strates advance s use lab skills and t how evidence of a and storage. Identifi in designing, prodit I analysis of data	ge. Identifies and uses kills in designing, prod eechniques and analysis analytical and critical at- fies and uses technique- ucing and evaluating so and results to draw (	advanced technique ucing and evaluating of data and results t bilities of the change s and equipment for lutions of high qualit generally appropriate
(A+ to F)	В	and equipment for solutions of excell draw appropriate. Demonstrate subthat take place in variety of food-sp for specific food conclusions. Demonstrate gen abilities and logic Identifies and use	r a variety of ent quality for rand insightful of and insightful of variety of food excific purposes purposes. Use eral but incomal thinking of s appropriate to ucing and eva	ty of food during food-specific pospecific food pur conclusions. of the subject m during preparatis. Demonstrates e lab skills and uplete grasp of the changes the techniques and eluluating solutions	preparation, proposes. Demon occess. Critically atter covered. Son, processing a high-level skills techniques and take place ir aquipment for a of sound qualit	ocessing and stora strates advance use lab skills and thow evidence of a and storage. Identifi in designing, produlation and analysis of data er covered. Show variety of food cy variety of food-spe y for specific food	ge. Identifies and uses kills in designing, prod echniques and analysis analytical and critical ab lies and uses technique: ucing and evaluating so	advanced technique ucing and evaluating of data and results t illities of the change s and equipment for illutions of high qualit generally appropriate analytical and critical cessing and storage trates adequate skill
(A+ to F)		and equipment for solutions of excell draw appropriate Demonstrate subthat take place in variety of food-sp for specific food conclusions. Demonstrate gen abilities and logic Identifies and use in designing, procanalysis of data a Demonstrate part evidence of cohe storage. Identifies	ra variety of ent quality for and insightful chantial grasp of examinating proposes. Using all thinking of sappropriate to ucing and evaluating and evaluating and loud results to drall but limited ent and logica and uses basing and evaluating and	ty of food during food-specific pospecific food pur sonclusions. of the subject m during preparatis. Demonstrates e lab skills and uplete grasp of the changes the techniques and elluating solutions aw moderately a grasp, with reter all thinking of the cite cechniques an extra the cite of the c	preparation, proposes. Demonoses. Critically satter covered. Son, processing a high-level skills techniques and take place in equipment for a of sound quality propriate concition of some rechanges that take quelipment for specific food proposed to the control of the concition of the control	ocessing and stora strates advance is use lab skills and the how evidence of a and storage. Identify in designing, produ- analysis of data er covered. Show a variety of food-spe y for specific food usions. levant information ake place in variety a variety of food-spe	ge. Identifies and uses kills in designing, production and analysis analytical and critical at lies and uses technique ucing and evaluating so and results to draw a dequate evidence of during preparation, producific purposes. Demons	advanced technique ucing and evaluating of data and results to dilities of the changes and equipment for illutions of high quality generally appropriate analytical and critical design and storage trates adequate skills and techniques and covered. Show some atton, processing and snstrates basic skills in some techniques and techniques
(A+ to F)	С	and equipment for solutions of excell draw appropriate Demonstrate subthat take place in variety of food-sp for specific food conclusions.  Demonstrate gan abilities and logic Identifies and use in designing, procanalysis of data a Demonstrate part evidence of cohe storage. Identifies designing, producresults to draw ap Demonstrate little and logical thinking uidance factors guidance, demon and techniques:	r a variety of ent quality for and insightful of the stantial grasp avariety of food carlier purposes. Use the stantial grasp purposes. Use the stantial grasp purposes. Use the stantial grasp purposes and thinking of sappropriate the using and evaluated and uses basing and evaluated or no grasp, to go fhe chang and uses som and uses som the stantial grasp go for the chang and uses som the stantial grantial  ty of food during food-specific pospecific food pur conclusions. of the subject m during preparati s. Demonstrates e lab skills and aplete grasp of the changes the techniques and eludating solutions raw moderately a grasp, with reter all thinking of the ic techniques anating solutions for lusions occasion with retention of jes that take plane appropriate te skills in designin	preparation, proposes. Demon ocoses. Critically after covered. Son, processing a high-level skills techniques and esubject matter at take place in equipment for a of sound qualit ppropriate concition of some changes that to dequipment for specific food pally. When the concept in the concept of the concept	ocessing and stora strates advance s use lab skills and thow evidence of a nd storage. Identifin designing, produlation and the storage identified analysis of data are covered. Show wariety of food-spey for specific food usions. I evant information ike place in variety a variety of food-spey for specific food usions. I evant information ike place in variety a variety of food-spey for specific food usions. I evant information is proposed. Use lab sommation, of the sucood during prepara equipment for a line of evaluating solution.	ge. Identifies and uses kills in designing, prod cechniques and analysis analytical and critical at fies and uses techniques using and evaluating so and results to draw gadequate evidence of during preparation, producific purposes. Demons purposes. Use lab skills, of the subject matter yof food during preparapecific purposes. Demons pecific purposes.	advanced technique: ucing and evaluating of data and results to of data and results to silities of the changes is and equipment for ulutions of high quality generally appropriate analytical and critica cessing and storage strates adequate skills and techniques and covered. Show some ation, processing and instrates basic skills in d analysis of data and show lack of coheren torage. Identifies witt ecific purposes. Witt rposes. Use lab skills	
Communication-	C	and equipment for solutions of excell draw appropriate Demonstrate subthat take place in variety of food-sp for specific food conclusions.  Demonstrate gen abilities and logic Identifies and use in designing, proc analysis of data a Demonstrate part evidence of cohe storage. Identifies designing, produc results to draw ap Demonstrate little and logical thinking uidance factors guidance, demon	r a variety of ent quality for and insightful of the stantial grasp avariety of food carlier purposes. Use the stantial grasp purposes. Use the stantial grasp purposes. Use the stantial grasp purposes and thinking of sappropriate the using and evaluated and uses basing and evaluated or no grasp, to go fhe chang and uses som and uses som the stantial grasp go for the chang and uses som the stantial grantial  ty of food during food-specific pospecific food pur conclusions. of the subject m during preparati s. Demonstrates e lab skills and aplete grasp of the changes the techniques and eludating solutions raw moderately a grasp, with reter all thinking of the ic techniques anating solutions for lusions occasion with retention of jes that take plane appropriate te skills in designin	preparation, proposes. Demon ocoses. Critically after covered. Son, processing a high-level skills techniques and esubject matter at take place in equipment for a of sound qualit ppropriate concition of some changes that to dequipment for specific food pally. When the concept in the concept of the concept	ocessing and stora strates advance s use lab skills and thow evidence of a nd storage. Identifin designing, produlation and the storage identified analysis of data are covered. Show wariety of food-spey for specific food usions. I evant information ike place in variety a variety of food-spey for specific food usions. I evant information ike place in variety a variety of food-spey for specific food usions. I evant information is proposed. Use lab sommation, of the sucood during prepara equipment for a line of evaluating solution.	ge. Identifies and uses kills in designing, prod cechniques and analysis analytical and critical at fies and uses technique ucing and evaluating so and results to draw gadequate evidence of during preparation, procific purposes. Demons purposes. Use lab skills, of the subject matter y of food during preparatic purposes. Demons kills and techniques and ubject matter covered. Sation, processing and similar drange of food-spons for specific food purpose for specific food purpose for specific food purpose for specific food purpose for specific food purpose for specific food purpose for specific food purpose for specific food purpose for specific food purpose for specific food purpose for specific food purpose for specific food purpose and section for specific food purpose for specific food purpose and section for specific food purpose for specific food purpose and section for specific food purpose for specific food pur	advanced technique: ucing and evaluating of data and results to of data and results to silities of the changes is and equipment for ulutions of high quality generally appropriate analytical and critica cessing and storage strates adequate skills and techniques and covered. Show some ation, processing and instrates basic skills in d analysis of data and show lack of coheren torage. Identifies witt ecific purposes. Witt rposes. Use lab skills	
Communication- intensive Course Course Type	C D Fail	and equipment for solutions of excell draw appropriate Demonstrate subthat take place in variety of food-sp for specific food conclusions.  Demonstrate gan abilities and logic Identifies and use in designing, procanalysis of data a Demonstrate part evidence of cohe storage. Identifies designing, producresults to draw ap Demonstrate little and logical thinking uidance factors guidance, demon and techniques:	r a variety of ent quality for and insightful contains a certain and insightful contains a certain and insightful contains a certain and insight and results to draw and uses basing and evaluation or no grasp, up of the change and uses sometitates limited and analysis of the change and uses sometimes and uses and uses sometimes and uses and uses and uses sometimes and uses and	ty of food during food-specific pospecific food pur conclusions. of the subject m during preparati s. Demonstrates e lab skills and uplete grasp of the changes the techniques and ellulating solutions aw moderately a grasp, with rete all thinking of the ic techniques and interest of the conclusions occasion with retention of less that take plane appropriate to skills in designing of data and res	preparation, proposes. Demon ocoses. Critically after covered. Son, processing a high-level skills techniques and esubject matter at take place in equipment for a of sound qualit ppropriate concition of some changes that to dequipment for specific food pally. When the concept in the concept of the concept	ocessing and stora strates advance s use lab skills and thow evidence of a nd storage. Identifin designing, produlation and the storage identified analysis of data are covered. Show wariety of food-spey for specific food usions. I evant information ike place in variety a variety of food-spey for specific food usions. I evant information ike place in variety a variety of food-spey for specific food usions. I evant information is proposed. Use lab sommation, of the sucood during prepara equipment for a line of evaluating solution.	ge. Identifies and uses kills in designing, prod cechniques and analysis analytical and critical at fies and uses technique ucing and evaluating so and results to draw gadequate evidence of during preparation, procific purposes. Demons purposes. Use lab skills, of the subject matter y of food during preparatic purposes. Demons kills and techniques and ubject matter covered. Sation, processing and similar drange of food-spons for specific food purpose for specific food purpose for specific food purpose for specific food purpose for specific food purpose for specific food purpose for specific food purpose for specific food purpose for specific food purpose for specific food purpose for specific food purpose for specific food purpose and section for specific food purpose for specific food purpose and section for specific food purpose for specific food purpose and section for specific food purpose for specific food pur	advanced technique: ucing and evaluating of data and results to of data and results to silities of the changes is and equipment for ulutions of high quality generally appropriate analytical and critica cessing and storage strates adequate skills and techniques and covered. Show some ation, processing and instrates basic skills in d analysis of data and show lack of coheren torage. Identifies witt ecific purposes. Witt rposes. Use lab skills

& Learning Activities	Lectures			24
	Laboratory laboratory/field trip/seminar			24
	Tutorials		6	
	Reading / Self study			100
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments		30	CLO 1,2,3
	Laboratory reports	40		CLO 1,2,3
	Test		30	CLO 1,2,3
Required/recommended reading and online materials	Food Processing Technology-P Unit Operations in Food Proces		P.J. Fellows	
Course Website	http://moodle.hku.hk/			
Additional Course Information	This course will be offered subj	ect to a minimum enrollmer	nt number and availability of teachers	S.

BIOL4207	Meat an	Academic Ye	ear 2021					
Offering Department	Biological	50						
Course Co-ordinator	Prof N P S	Shah, Biological Sci	ences (npshah@hku.hk)					
Teachers Involved								
Course Objectives	processin	To give students a broad understanding of modern practice and technologies used in meat and dairy production, processing and marketing.						
Course Contents & Topics	carcass i	Principles of animal nutrition and feed formulation; genetic selection and breeding of farm animals; slaughter and carcass inspection; meat preservation and safety; sensory quality of meat. Dairy processing emphasizing fermented products such as cheese and yogurt; probiotics and health effects. Meat and dairy product marketing.						
Course Learning			this course, students should be		roduct marketing.			
Outcomes	CLO 1 ur	nderstand modern p	ractices in meat and dairy produ	uction				
			edge and understanding of mea vation or improvement of meat a	t and dairy sensory quality, and th and dairy products	e technologies use			
	CLO 3 de	emonstrate knowled	lge of selected issues related to	meat and dairy safety				
Pre-requisites and Co-requisites and Impermissible combinations)	Pass in B	Pass in BIOL3201						
Offer in 2021 - 2022	N Off	er in 2022 - 2023 : I	V	Examination				
Grade Descriptors (A+ to F)	A	evidence of creative a analysis of data and r	ability and competence in professional-	Show strong analytical and critical abilities level problem solving. Critically use lab subscriptions to real-world problems. Determine the conclusions to real-world problems.	skills and techniques an			
	B Demonstrate substantial grasp of the subject matter covered. Show evidence of analytical and critical abilities and logical thinking with some evidence of competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw generally appropriate conclusions to real-world problems. Demonstrate effective team-based organizational and presentational skills.							
	С	Demonstrate general but incomplete grasp of the subject matter covered. Show some evidence of analytical and critical abilities and logical thinking with limited competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw moderately appropriate but sometimes erroneous conclusions to real-world problems. Demonstrate moderately effective team-based organizational and presentational skills.						
	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Show some evidence of coherent and logical thinking, but lacking competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw sometimes appropriate but often erroneous conclusions to real-world problems. Demonstrate team-based organizational and presentational skills of limited effectiveness.							
	Pail  Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of coherent and logical thinking, and minimal competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results ineffectively, leading generally to inappropriate and usually erroneous conclusions to real-world problems. Demonstrate ineffectiveness team-based organizational and presentational skills.							
Communication- Intensive Course	N		·					
Course Type	Lecture w	ith laboratory comp	onent course					
Course Teaching	Activities	5	Details		No. of Hours			
Learning Activities	Lectures							
	Laborato	ry						
	Tutorials	•			6			
	Reading	/ Self study			100			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin			
	Examinat	ion		80	CLO 1,2,3			
	Laborato			20	CLO 1,2,3			
Required/recommended		, ,	awrie (CRC Press, 2006)	20	OLO 1,2			
eading and				lara, N Shah (Eds) (Blackwell, 20	08)			
online materials	I- 44 //	-11 1-1 1-1-/						
Course Website		dle.hku.hk/		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				
Additional Course	This cours	se will be offered su	ibject to a minimum enrollment r	number and availability of teachers	3.			

BIOL4208	Meat, dairy and grain sciences (6 credits)	Academic Year	2021
Offering Department	Biological Sciences	Quota	15
Course Co-ordinator	Prof N P Shah, Biological Sciences (npshah@hku.hk)		
Teachers Involved	(Dr J C Y Lee, School of Bioloigcal Science)		
	(Prof N P Shah, School of Biological Science)		

Course Objectives	To give students a broad understanding of modern practice and technologies used in agriculture products including meat, dairy and grain production, processing and marketing.					
Course Contents & Topics	Principles of animal nutrition and feed formulation; genetic selection and breeding of farm animals; slaughter and carcass inspection; meat preservation and safety; sensory quality of meat. Dairy processing emphasizing fermented products such as cheese and yogurt; probiotics and health effects. Grain production related to milling dough rheology; the baking process and quality. Meat, dairy and grain product marketing.					
Course Learning	On succe	ssful completion of this c	ourse, students should be	pe able to:		
Outcomes	CLO 1 ui	nderstand modern praction	ces in meat, dairy and gi	ain production		
		emonstrate a knowledge			uality, and the	technologies used
		processing, preservation				
		emonstrate knowledge of nderstand the technology		•	у	
Pre-requisites		IOL3201 or (BIOL2101 a	· · · · · · · · · · · · · · · · · · ·	•		
(and Co-requisites		udents who have passed		ise), and		
and Impermissible		udents who have passed				
combinations)						
Offer in 2021 - 2022	N Off	fer in 2022 - 2023 : N		E	xamination	
Grade Descriptors (A+ to F)	A	evidence of creative ability	o of the subject matter covere and competence in professio to draw appropriate and insig and presentational skills.	nal-level problem solving. Cri	tically use lab ski	lls and techniques and
	B Demonstrate substantial grasp of the subject matter covered. Show evidence of analytical and critical abilities and logical thinking with some evidence of competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw generally appropriate conclusions to real-world problems. Demonstrate effective team-based organizational and presentational skills.					
	С	Demonstrate general but incomplete grasp of the subject matter covered. Show some evidence of analytical and critical abilities and logical thinking with limited competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw moderately appropriate but sometimes erroneous conclusions to real-world problems. Demonstrate moderately effective team-based organizational and presentational skills.				
	D Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Show some evidence of coherent and logical thinking, but lacking competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw sometimes appropriate but often erroneous conclusions to real-world problems. Demonstrate team-based organizational and presentational skills of limited effectiveness.					
	Fail  Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of coherent and logical thinking, and minimal competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results ineffectively, leading generally to inappropriate and usually erroneous conclusions to real-world problems. Demonstrate ineffectiveness team-based organizational and presentational skills.					
Communication- intensive Course	N					
Course Type	Lecture w	vith laboratory componen	t course			
Course Teaching	Activitie	S	Details			No. of Hours
& Learning Activities	Lectures					24
	Laborato	ry				24
	Reading	/ Self study				100
Assessment Methods and Weighting	Methods		Details		ng in final grade (%)	Assessment Methods to CLO Mapping
	Examina	tion			70	CLO 1,2,3,4
		ry reports			30	CLO 1,2,3
Required/recommended						
reading and	,	cessing and Quality Assu	,	, , , ,	,	3)
online materials		edia of Grain Science, ec	lited by Wrigley CW, Co	rke H, and Walker CE (2	2004)	
Course Website		odle@hku.hk				
Additional Course Information	The cours	se will be offered subjecte	ed to a minimum enrollm	ent number and availab	ility of teacehr	S.

BIOL4209	Functional foods (6 credits)	Academic Year	2021			
Offering Department	Biological Sciences	Quota	40			
Course Co-ordinator	Dr L Zhang, Biological Sciences (Izhang@hku.hk)					
Teachers Involved	(Dr L Zhang,Biological Sciences) (Dr T C S Lam,Biological Sciences)					
Course Objectives	To provide a fundamental understanding of the rapidly emerging fun emphasis on the history, regulation, chemical basis and quality control effects on human health.					
Course Contents & Topics	nutraceuticals based on their chemical structures; unsaturated fatty a fibers as healthy food ingredients; health benefits of dietary phen	Concept, history and global regulation of functional foods and nutraceuticals; classification of functional foods and nutraceuticals based on their chemical structures; unsaturated fatty acids, proteins, food pigments and dietary fibers as healthy food ingredients; health benefits of dietary phenolics, terpenes, phytosterols and sulphurcontaining compounds; probiotics and prebiotics; small berries, spices, teas and herbs for health; quality control and assurance of functional foods and putraceuticals.				
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 understand the definition and global regulation of functional food	ds and nutraceuticals				
	CLO 2 have substantial chemical knowledge of functional food and nut	raceutical products				
	CLO 3 be able to describe examples of functional foods and interpret critically their claimed health benefits					
	CLO 4 demonstrate understanding of the current functional food and nutraceutical industry					
	CLO 5 understand major techniques and technologies for quality control and manufacturing of healthy products					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BIOL3202					
Offer in 2021 - 2022	Y 1st sem Offer in 2022 - 2023 : Y	Examination	Dec			
Grade Descriptors (A+ to F)	A Demonstrate thorough grasp of the subject matter covered. Show strong a evidence of creative ability and competence in professional-level problem and insightful conclusions to real-world problems. Demonstrate highly eff skills.	solving. Critically use knowledge	to draw appropriate			

	В		tical abilities and logical raw generally appropriate al skills.			
	С	and logical thinking v	out incomplete grasp of the subje- with limited competence in prol times erroneous conclusions to sentational skills.	fessional-level problem solv	ing. Use knowled	ge to draw moderately
	D	evidence of coherent a sometimes appropriate presentational skills of		ompetence in professional-levels to real-world problems. D	vel problem solving emonstrate team-b	. Use knowledge to draw pased organizational and
	Fail	and logical thinking,	o grasp, with retention of little rel and minimal competence in pro ate and usually erroneous concl sentational skills.	fessional-level problem solv	ing. Use knowled	ge ineffectively, leading
Communication- intensive Course	N					
Course Type	Lecture-b	ased course				
Course Teaching	Activities		Details	Details		
& Learning Activities	Lectures					
	Tutorials		tutorials/seminars	tutorials/seminars		12
	Reading / Self study					100
Assessment Methods and Weighting	Methods		Details	_	nting in final e grade (%)	Assessment Methods to CLO Mapping
	Assignme	ents			30	CLO 1,2,3,4,5
	Examinat	ion			50	CLO 1,2,3,4,5
	Test				20	CLO 1,2,3,4,5
Required/recommended reading and online materials			of Nutraceuticals and Func unctional Foods and Nutrac			ess, 2005)
Course Website	http://mod	dle.hku.hk/				
Additional Course Information	This cours	se will be offered sul	oject to a minimum enrollm	ent number and availab	ility of teachers	S.

BIOL4210	Food p	roduct developme	ent (6 credits)	Academic Year	2021	
Offering Department	Biologica	Biological Sciences Quota				
Course Co-ordinator	Dr M F V	Vang, Biological Scien	ces (mfwang@hku.hk)			
Teachers Involved	(Dr M F \	Wang,Biological Scien	ices)			
Course Objectives			ots and techniques used in food dopment and production of a new		vide small grou	
Course Contents & Topics	History and future of the food industry; industrial product development process; idea generation and prototype development for new food products; quality management and legal protection; marketing strategies; food labeling food package design; new product development for different food industries.					
Course Learning	On succe	essful completion of th	is course, students should be abl	e to:		
Outcomes	CLO 1	understand the food p	roduct development cycle			
	CLO 2	know the key steps in	new product development			
	CLO 3	demonstrate enhance	d insight and understanding of cu	rrent and future trends in the food	lindustry	
	CLO 4	have professional leve	el practical experience in new prod	duct development		
	CLO 5	know the main charac	teristics of different sectors of the	food industry		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	BIOL3203 or BIOL420	5			
Offer in 2021 - 2022	N O	ffer in 2022 - 2023 : N		Examination		
Grade Descriptors (A+ to F)	A B	evidence of creative ability and competence in professional-level problem solving. Critically use lab skills and techniques and analysis of data and results to draw appropriate and insightful conclusions to real-world problems. Demonstrate highly effective team-based organizational and presentational skills.				
		thinking with some evidence of competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw generally appropriate conclusions to real-world problems. Demonstrate effective team-based organizational and presentational skills.				
	С	Demonstrate general but incomplete grasp of the subject matter covered. Show some evidence of analytical and critical abilities and logical thinking with limited competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw moderately appropriate but sometimes erroneous conclusions to real-world problems. Demonstrate moderately effective team-based organizational and presentational skills.				
	D					
	Fail	and logical thinking, and data and results ineffe	grasp, with retention of little relevant information of minimal competence in professional-leventively, leading generally to inappropriations team-based organizational and pres	el problem solving. Úse lab skills and tech e and usually erroneous conclusions to	niques and analysis	
Communication- intensive Course	N					
Course Type	Laborato	ory and workshop cour	se			
Course Teaching	Activitie	es	Details			
Learning Activities	Laborato	ory				
	Group w	vork	80-100 hours group project v	80-100 hours group project work		
	Tutorials		10 lectures + 12 tutorials		22	
		y / Self study			100	
Assessment Methods and Weighting	Method		Details	Weighting in final course grade (%)	Assessment Methods to CLO	

				Mapping		
	Assignments	assessment of group product development project including inclass presentation	80	CLO 1,2,3,4,5		
	Test		20	CLO 1,2,3,4,5		
Required/recommended reading and online materials	E. Graf and I. S. Saguy: Food Prod	A. L. Brody and J. B. Lord: Developing New Food Products for a Changing Marketplace (CRC Press, 2007) E. Graf and I. S. Saguy: Food Product Development (Avi Books, 1991) G. W. Fuller: New Food Product Development (CRC Press, 2005)				
Course Website	http://moodle.hku.hk/					
Additional Course Information	This course will be offered subject	to a minimum enrollment number and	l availability of teachers	S.		

BIOL4301	Fish and	fisheries (6 credits	5)	Academic Year	r 2021		
Offering Department	Biological :	Sciences		Quota	40		
Course Co-ordinator	TBC, Biolo	gical Sciences ()					
Teachers Involved	(TBC,)	(TBC,)					
Course Objectives	abiotic asp - to provid fishery ma - to cover t	<ul> <li>to acquaint students with the principles governing interrelationships among fishes as well as with biotic and abiotic aspects of their environment for an understanding of population dynamics and multispecies interactions.</li> <li>to provide an understanding of how species diversity and selected aspects of their life history are relevant to fishery management challenges, sustainable supply of seafood, and the conservation of threatened species.</li> <li>to cover the theoretical and practical aspects of marine fisheries management, fish farming and fish conservation using local, regional and global examples</li> </ul>					
Course Contents				epts and adaptation. Multispe	cies interactions ir		
& Topics	Introduction to course: phylogenetic, biological and ecological concepts and adaptation. Multispecies interactions in marine and freshwater fish assemblages. Fishery theory; how do fisheries work? Status of the world's capture fisheries; fish stock assessment and fishery management practices using local, regional and global examples. The roles of mariculture and capture fisheries for seafood supply and relationship to capture fisheries. Fishery management and fish conservation. Conclusion: fish biodiversity and fishery production; ethics of fish research and exploitation; climate change and the future of fish and fisheries.						
Course Learning			ourse, students should be able to	):			
Outcomes	CLO 1 understand the basis of fish species diversity in relation to phylogenetic, ecological and biological factors CLO 2 appreciate the direct and indirect impacts and consequences of human activities on fish species and species assemblages and implications for seafood security  CLO 3 understand of the functioning of fisheries and standards of fisheries assessment, development and management  CLO 4 appreciate the mutual dependency of humans with fished populations in relation to their long-term sustainability  CLO 5 enhance the ability for critical and synthetic thinking and to consider innovative approaches to research						
	an	d management					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Blo	OL3301 or BIOL3303					
Offer in 2021 - 2022	N Offe	er in 2022 - 2023 : N		Examination			
Grade Descriptors (A+ to F)	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, ability to integrate and synthesize information, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective presentational skills. Strong evidence of clear attention to thoughtful and reflective thinking.  B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, integration of materials and ability to apply knowledge to familiar and some unfamiliar situations. Demonstrate effective presentational skills. Evidence of clear attention to thoughtful and reflective thinking.  C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective presentational skills. Little evidence of clear attention to thoughtful and reflective thinking.  D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes.						
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BIOL4302	Environ	mental impact asse	ssment (6 credits)	Academic Yea	r 2021			
Offering Department	Biological			Quota	30			
Course Co-ordinator	Dr J Wu, E	Biological Sciences <i>(jin</i> พ	ru @hku.hk)					
Teachers Involved	(Dr C H H	Dr B Russell,Biological Sciences) Dr C H Hau,Biological Sceinces) Dr J Wu,Biological Sciences)						
Course Objectives		To introduce the general principles, processes, techniques, current practices and problems of environmental mpact assessment (EIA).						
Course Contents	_	•	•	rying capacity and precaution				
& Topics	remediation Common EIA instru	on. Cost benefit analys techniques employed in ments (environmental li	sis. Šocio-economic perspectiv s EIA (e.g. matrix, sequence di	and management. Mitigator res and analysis. Project mor agram, causal chain analysis, l e and environmental share). Ap	nitoring and audit modeling). Moder			
Course Learning		•	course, students should be able	to:				
Outcomes	CLO 1	inderstand the operation	of EIA systems in Hong Kong	and overseas				
			ues in assessing environmenta					
				environmental impact assessm	ent			
	CLO 4 p	olan ecological surveys i	n EIA projects					
Pre-requisites (and Co-requisites and Impermissible combinations)	(ENVS300	BIOL2103 or BIOL2306); 04 or any BIOL3XXX coi	urse)					
Offer in 2021 - 2022	-	l sem Offer in 2022 - 2		Examination	No Exam			
Grade Descriptors (A+ to F)	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, ability to integrate and synthesize information, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective presentational skills. Strong evidence of clear attention to thoughtful and reflective thinking.							
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, integration of material sand ability to apply knowledge to familiar and some unfamiliar situations. Demonstrate effective presentational skills. Evidence of clear attention to thoughtful and reflective thinking.							
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective presentational skills. Little evidence of clear attention to thoughtful and reflective thinking.							
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities and little attempt at integration. Show limited ability to apply knowledge to solve problems. Apply limited effectiveness in presentational skills. Lack of attention to thoughtful and reflective thinking.							
	Fail	Fail Demonstrate little or no Lack of analytical and critic	evidence of command of knowledge a	and skills required for attaining the coung. Show very little or no ability to apactive or ineffective.				
Communication- intensive Course	N							
Course Type		ith laboratory componen						
Course Teaching	Activities	3	Details		No. of Hours			
& Learning Activities	Lectures			24				
	Field worl		field trip / tutorials		24			
	_	Self study	student center learning		70			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignments			80	CLO 1,2,3,4			
	Laborator	y reports		20	CLO 1,2			
	J. Glasson, R. Therivel & A. Chadwick: Introduction to Environmental Impact Assessment			mental Impact Assessment (I				
Required/recommended		n, R. Therivel & A. Cha	adwick: introduction to Environ					
•		n, R. Therivel & A. Cha	adwick: introduction to Environ	montal impact 7.00000mont, (E	ondon: Routleage			
reading and	J. Glasson 2005) HKSAR G HKSAR G		Memorandum for Environmen	tal Impact Assessment Ordina				
reading and online materials	J. Glasson 2005) HKSAR G HKSAR G Reference	Government: Technical Government, 1998)	Memorandum for Environmen	·				
reading and online materials Course Website	J. Glasson 2005) HKSAR G HKSAR G Reference http://moo	Government: Technical lovernment, 1998) es: To be provided in cla dle.hku.hk	Memorandum for Environmen	tal Impact Assessment Ordina				
Required/recommended reading and online materials  Course Website  Additional Course Information	J. Glasson 2005) HKSAR G HKSAR G Reference http://moo	Government: Technical lovernment, 1998) es: To be provided in cla dle.hku.hk	Memorandum for Environmen	tal Impact Assessment Ordina				

BIOL4303	Animal behaviour (6 credits)	Academic Year	2021		
Offering Department	Biological Sciences	Quota	30		
Course Co-ordinator	Dr L Karczmarski, Biological Sciences (leszek@hku.hk)				
Teachers Involved					
Course Objectives	This course teaches students the ways and means of exploring and understanding animal behaviour; it provides insights into a field of science that investigates everything animals do, including the underlying mechanisms and functions of specific behaviours; the ways in which animals interact with each other, with their physical environment and other organisms; how animals find and defend resources, avoid predators, choose mates, reproduce, and care for their young; how complex animal societies are formed and how behaviour of an individual affects the structure of a population				
Course Contents & Topics	of a population.  This course will introduce students to scientific reasoning and conceptual basis of an understanding of animal behaviour and behavioural ecology. What causes specific behaviour and what are the underlying mechanisms? How does behaviour develop within the individual's lifetime and what functions does it serve? For example; why are some species monogamous while others are polygamous? What makes one organism the hunter and another the hunted? Several animal species, including humans, tend to live in groups; social life is among the most complex and effective survival strategy. However, how could, for instance, the birth of sterile castes, like in bees, be explained through an evolving mechanism which emphasizes the reproductive success of as many individuals as possible? Why, among animals living in small groups like squirrels, would an individual risk its own life to save the rest of the group? In this course, based upon ecological and evolutionary principles, students will learn to think				

	behaviour research	within the paradigm of behavioural ecology and understand the causes, functions, development, and evolute ehaviour. We will discuss several classical studies that form the foundation of this field, as well as more essearch that represents the current concepts which have led to modern understanding of animal behaviors.					
		rill also illustrate the links between the recent extraordinary advances in behavioural ecology and socio-ecol rith their application in animal conservation.					
Course Learning		successful completion of this course, students should be able to:					
Outcomes			ises, functions, development, and evo	olution of animal behavior	ır		
			of interactions between environmenta				
	CLO 3 ap	preciate current theories	s that form basis for modern understa	nding of animal behaviou	r		
	CLO 4 le	arn the scientific reasoni	ng and methodology in the field of An	imal Behaviour			
			s of behavioural ecology, animal so behaviour contributes to its conservat		kity, and how the		
Pre-requisites		IOL2306; and					
and Co-requisites and Impermissible combinations)		ne of the following course udents who have passed	es: BIOL3301, BIOL3313, BIOL3319, in BIOL3101	BIOL3320 or BIOL3419			
Offer in 2021 - 2022	N Off	er in 2022 - 2023 : N		Examination			
Grade Descriptors (A+ to F)	A	excellent use of named exar of fundamental concepts to	p of the subject in a broader comparative per- nples and case studies. Evidence of independer draw insightful and logical conclusions. Show e with excellent analytical argumentation. Excelle	ent critical thought with excelled eagerness to learn, great abilitie	nt use of a broad range es of independent work,		
	В	Evidence of a good grasp of and some case studies. Ev outstanding) abilities of inde	the subject as demonstrated by some backgrr ridence of good critical thought, although not spendent work, effective presentation skills we ed knowledge to draw meaningful and logical	t necessarily original. Good a vith good analytical and logica	nd very good (but not argumentation. Good		
	Demonstrate an adequate, but not coherent and incomplete grasp of the subject, with limited background reading and limited use of named examples and case studies. Some abilities of logical critical thinking, but not insightful and/or independent; only partial abilities to use acquired knowledge and work independently to draw meaningful conclusions. Fair presentation skills, with mostly correct argumentation, but limited (or no) abilities to integrate broader concepts. Work sufficient for what is required for degree level.						
	Demonstrate some grasp of the subject, but partial and limited to the most basic concepts, examples, and limited (or none) case studies. Insufficient evidence of background reading, limited abilities of critical independent thinking, and not particularly effective presentation skills with generally weak logical argumentation and restricted ability of drawing appropriate conclusions. Work barely meets what is required at degree level.						
	Fail  No evidence of basic minimum knowledge and understanding of the subject. No evidence of background reading and no familiarity with any relevant examples and case studies. Inadequate evidence of coherent logical thought; ineffective presentation skills with poor argumentation and no abilities to draw meaningful conclusions. Work fails to reach degree level.						
Communication-	N		ŭ	Ţ.			
ntensive Course							
Course Type	Lecture w	ith laboratory component	t course				
Course Teaching	Activities	S	Details	No. of Hours			
Learning Activities	Lectures				24		
	Laborato	ry	including field trips, site visits, interactive practical/visual		32		
	Project w	ork	sessions, classroom debates		8		
		/ Self study	project work review		60		
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO		
	Assignme	ents	active participation/continuous	55	Mapping CLO 1,2,3,4,5		
			assessment/presentation				
Paguirad/racammandad	Examinat		he Behavior of Animals: Mechani	45	CLO 1,2,3,4,5		
Required/recommended reading and online materials	Publishing Danchin E Dugatkin	g 2005) E., Giraldeau L-A. & Cezi L.A.  Principles of Anima	Ily F. Behavioural Ecology (Oxford U Behavior (2nd edition) (W.W. Norton cyclopedia of Animal Behavior (Acade	niversity Press 2008) a & Company 2009)	olulion (blackwell		
Course Website		v.biosch.hku.hk/ecology/		1111011033 2010)			
Additional Course		se is offered in alternate					
nformation				d availability of teachers			
	. The court	his course will be offered subject to a minimum enrollment number and availability of teachers.					

BIOL4304	Ecosystem functioning and services (6 credits)	Academic Year	<b>/ear</b> 2021			
Offering Department	Biological Sciences	Quota	30			
Course Co-ordinator	Dr B Russell, Biological Sciences (brussell@hku.hk)					
Teachers Involved	(Dr B Guenard,Biological Sciences) (Dr B Russell,Biological Sciences) (Dr C Dingle,Biological Sciences) (Dr S Cannicci,Biological Sciences) (Guester Lecturer,Biological Sciences)					
Course Objectives	This course will introduce the functioning of terrestrial, fresh water and marine ecosystems and the services which they provide human populations. The concept of ecosystem services will be further expanded into "value", including financial, cultural, social and, importantly, the intrinsic value that may be priceless. We will also explore how human activities degrade these ecosystem services and how protecting ecosystems and biodiversity can increase the ecosystem services supplied to humans.					
Course Contents & Topics	Natural ecosystems provide trillions of dollars' worth of ecosystem services to hu services go unrecognized and undervalued. In fact, because humans rely on ecomay be priceless. This course will first cover the function of different ecosystems marine environments. Students will then be introduced to the concept of ecosystem to human populations. Finally, human activities which degrade ecosystems and recan provide these services, and what that means for human populations, will be independent and creative thinking when proposing solutions to the question of human populations.	osystems many of from terrestrial of services and vertices and vertices the extent of covered. Studies	of these service, fresh water and what they provide that ecosystem ents will develop			

	inherent	herent properties rather than perceived monetary value.				
Course Learning		essful completion of this of				
Outcomes	CLO 1 Demonstrate an understanding of the complexity and function of ecosystems					
		xplain how ecosystems				
				ulate the value of ecosystem services		
		emonstrate knowledge of angers of placing a value		hods used to calculate the value of e	ecosystems and the	
		emonstrate an understa cosystem services	anding of how human a	ctivities reduce the function of ecosy	stems and reduces	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in	,	ourses: BIOL3301 or E	SIOL3303 or BIOL3313 or BIOL331	9 or ENVS3019 or	
Offer in 2021 - 2022	Y 1s	t sem Offer in 2022 - 20	023 : N	Examination	Dec	
Grade Descriptors (A+ to F)	A	Evidence of a thorough gras familiarity with relevant back skills. Ample evidence of in comparative perspective to	sp of the subject and relevant kground reading and case stu dependent critical thought wit draw insightful and logical o	research techniques. Eagerness and enthusia dies. Exemplary handling of field data collectio h excellent use of a broad range of fundamen conclusions. Show outstanding abilities of ind n. Excellent or outstanding work relative to w	sm to learn and excellent n and excellent analytical tal concepts and broader ependent work, effective	
	В	Evidence of a good grasp of with relevant background re Good evidence of critical the consideration of broader consideration of broader consideration.	eading and case studies. Go hought (although not always omparative perspective in dra	search techniques. Interest in learning and good handling of field data collection and comm independent), with an appreciable use of fur wing logical conclusions. Good abilities of ind on. Work more than sufficient for what is require.	nendable analytical skills. Indamental concepts and dependent work, effective	
	Demonstrate an adequate, but incomplete grasp of the subject and relevant research techniques. Moderate familiarity with relevant background reading and case studies, but no interest in learning beyond the adequate average level. Evidence of logical critical thinking (although not always independent), with mostly good use of fundamental concepts to draw logical conclusions. Fair presentation skills, with mostly correct argumentation, but limited (or no) abilities to integrate broader concepts. Work sufficient for what is required for degree level.					
	Demonstrate some grasp of the subject, but only partial and with limited understanding of relevant research concepts and research techniques. Some familiarity with relevant case studies, but insufficient evidence of background reading and limited abilities of critical independent thinking. Ineffective presentation skills with generally weak logical argumentation with restricted ability of drawing appropriate conclusions. Work barely meets what is required at degree level.					
	Fail  No evidence of basic a minimum grasp of the subject and the minimum relevant research techniques. No evidence of background reading and no familiarity with any relevant examples and case studies. Inadequate evidence of coherent logical thought; ineffective presentation skills with poor argumentation and no abilities to draw meaningful conclusions. Work fails to reach degree level.					
Communication- intensive Course	N	· ·				
Course Type	Lecture-b	ased course				
Course Teaching	Activitie	s	Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials				12	
	Reading	/ Self study			70	
Assessment Methods and Weighting	Methods	3	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignm	ents		40	CLO 1,2,3,4,5	
	Examina			40	CLO 1,2,3,4,5	
	Presenta	ition		20	CLO 1,2,4,5	
Required/recommended reading and online materials	Students	will be directed to releva	int scientific literature an	d websites		
Course Website	http://mo	odle.hku.hk				
Additional Course			2017			
		fer in alternate year from 2016-2017 his course will be offered subject to a minimum enrollment number and availability of teachers.				

BIOL4401	Medical microbiology and applied immunology (6 credits)	Academic Year	2021				
Offering Department	Biological Sciences	Quota	40				
Course Co-ordinator	Dr W Y Lui, Biological Sciences (wylui@hku.hk)						
Teachers Involved	(Dr A Yan,Biological Sciences) (Dr C G Zheng,Biological Sciences) (Dr W Y Lui,Biological Sciences)						
Course Objectives	The objective is to provide students the knowledge on the practical application biological research, clinical analysis and disease diagnosis.	ons of immunology ar	d microbiology ir				
Course Contents & Topics	Application of antigen-antibody interaction in advanced research such as chromatin. immunoprecipation assay, co immunoprecipitation and dual immunofluorescence analysis.  Principles of flow cytometry and its application.  Tumor immunology and immunotherapy such as FDA-approved checkpoint inhibitor immunotherapy and chimeric antigen receptor (CAR) T-cell therapy.  Microbial pathogens and associated diseases, host immune response, antimicrobial agents and multidrug resistance, epidemiology and prevention of microbial infections.  Clinical laboratory analysis in haematology, chemical pathology, and clinical microbiology. The application of these testing methods in the diagnosis of disease associated with major systems of the human body and the diagnosis of						
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 apply the principles of antigen-antibody interaction in various advanced research techniques						
	CLO 2 demonstrate knowledge on microbial pathogens, mechanisms for their disease-causing, and principles of antibiotic development						
	CLO 3 understand the scientific principles of various clinical laboratory analyses						
	CLO 4 promote public attention on control of microbial infection and the spread of antibiotic resistance						
Pre-requisites (and Co-requisites	Pass in BIOL3401						

and Impermissible combinations)						
Offer in 2021 - 2022	Y 2nd	sem Offer in 2022	- 2023 : N	Examination	May	
Grade Descriptors (A+ to F)	,	Demonstrate thorough mastery at an advanced level of extensive knowledge required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to appl knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentations skills.				
	_	Demonstrate substantial command of a broad range of knowledge required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.				
		evidence of some analy Apply moderately effect	tical and critical abilities and log tive lab skills and techniques.	ledge required for attaining most of the course I gical thinking, and ability to apply knowledge to Mostly correct but some erroneous use of da anizational and presentational skills.	most familiar situations	
	D	appropriate conclusions. Apply moderately effective organizational and presentational skills.  Demonstrate partial but limited command of knowledge required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.				
Communication- Intensive Course	N					
Course Type	Lecture with	n laboratory compor	nent course			
Course Teaching	Activities		Details	No. of Hours		
Learning Activities	Lectures				24	
	Laboratory				20	
	Tutorials				6	
	Reading / S	Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Examination	n		50	CLO 1,2,3	
	Laboratory reports			30	CLO 1,2,3	
	Test			20	CLO 1,2,3	
Required/recommended reading and contine materials	To be anno	unced in class	·	·		
Course Website	http://mood	le.hku.hk/				
Additional Course	This course	http://moodle.hku.hk/ This course will be offered subject to a minimum enrollment number and availability of teachers.				

BIOL4402	Microb	ial biotechnology (6 credits)		Academic Year	2021		
Offering Department	Biologica	al Sciences		Quota	30		
Course Co-ordinator	, Biolo	gical Sciences ()					
Teachers Involved	(,Biolo	ogical Sciences)					
Course Objectives	biotechn the end	This course is intended for students who would like to understand the application of modern microbiology in biotechnology. The microbial systems being used include different types of viruses, bacteria, fungi and algae. At the end of the course the students are expected to know the parameters and conditions that affect the yield of production and the systems available for the expression of vaious types of biotechnology products.					
Course Contents & Topics	microbia algae wi limited to	Upstream and downstream processing will be briefly described to equip the students with the background for microbial biotechnology. The latest advances in microbial expression systems using viruses, bacteria, yeasts and algae will be reviewed. Specific examples on the use of these systems will be provided. These include but no limited to production of recombinant vaccines, secondary metabolites, food and food additives, industrial enzymes and biopesticides as well as bioremediation and medical diagnostics.					
Course Learning	On succ	essful completion of this course, students sho	uld be able to:				
Outcomes	ŀ	explain the fundamental biochemical concep piotechnology products	, 0	•			
	CLO 2 understand the importance of the current recombinant technology for large-scale manufacturing of various protein products						
	CLO 3 describe the major expression systems, understand their purposes, advantages, and disadvantages						
	CLO 4 deliver a professional group presentation on a self-decided topic related to microbial biotechnology						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in I	BIOL3401					
Offer in 2021 - 2022	N O	ffer in 2022 - 2023 : N		Examination			
Grade Descriptors (A+ to F)	Α	Demonstrate thorough mastery at an advanced level learning outcomes. Demonstrate deep understandir theories, principles, evidence and techniques. Illustra full range of high quality sources and to quote/refer	ng of the subject. Demonstrate in ate insightful use and critical anal	ntegration of the full of the	range of appropriate formation drawn from		
	В	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining most of the course lea outcomes. Demonstrate substantial grasp of the subject. Demonstrate general integration of theories, principles, evidence techniques. Illustrate critical use of relevant information from sources, showing ability to make meaningful comparisons be different secondary interpretations and to quote/reference aptly. Apply effective organizational and presentational skills.					
	С	Demonstrate general but incomplete knowledge a Demonstrate general but incomplete grasp of the su and techniques. Illustrate use of relevant informati interpretations and to quote/reference aptly. Apply m	bject. Demonstrate some partial in on from sources, showing ability oderately effective organizational	integration of theories to make comparison and presentational sk	, principles, evidence ns between different ills.		
	D	Demonstrate limited knowledge and skills required fi limited grasp, with retention of some relevant informa and techniques. Demonstrate use and reference o comparison. Apply limited or barely effective organiza	tion, of the subject. Show limited f several sources, but mainly th	integration of theories	, principles, evidence		
	Fail	Demonstrate little or no knowledge and skills require	d for attaining the course learning	g outcomes. Demonst	rate evidence of little		

	or no grasp of the knowledge and understanding of the subject. Show little or no or inapt integration of theories evidence and techniques. Show limited use of secondary sources and no critical comparison of them. Organ presentational skills are minimally effective or ineffective.					
Communication- intensive Course	N					
Course Type	Lecture-based course					
Course Teaching	Activities	Details		No. of Hours		
& Learning Activities	Lectures			30		
	Tutorials	including group present	including group presentations			
	Reading / Self study			100		
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments		30	CLO 1,2,3,4		
	Examination		70	CLO 1,2,3		
Required/recommended reading and online materials	Co., 1995)	A. N. Glazer and H. Nikaido: Microbial Biotechnology: Fundamentals of Applied Microbiology (W. H. Freeman &				
Course Website	http://moodle.hku.hk/	· · · · · · ·	<b>y</b> .			

BIOL4409	General	virology (6 credits)		A	cademic Year	2021
Offering Department	Biological	Sciences		C	luota	30
Course Co-ordinator	Dr W B L I	im, Biological Science	s (bllim @hku.hk)			
Teachers Involved	(Dr W B Li	m,School of Biological	Sceinces)			
Course Objectives	major viral virology, m	diseases that affect a nedicine and biotechnol	nental principles of virology so nimal health. The course will p ogy.			
& Topics	Fundamental Virology  1. Classification and Nomenclature of Viruses  2. Virus structure: Capsid symmetry, Icosahedral symmetry  3. Virus structure: Genetic Materials, Nucleocapsid, Envelope  4. Virus entry: Receptors, uncoating and fusion  5. Virus-Cell interaction  6. RNA viruses: Genome replication and mRNA production  7. Baltimore Class IV (+) s.s. RNA viruses: Picornaviruses  8. Baltimore Class IV (-) s.s. RNA viruses: Myxoviruses  9. Ambisense RNA viruses: Bunyaviruses and Arenaviruses  10, 11. Baltimore Class VI (+) s.s. RNA viruses: Retroviruses  12. Baltimore Class III d.s. RNA viruses: Reoviruses  13, 14. Baltimore Class I d.s. DNA viruses: Adenoviruses, Herpesviruses  15. Baltimore Class II s.s. (+) DNA viruses: Parvoviruses  16. Mechanisms of Viral Oncogenesis  17. Anti-viral treatments  18. Viruses as Tools in Medicine and Biotechnology  Practical Virology  19. Specimen Collection, Transportation and Processing, Quality Assurance & Laboratory Safety  20. Virus isolation, propagation and titration  21, 22. Virus Identification: Immunocytochemical assays, ELISA,					
	Compleme	ent Fixation Assay, Hen	nocytochemical assays, ELISA nagglutination and HI assays	,		
•	Compleme 23, 24. Ne On succes CLO 1 be CLO 2 ga	ent Fixation Assay, Her utralization assay and a sful completion of this familiar with virus clas in hand-on experience	nocytochemical assays, ELISA nagglutination and HI assays Antiviral assay course, students should be abl sification and the modes of rep s on common virological techni	e to: olication and transn iques	nission of variou	us viral families
Outcomes  Pre-requisites (and Co-requisites and Impermissible	Compleme 23, 24. Ne On succes CLO 1 be CLO 2 ga CLO 3 ca	ent Fixation Assay, Her utralization assay and a sful completion of this familiar with virus clas in hand-on experience	nocytochemical assays, ELISA nagglutination and HI assays Antiviral assay course, students should be abl sification and the modes of rep	e to: olication and transn iques	nission of variou	us viral families
Course Learning Outcomes  Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2021 - 2022	Compleme 23, 24. Ne On succes CLO 1 be CLO 2 ga CLO 3 ca Pass in Bl	ent Fixation Assay, Her utralization assay and a sful completion of this familiar with virus clas in hand-on experience rry out researches on v OL3401 or BIOL3403	nocytochemical assays, ELISA nagglutination and HI assays Antiviral assay course, students should be abl sification and the modes of rep s on common virological techni	e to: llication and transn iques	nission of variou	us viral families
Outcomes  Pre-requisites and Co-requisites and Impermissible combinations)  Offer in 2021 - 2022	Compleme 23, 24. Ne On succes CLO 1 be CLO 2 ga CLO 3 ca Pass in Bl	ent Fixation Assay, Her utralization assay and a sful completion of this familiar with virus clas in hand-on experience rry out researches on vOL3401 or BIOL3403  er in 2022 - 2023 : Y  Demonstrate thorough mas strong analytical skills and skills and techniques. Apply Demonstrate substantial or	nocytochemical assays, ELISA nagglutination and HI assays Antiviral assay course, students should be abl sification and the modes of reps on common virological technivirology after taking this course attery at an advanced level of knowleds competent ability to acquire knowledgy highly effective organizational and prominend of a broad range of knowleds and of a broad range of knowleds.	e to: olication and transniques  ge required for attaining e on new development escentational skills.  ge and skills required	<b>xamination</b> all the course lear of the subject. App for attaining at leas	 ning outcomes. Sho ly highly effective la st most of the cours
Pre-requisites and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Compleme 23, 24. Ne On succes CLO 1 be CLO 2 ga CLO 3 ca Pass in Ble  N Offe	ent Fixation Assay, Her utralization assay and a sful completion of this familiar with virus class in hand-on experience rry out researches on OL3401 or BIOL3403  er in 2022 - 2023 : Y  Demonstrate thorough masstrong analytical skills and skills and techniques. Apply Demonstrate substantial collearning outcomes. Show subject. Apply effective lab Demonstrate general but outcomes. Show evidence	nocytochemical assays, ELISA nagglutination and HI assays Antiviral assay course, students should be abl sification and the modes of reps on common virological technivirology after taking this course attery at an advanced level of knowledg competent ability to acquire knowledgy highly effective organizational and prommand of a broad range of knowledgevidence of analytical skills and adeciskills and techniques. Apply effective incomplete command of knowledge of some analytical skills and certain a	e to:  lication and transniques  ge required for attaining e on new development esentational skills.  Ige and skills required quate ability to acquire organizational and pres and skills required for bility to acquire knowle	xamination  all the course lear of the subject. App for attaining at leas knowledge on new entational skills. attaining most of dge on new develo	ning outcomes. Sho ly highly effective la st most of the cours development of th the course learnin pment of the subjec
Pre-requisites and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Compleme 23, 24. Ne On success CLO 1 be CLO 2 ga CLO 3 ca Pass in Blue N Offe A B C D	ent Fixation Assay, Her utralization assay and asful completion of this familiar with virus class in hand-on experience in hand-on experience arry out researches on vOL3401 or BIOL3403  er in 2022 - 2023: Y  Demonstrate thorough masstrong analytical skills and skills and techniques. Apply Demonstrate substantial culcaming outcomes. Show subject. Apply effective lab  Demonstrate general but outcomes. Show evidence Apply moderately effective  Demonstrate partial but lim  Show evidence of limited a effective lab skills and tech	nocytochemical assays, ELISA nagglutination and HI assays Antiviral assay course, students should be abl sification and the modes of rep so on common virological technivirology after taking this course attery at an advanced level of knowledged to the properties of	e to: olication and transniques  ge required for attaining e on new development esentational skills. ge and skills required for attaining to the skills required for ability to acquire forganizational and pres and skills required for bility to acquire showle to the skills required for attaining knowledge on new development of attaining knowledge on new development of the skills required for attaining knowledge on new development of the skills required for attaining knowledge on new development of the skills required for attaining knowledge on new development of the skills required for attaining knowledge on new development of the skills required for attaining knowledge on new development of the skills required for attaining the skills required f	xamination  all the course lear of the subject. App for attaining at leas knowledge on new entational skills. attaining most of dge on new develo tional and presenta some of the cours velopment of the su esentational skills.	ning outcomes. Shooly highly effective last most of the course development of the course learning pment of the subjectional skills.  e learning outcomesubject. Apply partially
Outcomes  Pre-requisites and Co-requisites and Impermissible combinations)  Offer in 2021 - 2022  Grade Descriptors (A+ to F)	Compleme 23, 24. Ne On succes CLO 1 be CLO 2 ga CLO 3 ca Pass in Bli  N Offe A  B	ent Fixation Assay, Her utralization assay and a sful completion of this familiar with virus clas in hand-on experience rry out researches on vOL3401 or BIOL3403  er in 2022 - 2023 : Y  Demonstrate thorough mas strong analytical skills and skills and techniques. Apply Demonstrate substantial or learning outcomes. Show subject. Apply effective lab Demonstrate partial but im Show evidence Apply moderately effective Demonstrate partial but lim Show evidence of limited a effective lab skills and tech Demonstrate little or no evi of analytical skills and abilit and abilits and abi	nocytochemical assays, ELISA nagglutination and HI assays Antiviral assay course, students should be abl sification and the modes of registrons of the sification and the modes of registrons of the sification and the modes of registrons of the sification and the modes of registrons of the sification and the modes of registrons of the sification and the sification of the sification of the sification and promised of the sification and promised of the sification of the sification of the sification of the sification and sification and the sification of the sification o	e to:  olication and transniques  ge required for attaining e on new development essentational skills.  Ige and skills required for ability to acquire organizational and pressand skills required for attaining knowledge on new development of the subject. As skills required for attaining knowledge on new development of the subject.	xamination  all the course lear of the subject. App for attaining at leas knowledge on new entational skills. attaining most of dge on new develo attaining most of dge on new develo attaining and presents some of the cours velopment of the si sesentational skills. ining the course lea upply minimally effe	ning outcomes. Show a strong to the course of the course learning pment of the subject tional skills.  The course learning outcomes of the subject. Apply partiall trining outcomes. Lacet and the subject. Lacet and the subject outcomes. Lacet and the subject outcomes. Lacet and the subject outcomes.
Outcomes  Pre-requisites and Co-requisites and Impermissible combinations Offer in 2021 - 2022 Grade Descriptors (A+ to F)	Compleme 23, 24. Ne On success CLO 1 be CLO 2 ga CLO 3 ca Pass in Blue N Offe A B C D	ent Fixation Assay, Her utralization assay and a sful completion of this familiar with virus clas in hand-on experience rry out researches on vOL3401 or BIOL3403  er in 2022 - 2023 : Y  Demonstrate thorough mas strong analytical skills and skills and techniques. Apply Demonstrate substantial or learning outcomes. Show subject. Apply effective lab Demonstrate partial but im Show evidence Apply moderately effective Demonstrate partial but lim Show evidence of limited a effective lab skills and tech Demonstrate little or no evi of analytical skills and abilit and abilits and abi	nocytochemical assays, ELISA nagglutination and HI assays Antiviral assay course, students should be abl sification and the modes of reps on common virological technicity of the sification and the modes of reps on common virological technicity of the sification and the modes of reps on common virological technicity of the sification and the modes of the sification of the sification and sificat	e to: olication and transniques ge required for attaining e on new development essentational skills. Ige and skills required for ability to acquire organizational and pressand skills required for attaining knowledge on new development of the subject. As required for attaining knowledge on new development of the subject. As required for attaining knowledge on the skills required for attaining knowledge on the skills required for attaining knowledge on the skills required for attaining the skills required for attaining the skills required for attaining the skills required for the subject. As the skills required for attaining the skills required for the subject.	xamination  all the course lear of the subject. App for attaining at leas knowledge on new entational skills. attaining most of dge on new develo attaining most of dge on new develo attaining and presents some of the cours velopment of the si sesentational skills. ining the course lea upply minimally effe	ning outcomes. Showing highly effective last most of the course development of the course learning by the subject tional skills.  The image is a subject to the subject. Apply partially the subject. Apply partially training outcomes. Lacetting in the subject.
Outcomes  Pre-requisites and Co-requisites and Impermissible combinations)  Offer in 2021 - 2022  Grade Descriptors (A+ to F)  Communication- ntensive Course Course Type	Compleme 23, 24. Ne On succes CLO 1 be CLO 2 ga CLO 3 ca Pass in Ble  N Offe A  B  C  D  Fail  N  Lecture wi	ent Fixation Assay, Her utralization assay and asful completion of this familiar with virus class in hand-on experience rry out researches on vOL3401 or BIOL3403  er in 2022 - 2023: Y  Demonstrate thorough masstrong analytical skills and skills and techniques. Apply Demonstrate substantial culearning outcomes. Show subject. Apply effective lab Demonstrate general but outcomes. Show evidence Apply moderately effective Demonstrate partial but lim Show evidence of limited effective lab skills and technomostrate little or no evi of analytical skills and abilit skills and techniques. Orgatth laboratory component	nocytochemical assays, ELISA nagglutination and HI assays Antiviral assay course, students should be abl sification and the modes of rep so on common virological technicity of the solution of the modes of rep so on common virological technicity of the solution of the modes of rep so on common virological technicity of the solution o	e to: olication and transniques ge required for attaining e on new development essentational skills. Ige and skills required for ability to acquire organizational and pressand skills required for attaining knowledge on new development of the subject. As required for attaining knowledge on new development of the subject. As required for attaining knowledge on the skills required for attaining knowledge on the skills required for attaining knowledge on the skills required for attaining the skills required for attaining the skills required for attaining the skills required for the subject. As the skills required for attaining the skills required for the subject.	xamination  all the course lear of the subject. App for attaining at leas knowledge on new entational skills. attaining most of dge on new develo attaining most of dge on new develo attaining and presents some of the cours velopment of the si sesentational skills. ining the course lea upply minimally effe	ning outcomes. Showing highly effective last most of the course development of the the course learning pment of the subjectional skills.  It is a learning outcomes are learning outcomes. Lactive or ineffective last learning outcomes.
Outcomes  Pre-requisites and Co-requisites and Impermissible combinations)  Offer in 2021 - 2022  Grade Descriptors (A+ to F)  Communication- ntensive Course Course Type Course Teaching	Compleme 23, 24. Ne On succes CLO 1 be CLO 2 ga CLO 3 ca Pass in Ble  N Offe A B C D Fail N Lecture wi Activities	ent Fixation Assay, Her utralization assay and asful completion of this familiar with virus class in hand-on experience rry out researches on vOL3401 or BIOL3403  er in 2022 - 2023: Y  Demonstrate thorough masstrong analytical skills and skills and techniques. Apply Demonstrate substantial culearning outcomes. Show subject. Apply effective lab Demonstrate general but outcomes. Show evidence Apply moderately effective Demonstrate partial but lim Show evidence of limited effective lab skills and technomostrate little or no evi of analytical skills and abilit skills and techniques. Orgatth laboratory component	nocytochemical assays, ELISA nagglutination and HI assays Antiviral assay course, students should be abl sification and the modes of rep so on common virological technivirology after taking this course attery at an advanced level of knowledged the properties of th	e to: olication and transniques ge required for attaining e on new development essentational skills. Ige and skills required for ability to acquire organizational and pressand skills required for attaining knowledge on new development of the subject. As required for attaining knowledge on new development of the subject. As required for attaining knowledge on the skills required for attaining knowledge on the skills required for attaining knowledge on the skills required for attaining the skills required for attaining the skills required for attaining the skills required for the subject. As the skills required for attaining the skills required for the subject.	xamination  all the course lear of the subject. App for attaining at leas knowledge on new entational skills. attaining most of dge on new develo attaining most of dge on new develo attaining and presents some of the cours velopment of the si sesentational skills. ining the course lea upply minimally effe	ning outcomes. Showing highly effective last most of the course development of the subjectional skills.  The learning outcomes are learning outcomes. Lacetive or ineffective last lacetive of Hours.
Outcomes  Pre-requisites and Co-requisites and Impermissible combinations)  Offer in 2021 - 2022  Grade Descriptors (A+ to F)  Communication- ntensive Course Course Type Course Teaching	Compleme 23, 24. Ne On succes CLO 1 be CLO 2 ga CLO 3 ca Pass in Ble  N Offe A  B  C  D  Fail  N  Lecture wi	ent Fixation Assay, Her utralization assay and asful completion of this familiar with virus class in hand-on experience rry out researches on vOL3401 or BIOL3403  er in 2022 - 2023: Y  Demonstrate thorough masstrong analytical skills and skills and techniques. Apply Demonstrate substantial culearning outcomes. Show subject. Apply effective lab Demonstrate general but outcomes. Show evidence Apply moderately effective Demonstrate partial but lim Show evidence of limited effective lab skills and technomostrate little or no evi of analytical skills and abilit skills and techniques. Orgatth laboratory component	nocytochemical assays, ELISA nagglutination and HI assays Antiviral assay course, students should be abl sification and the modes of rep so on common virological technicity of the solution of the modes of rep so on common virological technicity of the solution of the modes of rep so on common virological technicity of the solution o	e to: olication and transniques ge required for attaining e on new development essentational skills. Ige and skills required for ability to acquire organizational and pressand skills required for attaining knowledge on new development of the subject. As required for attaining knowledge on new development of the subject. As required for attaining knowledge on the skills required for attaining knowledge on the skills required for attaining knowledge on the skills required for attaining the skills required for attaining the skills required for attaining the skills required for the subject. As the skills required for attaining the skills required for the subject.	xamination  all the course lear of the subject. App for attaining at leas knowledge on new entational skills. attaining most of dge on new develo attaining most of dge on new develo attaining and presents some of the cours velopment of the si sesentational skills. ining the course lea upply minimally effe	ning outcomes. Shooly highly effective last most of the course development of the subjectional skills.  e learning outcomes beginning outcomes. Lacotive or ineffective last
Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Compleme 23, 24. Ne On succes CLO 1 be CLO 2 ga CLO 3 ca Pass in Ble  N Offe A B C D Fail N Lecture wi Activities	ent Fixation Assay, Her utralization assay and asful completion of this familiar with virus class in hand-on experience rry out researches on vOL3401 or BIOL3403  er in 2022 - 2023 : Y  Demonstrate thorough masstrong analytical skills and skills and stechniques. Apply Demonstrate substantial calearning outcomes. Show evidence Apply moderately effective apply moderately effective Demonstrate partial but lim Show evidence of limited; effective lab skills and tech Demonstrate little or no evi of analytical skills and abilit skills and techniques. Orgatth laboratory component	nocytochemical assays, ELISA nagglutination and HI assays Antiviral assay course, students should be abl sification and the modes of rep so on common virological technicity of the solution of the modes of rep so on common virological technicity of the solution of the modes of rep so on common virological technicity of the solution o	e to: olication and transniques ge required for attaining e on new development essentational skills. Ige and skills required for ability to acquire organizational and pressand skills required for attaining knowledge on new development of the subject. As required for attaining knowledge on new development of the subject. As required for attaining knowledge on the skills required for attaining knowledge on the skills required for attaining knowledge on the skills required for attaining the skills required for attaining the skills required for attaining the skills required for the subject. As the skills required for attaining the skills required for the subject.	xamination  all the course lear of the subject. App for attaining at leas knowledge on new entational skills. attaining most of dge on new develo attaining most of dge on new develo attaining and presents some of the cours velopment of the si sesentational skills. ining the course lea upply minimally effe	ning outcomes. Sho bly highly effective le st most of the cours development of th the course learnin pment of the subject tional skills. e learning outcome ubject. Apply partial rning outcomes. Lac ctive or ineffective le

	Reading / Self study			100
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Examination		80	CLO 1,2,3
	Laboratory reports		20	CLO 1,2,3
Required/recommended reading and online materials	Virology: Molecular Biology and pa Principles of Virology (2009) S.J. F Basic Virology (2008) E.K. Wagne	Flint, ASM Press.	Norkin, ASM Press.	
Course Website	http://moodle.hku.hk/			
Additional Course Information	Offer in alternate year from 2017-2 This course will be offered subject		number and availability of teachers	<b>5.</b>

BIOL4411	Plant ar	nd food biotechr	nology (6 credits)	Academic Y	ear 2021	
Offering Department		l Sciences	<b>3</b> , (	Quota	50	
Course Co-ordinator			iences (mlchye@hku.hk)	1 24 2 2 2		
Teachers Involved	(mlchye@	hku.hk,Biological S	Sciences)			
Course Objectives	This course covers the principles and key concepts of plant and food biotechnology and its applications is increasing global food supply. The significances of biotechnology in agriculture and food production, and the emerging importance of plant biotechnology in molecular farming for the production of biopharmaceuticals an other high-value proteins will be discussed. The course will also provide an insight on the real-life applications of plant and food biotechnology.					
Course Contents & Topics	<ul> <li>Genetic improvements in agriculture. Transgenic crops in global food production.</li> <li>Tools in plant genetic engineering: promoters and marker genes.</li> <li>Techniques in plant gene transfer: Agrobacterium-mediated transformation, biolistics and microinjection.</li> <li>Nuclear and plastid transformation.</li> <li>Gene silencing in plants. Genetic manipulation of commercially useful biosynthetic pathways in crops. Extending shelf-life of fruits. Prevention of enzymatic browning of potato tubers. Genetically-engineered biofortified foods: provitamin A-enriched rice, omega-3-enriched soy and high anthocyanin tomatoes.</li> <li>Biotechnology in plant pest and disease management: Producing crops resistant to phytopathogens and pests. Genome editing. Short-interfering RNAs in gene silencing to defend against plant viruses.</li> <li>Protecting crops in the field using the Bt toxin.</li> <li>Pest-resistant genetically-transformed seeds using the alpha-amylase inhibitor</li> <li>Herbicide-resistant crops.</li> <li>Plants as bioreactors for molecular farming: transgenic and transplastomic plants for producing recombinant biopharmaceutical proteins.</li> <li>Biodegradable plastics. Biofuels.</li> <li>Genetically-modified crops and food products: regulation, testing and labelling.</li> </ul>					
			America, Europe and Hong Kong.	gg.		
Course Learning Outcomes	On successful completion of this course, students should be able to:  [CLO 1] acquire key concepts in plant and food biotechnology and basic laboratory techniques in plant					
Pre-requisites (and Co-requisites and Impermissible	CLO 2 g CLO 3 d		life applications in plant and food build and critical thinking skills	oiotechnology		
combinations)	V 10	t Offer in 202	2 2022 · V	Eveninetien	Doo	
Offer in 2021 - 2022 Grade Descriptors		t sem Offer in 202		Examination		
(A+ to F)	A Demonstrate thorough and complete mastery of extensive knowledge and skills required for attaining the learning outcomes Plant and Food Biotechnology. Show strong analytical and critical abilities and logical thinking, with evidence of original though and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations in plant biotechnology. Apply hig effective organizational and presentational skills.  B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the coulearning outcomes in plant biotechnology. Show evidence of analytical and critical abilities and logical thinking, and ability apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.  C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learn outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to many familiar situations. Show moderately effective organizational and presentational skills.  D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Some evidence of coherent and logical thinking, accompanied with limited analytical and critical akills. Show limited ability apply knowledge in plant biotechnology. Show limited or barely effective organizational and presentational skills.  Fail to demonstrate command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical arcritical abilities, logical and coherent thinking. No evidence in ability to apply knowledge in plant biotechnology. Ineffect organizational and presentational and presentational skills.					
Communicatio -	Fail	Some evidence of co apply knowledge in pl Fail to demonstrate co critical abilities, logical	wherent and logical thinking, accompanied ant biotechnology. Show limited or barely of command of knowledge and skills required f al and coherent thinking. No evidence in	effective organizational and presentation for attaining the course learning outcon	lls. Show limited ability to nal skills. nes. Lack of analytical and	
		Some evidence of co apply knowledge in pl Fail to demonstrate co critical abilities, logical	wherent and logical thinking, accompanied ant biotechnology. Show limited or barely of command of knowledge and skills required f al and coherent thinking. No evidence in	effective organizational and presentation for attaining the course learning outcon	lls. Show limited ability to nal skills. nes. Lack of analytical and	
ntensive Course	Fail N	Some evidence of co apply knowledge in pl Fail to demonstrate co critical abilities, logico organizational and pre	wherent and logical thinking, accompanied ant biotechnology. Show limited or barely o ommand of knowledge and skills required to all and coherent thinking. No evidence in esentational skills.	effective organizational and presentation for attaining the course learning outcon	lls. Show limited ability to nal skills. nes. Lack of analytical and	
ntensive Course Course Type	Fail N Lecture v	Some evidence of co apply knowledge in pl Fail to demonstrate or critical abilities, logic organizational and pre vith laboratory comp	wherent and logical thinking, accompanied ant biotechnology. Show limited or barely command of knowledge and skills required to all and coherent thinking. No evidence in esentational skills.	effective organizational and presentation for attaining the course learning outcon	Ils. Show limited ability to nal skills. nes. Lack of analytical and biotechnology. Ineffective	
ntensive Course Course Type Course Teaching	N Lecture w	Some evidence of co apply knowledge in pl Fail to demonstrate or critical abilities, logic organizational and pre with laboratory comp	wherent and logical thinking, accompanied ant biotechnology. Show limited or barely o ommand of knowledge and skills required to all and coherent thinking. No evidence in esentational skills.	effective organizational and presentation for attaining the course learning outcon	Ils. Show limited ability to nal skills. nes. Lack of analytical and biotechnology. Ineffective	
ntensive Course Course Type Course Teaching	N Lecture w Activitie Lectures	Some evidence of co apply knowledge in pl Fail to demonstrate co critical abilities, logico organizational and pre with laboratory comp	wherent and logical thinking, accompanied ant biotechnology. Show limited or barely command of knowledge and skills required to all and coherent thinking. No evidence in esentational skills.  Sometimes of the course of the cou	effective organizational and presentation for attaining the course learning outcon	Ils. Show limited ability to nal skills. nes. Lack of analytical and biotechnology. Ineffective  No. of Hours 24	
ntensive Course Course Type Course Teaching	Fail  N  Lecture w  Activitie  Lectures  Laborato	Some evidence of co apply knowledge in pl Fail to demonstrate or critical abilities, logico organizational and pre with laboratory comp	wherent and logical thinking, accompanied ant biotechnology. Show limited or barely command of knowledge and skills required to all and coherent thinking. No evidence in esentational skills.	effective organizational and presentation for attaining the course learning outcon	Ils. Show limited ability to nal skills. nes. Lack of analytical and biotechnology. Ineffective  No. of Hours  24  30	
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail  N  Lecture w  Activitie  Lectures  Laborato	Some evidence of co apply knowledge in pl Fail to demonstrate or critical abilities, logico organizational and pre with laboratory comp is ory / Self study	wherent and logical thinking, accompanied ant biotechnology. Show limited or barely command of knowledge and skills required to all and coherent thinking. No evidence in esentational skills.  Sometimes of the course of the cou	effective organizational and presentation for attaining the course learning outcon	Ils. Show limited ability to nal skills. ness Lack of analytical and biotechnology. Ineffective  No. of Hours  24  30  100  Assessment Methods to CLO Mapping	
Intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail  N  Lecture w  Activitie  Lectures  Laborato  Reading	Some evidence of co apply knowledge in pl Fail to demonstrate or critical abilities, logico organizational and pre with laboratory comp ss ory / Self study	wherent and logical thinking, accompanied ant biotechnology. Show limited or barely e manual of knowledge and skills required fall and coherent thinking. No evidence in escentational skills.  Sometical personal description of the companies of t	effective organizational and presentation of attaining the course learning outcon ability to apply knowledge in plant  Weighting in final	Ils. Show limited ability to nal skills. nal skills. nes. Lack of analytical and biotechnology. Ineffective  No. of Hours  24  30  100  Assessment Methods	
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail  N  Lecture w  Activitie Lectures Laborato Reading Methods	Some evidence of co apply knowledge in pl Fail to demonstrate or critical abilities, logico organizational and pre with laboratory comp ss ory / Self study	wherent and logical thinking, accompanied ant biotechnology. Show limited or barely e manual of knowledge and skills required fall and coherent thinking. No evidence in escentational skills.  Sometical personal description of the companies of t	effective organizational and presentation attaining the course learning outcon ability to apply knowledge in plant  Weighting in final course grade (%)	Ils. Show limited ability to nal skills. ness Lack of analytical and biotechnology. Ineffective  No. of Hours  24  30  100  Assessment Methods to CLO Mapping	
Communication- intensive Course Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	Fail  N  Lecture w  Activitie Lectures Laborato Reading Methods	Some evidence of coapply knowledge in plant to demonstrate plant to demo	wherent and logical thinking, accompanied ant biotechnology. Show limited or barely e manual of knowledge and skills required fall and coherent thinking. No evidence in escentational skills.  Sometical personal description of the companies of t	effective organizational and presentation attaining the course learning outcon ability to apply knowledge in plant  Weighting in final course grade (%)	Ils. Show limited ability to nal skills. ness Lack of analytical and biotechnology. Ineffective  No. of Hours  24  30  100  Assessment Methods to CLO Mapping CLO 1,2,3	

Required/recommended reading and online materials	Chrispeels, M.J. and D.E. Sadava. Plants, genes, and agriculture. Jones and Bartlett.  E-reserves (HKU Library) Lecture notes on Moodle
Course Website	http://moodle.hku.hk/
Additional Course Information	Core in Molecular Biology & Biotechnology Major An advanced elective course in FNS Major An advanced elective course in Plant Science Minor

BIOL4415	Healthca	are biotechnology (	(6 credits)	Academic Ye	ear 2021		
Offering Department	Biological			Quota	70		
Course Co-ordinator	Dr G Y W	Chan, Biological Science	ces (gywchan@hku.hk)				
Teachers Involved	,	(Dr G Y W Chan,Biological Sciences) (Dr K W Y Yuen,Biological Sciences) This course discusses the key concepts and principles involved in healthcare biotechnology, and their application					
Course Objectives		se discusses the key collar medicine.	oncepts and principles involved	ved in healthcare biotechnology, a	and their applications		
Course Contents & Topics	Genetic biotechnology in animals (transgenics, knockouts and other related technologies): Transgenic animals a models in the study of human diseases, as bioreactors for the production of hormones, antibiotics and vaccines and organs for xenotransplantation.  Advanced molecular biology techniques related to human and animal science basic research, disease diagnosis and development of new therapies. These include but not limited to: applications of DNA technologies in diagnostis medicine and forensic science; tissue engineering.  An overview of the drug development process, with a focus on the early-stage, preclinical drug discovery, drug target identification, high-throughput assay development, and screening of chemical libraries (synthetic and natural products). The concept of individualized medicine will also be discussed.						
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 de	escribe key concepts in	genetic biotechnology and h	numan health			
	CLO 2 ac	equire and apply advance	ced laboratory techniques es	ssential to biotechnology			
	CLO 3 de			understand, analyze, and evalua	te problems in order		
	CLO 4 ga	ain insight into real-work	d applications in healthcare	biotechnology			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Bl	IOL3401					
Offer in 2021 - 2022	Y 2nd	d sem Offer in 2022 - 2	2023 : Y	Examination	May		
Grade Descriptors	Α			tensive knowledge required for attaining			
(A+ to F)	outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational skills. Writings consistently demonstrate informed, thoughtful intellectual engagement with broad range of relevant concepts.  B Demonstrate substantial command of a broad range of knowledge required for attaining at least most of the course learning						
		outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational skills. Writings mostly demonstrate informed, thoughtful intellectual engagement with broad range of relevant concepts.					
	Demonstrate general but incomplete command of knowledge required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational skills. Writings mostly indicate informed, intellectual engagement with concepts or theories but not always with sufficient depth, breadth or understanding.						
	D Demonstrate partial but limited command of knowledge required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational skills. Writings indicate some intellectual engagement with concepts or theories but mostly at a superficial level.						
	Fail  Demonstrate little or no evidence of command of knowledge required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organizational skills are minimally effective or ineffective. Writings reveal an absence of intellectual engagement with concepts or theories. Writings are irrelevant or superficial.						
Communication- intensive Course	N		·				
Course Type	Lecture w	rith laboratory componer	nt course				
Course Teaching	Activities	S	Details		No. of Hours		
& Learning Activities	Lectures				24		
	Laborator	ry			24		
	Tutorials		tutorials/assignments/computer sessions		6		
	Reading /	/ Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents		15	CLO 1,3,4		
	Examinat	ion		50	CLO 1,3,4		
	Laborator	ry reports		20	CLO 1,2,3,4		
	Test			15	CLO 1,3		
Required/recommended	- Textbool	k of Drug Design and D	iscovery (Krogsgaard-Larse	n, Liljefors, and Madsen, Taylor &			
reading and	- Human N	Molecular Genetics (Str	achan and Read, Garland S		,		
online materials		Suggested readings for each topic will be provided.					
Online materials Course Website		p://moodle.hku.hk/					
		odle.hku.hk/					

BIOL4416	Stem cells and regenerative biology (6 credits)	Academic Year	2021
Offering Department	Biological Sciences	Quota	40
Course Co-ordinator	Dr K W Y Yuen, Biological Sciences (kwyyuen@hku.hk)		
Teachers Involved	(Dr Chaogu Zheng,Biological Sciences)		

	(Dr J Zhang,Biological Sciences) (Dr K W Y Yuen,Biological Sciences)					
Course Objectives	To introd	uce the current unders	standing in regenerative biology, a nnection between these biological		ellular and molecula	
Course Contents		se will discuss cutting-e				
& Topics	\ / 0	(i) regenerative and stem cell biology:				
		ic characteristics of ste		<b></b>		
		•	trol of cell fate specification and dif	ferentiation		
	,	nic and adult stem cells				
			ent stem cells and tissue engineer	ing		
		utics potentials for sten	9,			
		ssues in stem cell rese and longevity:	earcn			
	, , ,	systems used for aging	and life-snan studies			
		and molecular biology				
		es and cellular senesce	0 0			
	- genomic	c stability, DNA mutatio	ons and repair			
		ndrial defects and oxid	ative stress			
		aging diseases				
			bolic pathways involved in longevi	•		
Course Learning			s course, students should be able t			
Outcomes			x regulations of cell potency, cell a ristics of stem cells and the differer			
			of stem cell research, and understa	· ·	<u> </u>	
			nechanisms of aging, and the path			
Pre-requisites			or BIOL3211 or BIOL3401 or BIC	, , ,	3/10/ or RIOI 3/108	
(and Co-requisites	1 433 111 1	7000001 01 B100000-	4 01 BIOE3211 01 BIOE3401 01 BIO	PLOTOZ OI BIOLOTOS OI BIOL	3404 OI DIOL3400	
and Impermissible						
combinations)						
Offer in 2021 - 2022	N Of	fer in 2022 - 2023 : Y		Examination		
Grade Descriptors (A+ to F)	Α		nd complete mastery at an advanced level of			
		course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational presentational skills.				
	В					
		learning outcomes. Evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and				
	С	some unfamiliar situations. Apply effective organizational and presentational skills.  C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning				
		outcomes. Evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar				
	D		ely effective organizational and presentatio imited command of knowledge and skills r		ourse learning outcomes	
		Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.				
	Pail Demonstrate little or no evidence of command of knowledge and skills required for attaining the course I of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to app			loorning outcomes I col		
	ı alı		vidence of command of knowledge and sk			
		of analytical and critical	vidence of command of knowledge and sk	Show very little or no ability to ap		
	N	of analytical and critical	evidence of command of knowledge and sk abilities, logical and coherent thinking. S	Show very little or no ability to ap		
intensive Course	N	of analytical and critical problems. Organization a	vidence of command of knowledge and sk abilities, logical and coherent thinking. \$ nd presentational skills are minimally effect	Show very little or no ability to ap		
intensive Course Course Type	N Lecture w	of analytical and critical problems. Organization and with laboratory componen	ent course  order command of knowledge and sk abilities, logical and coherent thinking. Snd presentational skills are minimally effect	Show very little or no ability to ap	ply knowledge to solve	
intensive Course Course Type Course Teaching	N Lecture w	of analytical and critical problems. Organization and with laboratory components	vidence of command of knowledge and sk abilities, logical and coherent thinking. \$ nd presentational skills are minimally effect	Show very little or no ability to ap	No. of Hours	
intensive Course Course Type Course Teaching	N Lecture w Activitie Lectures	of analytical and critical problems. Organization and with laboratory components	ent course  order command of knowledge and sk abilities, logical and coherent thinking. Snd presentational skills are minimally effect	Show very little or no ability to ap	No. of Hours	
intensive Course Course Type Course Teaching	N Lecture w Activitie Lectures Laborato	of analytical and critical problems. Organization and with laboratory components	ent course  order command of knowledge and sk abilities, logical and coherent thinking. Snd presentational skills are minimally effect	Show very little or no ability to ap	No. of Hours 24 24	
intensive Course Course Type Course Teaching	N Lecture w Activitie Lectures Laborato Tutorials	of analytical and critical problems. Organization and with laboratory components	ent course  order command of knowledge and sk abilities, logical and coherent thinking. Snd presentational skills are minimally effect	Show very little or no ability to ap	No. of Hours 24 24 6	
intensive Course Course Type Course Teaching & Learning Activities	N Lecture w Activitie Lectures Laborato Tutorials Reading	of analytical and critical problems. Organization and with laboratory components  s  ory  / Self study	vidence of command of knowledge and sk abilities, logical and coherent thinking. S nd presentational skills are minimally effect ent course    Details	Show very little or no ability to ap live or ineffective.	No. of Hours 24 24 6 100	
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture w Activitie Lectures Laborato Tutorials	of analytical and critical problems. Organization and with laboratory components  s  ory  / Self study	ent course  order command of knowledge and sk abilities, logical and coherent thinking. Snd presentational skills are minimally effect	Show very little or no ability to apility or ineffective.  Weighting in final	No. of Hours 24 24 6 100 Assessment	
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture w Activitie Lectures Laborato Tutorials Reading	of analytical and critical problems. Organization and with laboratory components  s  ory  / Self study	vidence of command of knowledge and sk abilities, logical and coherent thinking. S nd presentational skills are minimally effect ent course    Details	Show very little or no ability to ap live or ineffective.	No. of Hours 24 24 6 100 Assessment Methods	
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture w Activitie Lectures Laborato Tutorials Reading Methods	of analytical and critical problems. Organization and with laboratory components.	vidence of command of knowledge and sk abilities, logical and coherent thinking. Snd presentational skills are minimally effect ent course    Details   Details	Weighting in final course grade (%)	No. of Hours 24 24 6 100 Assessment Methods to CLO Mapping	
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture w Activitie Lectures Laborato Tutorials Reading Methods Assignm	of analytical and critical problems. Organization and with laboratory components.  Organization and critical problems. Organization and with laboratory components.  Organization and critical problems. Organizat	vidence of command of knowledge and sk abilities, logical and coherent thinking. S nd presentational skills are minimally effect ent course    Details	Weighting in final course grade (%)	No. of Hours 24 24 6 100 Assessment Methods to CLO Mapping CLO 1,2,3,4	
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture w Activitie Lectures Laborato Tutorials Reading Methods Assignm Examina	of analytical and critical problems. Organization and with laboratory components.  Organization and critical problems. Organization and with laboratory components.  Organization and critical problems. Organizat	vidence of command of knowledge and sk abilities, logical and coherent thinking. Snd presentational skills are minimally effect ent course    Details   Details	Weighting in final course grade (%)	No. of Hours 24 24 6 100 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4	
Intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture w Activitie Lectures Laborato Tutorials Reading Methods Assignm Examina	of analytical and critical problems. Organization and with laboratory components.  Organization and critical problems. Organization and with laboratory components.  Organization and critical problems. Organizat	vidence of command of knowledge and sk abilities, logical and coherent thinking. Snd presentational skills are minimally effect ent course    Details   Details	Weighting in final course grade (%)	No. of Hours 24 24 6 100 Assessment Methods to CLO Mapping CLO 1,2,3,4	
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting	N Lecture w Activitie Lectures Laborato Tutorials Reading Methods Assignm Examina Laborato Test	of analytical and critical problems. Organization and with laboratory components  yith laboratory components	vidence of command of knowledge and sk abilities, logical and coherent thinking. Snd presentational skills are minimally effect ent course    Details   Details	Weighting in final course grade (%)  10 50 20	No. of Hours 24 24 6 100 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 CLO 1,2,3,4	
Intensive Course Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	N Lecture w Activitie Lectures Laborato Tutorials Reading Methods Assignm Examina Laborato Test Reference	of analytical and critical problems. Organization and with laboratory components  yith laboratory components	vidence of command of knowledge and sk abilities, logical and coherent thinking. Snd presentational skills are minimally effect ent course    Details   Details	Weighting in final course grade (%)  10 50 20	No. of Hours 24 24 6 100 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 CLO 1,2,3,4	
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	N Lecture w Activitie Lectures Laborato Tutorials Reading Methods Assignm Examina Laborato Test Referenc Essential	of analytical and critical problems. Organization and critical problems.	ent course  Details  Details  assignment/discussion	Weighting in final course grade (%)  10 50 20	No. of Hours 24 24 6 100 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 CLO 1,2,3,4	
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	N Lecture w Activitie Lectures Laborato Tutorials Reading Methods  Assignm Examina Laborato Test Referenc Essential edited by	of analytical and critical problems. Organization and with laboratory components.  It is a second or the second of	ent course  Details  Details  assignment/discussion	Weighting in final course grade (%)  10 50 20	No. of Hours 24 24 6 100 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 CLO 1,2,3,4	
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	N Lecture w Activitie Lectures Laborato Tutorials Reading Methods  Assignm Examina Laborato Test Referenc Essential edited by Science i	of analytical and critical problems. Organization and with laboratory components  yith laboratory components  // Self study  sents  ention  ory reports  es: s of stem cell biology Robert Paul Lanza 200  n medicine: the JCI tex	ent course  Details  Details  assignment/discussion	Weighting in final course grade (%)  10 50 20 20	No. of Hours 24 24 6 100 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 CLO 1,2,3,4	
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	N Lecture w Activitie Lectures Laborato Tutorials Reading Methods  Assignm Examina Laborato Test Referenc Essential edited by Science i	of analytical and critical problems. Organization and with laboratory components  yith laboratory components  // Self study  sents  ention  ory reports  es: s of stem cell biology Robert Paul Lanza 200  n medicine: the JCI tex	ent course  Details  Details  assignment/discussion	Weighting in final course grade (%)  10 50 20 20	No. of Hours 24 24 6 100 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 CLO 1,2,3,4	
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	N Lecture w Activitie Lectures Laborato Tutorials Reading Methods  Assignm Examina Laborato Test Referenc Essential edited by Science i By Andre	of analytical and critical problems. Organization and critical problems. Organization and critical problems. Organization and critical problems. Organization and critical cri	ent course  Details  Details  assignment/discussion  ogeometric discussion	Weighting in final course grade (%)  10 50 20 20	No. of Hours 24 24 6 100 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 CLO 1,2,3,4	
Communication- intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	N Lecture w Activitie Lectures Laborato Tutorials Reading Methods Assignm Examina Laborato Test Referenc Essential edited by Science i By Andre	of analytical and critical problems. Organization and with laboratory components.  It is a second or the second of	ent course  Details  Details  assignment/discussion  operations of molecular medicine Society for Clinical Investigation, Use 51	Weighting in final course grade (%)  10 50 20 20  Jshma S. Neill	No. of Hours 24 24 6 100 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 CLO 1,2,3,4	
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	N Lecture w Activitie Lectures Laborato Tutorials Reading Methods Assignm Examina Laborato Test Referenc Essential edited by Science i By Andre Molecula By Leona	of analytical and critical problems. Organization and with laboratory components.  It is a second or the second of	ent course  Details  Details  assignment/discussion  ogeometric discussion	Weighting in final course grade (%)  10 50 20 20  Jshma S. Neill	No. of Hours 24 24 6 100 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 CLO 1,2,3,4	
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	N Lecture w Activitie Lectures Laborato Tutorials Reading Methods  Assignm Examina Laborato Test Referenc Essential edited by Science i By Andre Molecula By Leona http://mod	of analytical and critical problems. Organization and with laboratory components.  It is a second or the second of	ent course  Details  Details  assignment/discussion   Weighting in final course grade (%)  10 50 20 20  Jshma S. Neill	No. of Hours 24 24 6 100 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 CLO 1,2,3,4		

BIOL4417	'Omics' and systems biology (6 credits)	Academic Year	2021
Offering Department	Biological Sciences	Quota	40
Course Co-ordinator	Dr J W Zhang, Biological Sciences (jzhang1@hku.hk)		
Teachers Involved	(Dr J W Zhang,Biological Sciences)		
Course Objectives	Recent progress in high-throughput omics technology has revolutionized the profiling of various biomolecules simultaneously by omics technology generate the potential to obtain a global and holistic view of the system. This course air Omics and Systems Biology, and overview of various applications of omics technology is set to be the heart of future economy, promising to create the synthetic biology is set to be the heart of future economy.	s huge amounts ons to introduce the nology.	of data, providing e technologies of

				nificance of this field has been promo GEM competition. In this course, we		
				ills needed for iGEM competition.		
Course Contents & Topics	The course covers various OMICS techniques with special focus on sequence alignment, next generation sequencing, computational modeling, and statistic programming. This course will also provide students hands-on experience in large scale data analysis, and experiment methodologies involved in: Systems biology and functional genomics - the study of the interactome/network between components of a biological system, and modeling to discover the integrated function and emergent properties of that system; Synthetic biology- the design and building of synthetic protocells using basic biochemical building blocks from scratch.					
Course Learning	On succes	ssful completion of	this course, students shoul	d be able to:		
Outcomes	ap	pproach, and discus	ss the pros and cons of bot	• • •	traditional one-gene	
			ethodologies used in iGEM	, 0,	. 10	
	CLO 4 de			database resources generated in major ms Biology to understand the integra		
	CLO 5 id	entify questions tha	at can be addressed by 'On	nics' and Synthetic Biology studies		
Pre-requisites (and Co-requisites and Impermissible combinations)	CLO 5 identify questions that can be addressed by 'Omics' and Synthetic Biology studies  Pass in BIOC3601 or BIOC3604 or BIOL3211 or BIOL3401 or BIOL3402 or BIOL3403 or BIOL3404 or BIOL3408				_3404 or BIOL3408	
Offer in 2021 - 2022	Y 2nd	sem Offer in 202	22 - 2023 : Y	Examination	May	
Grade Descriptors (A+ to F)	A Demonstrate thorough and complete mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.					
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.				
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.				
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.				
	Fail	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.				
Communication- intensive Course	N					
Course Type		ith laboratory comp				
Course Teaching	Activities	3	Details		No. of Hours	
& Learning Activities	Lectures				24	
	Laborator	•				
		Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents		50	CLO 2,3,4,5	
	Examinat	ion		50	CLO 1,2,3,4,5	
Required/recommended reading and	TBA					
online materials	1					
Course Website		dle.hku.hk/				
Additional Course		ternate year from 2		, , ,		
Information	This cours	se will be offered su	ubject to a minimum enrolln	nent number and availability of teacher	S.	

BIOL4451	Cetacean behaviour, ecology and conservation: field research experience (6 credits)	Academic Year	2021
Offering Department	Biological Sciences	Quota	12
Course Co-ordinator	, Biological Sciences ()		
Teachers Involved			
Course Objectives	This course offers an exciting experiential learning opportunity through hands-obehavioural ecology and conservation of free-ranging cetaceans (whales, dol students with a fundamental knowledge, skills, and the appreciation of what i effectively run field studies in cetacean ecology, behaviour and conservation, an mobile marine vertebrates.	phins and porpoi t takes to design,	ses). It provides implement, and
Course Contents & Topics	Field-based studies of cetaceans have been rapidly evolving in recent year developments that allow researchers to tackle previously unexplored avenues component of cetacean studies, the direct contact with free-ranging animals out and on their terms remains unchanged; both challenging and fascinating. Tresearch site outside Hong Kong, will expose students to various aspects of definition of a research question to project design, and to various stages of data will learn a suite of research techniques, and will exercise their skills in data pemphasis will be on delphinid behavioural ecology and conservation application the scientific reasoning and methodology, and will develop an understanding how to advancing science and benefiting broader conservation management effor informal discussions of current research and recent discoveries, review of innextensive field component with sea-based research surveys performed daily (field-based activities, students are required to write an independent report descourse.	of research. Howe at sea, in their nat his course, cond f cetacean field s a collection and ar processing and in as; students will be w individual projects. The course in lovative research weather permitting	ever, the primary tural environment lucted in a field studies, from the halyses. Students terpretation. The e guided through tts can contribute noludes lectures, techniques, and g). Following the
Course Learning	On successful completion of this course, students should be able to:		

Outcomes	CLO 1 u	nderstand of the biodiver	sity and primary habitats in the ecosy	/stem studied		
	CLO 2 establish the basic skills needed to identify target species associated with the field course					
	CLO 3 be knowledgeable about and able to implement sampling techniques for organisms in the ecosystems studied					
	CLO 4 u	nderstand the basic ecolo	ogy of target species and how biotic	and abiotic factors shape	focal communities	
Pre-requisites	Pass in a	t least one of the followin	g courses: BIOL3101, BIOL3301, BI	OL3313 or BIOL3320.		
(and Co-requisites		•	marily for Ecology & Biodiversity Maj			
and Impermissible			owed to take this experiential cours	se is their year 3 study;	and because it is	
combinations)		-	se is best suited for year 3 students.			
Offer in 2021 - 2022		fer in 2022 - 2023 : N	p of the subject and relevant research technic	Examination		
Grade Descriptors (A+ to F)	A	familiarity with relevant back skills. Ample evidence of inc comparative perspective to	p of the subject and relevant research technic ground reading and case studies. Exemplary dependent critical thought with excellent use of draw insightful and logical conclusions. Sho ellent analytical argumentation. Excellent or o	handling of field data collection of a broad range of fundament w outstanding abilities of inde	and excellent analytical al concepts and broader pendent work, effective	
	В	with relevant background re Good evidence of critical th consideration of broader con	f the subject and relevant research technique ading and case studies. Good handling of fi- lought (although not always independent), w mparative perspective in drawing logical con- al and analytical argumentation. Work more th	eld data collection and comme vith an appreciable use of fun clusions. Good abilities of inde	endable analytical skills. damental concepts and ependent work, effective	
	С	Demonstrate an adequate, relevant background reading critical thinking (although no Fair presentation skills, with	but incomplete grasp of the subject and re and case studies, but no interest in learning it always independent), with mostly good use mostly correct argumentation, but limited	levant research techniques. No beyond the adequate average of fundamental concepts to d	Moderate familiarity with level. Evidence of logical raw logical conclusions.	
	D	sufficient for what is required for degree level.  Demonstrate some grasp of the subject, but only partial and with limited understanding of relevant research concepts and research techniques. Some familiarity with relevant case studies, but insufficient evidence of background reading and limited abilities of critical independent thinking. Ineffective presentation skills with generally weak logical argumentation with restricted				
	ability of drawing appropriate conclusions. Work barely meets what is required at degree level.  Fail  No evidence of basic a minimum grasp of the subject and the minimum relevant research techniques. No evidence of background reading and no familiarity with any relevant examples and case studies. Inadequate evidence of coherent logical thought; ineffective presentation skills with poor argumentation and no abilities to draw meaningful conclusions. Work fails to reach degree level.					
Communication- intensive Course	N	reactifuegree level.				
Course Type	Field can	nps				
Course Teaching	Activitie		Details		No. of Hours	
& Learning Activities	Lectures		lectures and tutorials		12	
	Field wo		into a stire delicate		80	
	Presenta		interactive debates		10	
		/ Self study	group projects		100	
A	Assessm		group projects		12	
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignm	ents		35	CLO 1,2,3,4	
	Report		project report (35%), group investigation & presenation (30%)	65	CLO 1,2,3,4	
Required/recommended	Mann, J.,	Connor, R.C., Tyack, P.	L., Whitehead, H. (eds.) 2000. Ceta	cean societies: Field stud	dies of dolphins and	
reading and		Chicago University Press				
online materials	, ,		S.J. (eds). 2010. Marine Mammal	Ecology and Conservati	ion: A Handbook of	
		es. Oxford University Pre				
Course Website		w.biosch.hku.hk/ecology/	ISC/			
Additional Course		nt Procedure:	and divine the add/draw waried of	the Ond competer Ctude	anta ana namilinad ta	
Information	The course is open to enrollment only during the add/drop period of the 2nd semester. Students are required to submit a brief (maximum 1-page) application letter (PDF file) via e-mail to the Course Coordinator (leszek@hku.hk) not later than 10th January. The application shall include the following:  1. Personal and academic details  2. ID photograph  3. Brief description of academic interests					
	<ul> <li>4. GPA</li> <li>5. Pre-requisite courses taken and grades received (if pre-requisites are not met, a reasoned request for waiver)</li> <li>All applications will be reviewed prior to the commencement of the 2nd semester and results will be announced within the 1st week of the add/drop period of the 2nd semester.</li> </ul>					

BIOL4501	Molecular phylogenetics and evolution (6 credits)	Academic Year	2021		
Offering Department	Biological Sciences	Quota	25		
Course Co-ordinator	TBC, Biological Sciences ()				
Teachers Involved	(TBC,Biological Sciences)				
Course Objectives	The purpose of this course is to provide a comprehensive overview of state-of phylogenetic research, focusing on in depth coverage of the latest techniques. in formal lectures is coupled with practical workshops.  - acquisition of the sequences from the databases  - DNA and protein sequence assembly and alignment  - phylogeny reconstruction using parsimony, distance based, and maximum like  - introduction to relevant software for phylogenetics  - methods for the evaluation of phylogene trees	The treatment of t	théoretical issues		
Course Contents & Topics	Introduction to molecular systematics and phylogenetics. Tree of life. Obtaining, storing and archiving specimens and tissue samples for use in molecular studies. Sources of molecular data, experimental design for molecular studies, taxon sampling and marker choice. Overview of basic laboratory methods for data collection (DNA isolation, PCR, DNA sequencing). Sequence editing and aligning; utilizing public sequence databases. Estimation of nucleotide polymorphism and diversity. Methods for phylogeny reconstruction: parsimony, distance methods, maximum likelihood, Bayesian methods. Statistical methods for the evaluation of phylogenetic trees. Software for phylogeny reconstruction. Molecular markers in conservation and ecological genetics. Phylogenies for different				

Course Learning		s. Biogeography vs. phylo	goog. ap) aogo.oa	Tel. delter			
	On succe	n successful completion of this course, students should be able to:					
Outcomes	CLO 1 u	nderstand the fundamenta	al principles of molecular	phylogenetics			
		nderstand the purposes e or the analysis of given da		and be able to choose the most ap	opropriate method(s)		
		nderstand the advantages		ne methods			
		cquire practical skills for th					
Pre-requisites	Pass in B	ass in BIOL3401 or BIOL3408					
(and Co-requisites and Impermissible							
combinations)							
Offer in 2021 - 2022	-	fer in 2022 - 2023 : N		Examination			
Grade Descriptors (A+ to F)	A	learning outcomes of the cou apply the relevant theories, p methods and software for e	urse. Show deep understandin principles, and methods taught volutionary analysis of real da	d level of skills sufficient for achieving all ig of the course subject. Excellent ability to in the course. Advanced skills in possess ata. Excellent ability to collect, systematize priately. Excellent presentational skills.	o efficiently combine and ion and application of the		
	В	outcomes of the course. Der theories, principles, and met software for molecular evoluti	monstrate good understanding thods taught in the course. Su	fficient for accomplishing most of the goal of the course subject. Show good ability ubstantial skills in possession and applica ow good ability to collect, systematize, anal Good presentational skills.	to combine and to apply		
	C Demonstrate basic knowledge and basic level of skills sufficient for accomplishing most of the goals and expected learning outcomes of the course. Demonstrate general understanding of the subject. Show some ability to combine and to apply theories, principles and methods taught in the course. Basic skills in possession and application of the methods and software for molecular evolutionary analysis of real data. Show general ability to collect, systematize, analyze and evaluate data from various sources and to quote them appropriately. Basic presentational skills.						
	Demonstrate incomplete knowledge and weak skills sufficient for accomplishing only some of the goals and expected learning outcomes of the course. Demonstrate poor understanding of the subject, Show poor ability to combine and to apply theories, principles, and methods taught in the course. Limited skills in possession and application of the methods and software for molecular evolutionary analysis of real data. Show poor ability to collect data from various sources, to systematize, analyze and evaluate them appropriately. Poor presentational skills.						
		molecular evolutionary analys	sis of real data. Show poor abil				
	Fail	molecular evolutionary analysevaluate them appropriately.  Demonstrate poor or no knc course. Demonstrate very principles, and methods taug molecular evolutionary analyse	sis of real data. Show poor abil Poor presentational skills. owledge and skills required for oor or no understanding of the thin the course. Poor or no sour sist of real data. Show very poor	lity to collect data from various sources, to r accomplishing the goals and expected I he subject. Show no ability to combine a skills in possession and application of the or or no ability to collect data from other so	systematize, analyze and earning outcomes of the and/or to apply theories, methods and software for		
	Fail N	molecular evolutionary analysevaluate them appropriately.  Demonstrate poor or no knc course. Demonstrate very principles, and methods taug molecular evolutionary analyse	sis of real data. Show poor abil Poor presentational skills. wledge and skills required for oor or no understanding of the ht in the course. Poor or no s	lity to collect data from various sources, to r accomplishing the goals and expected I he subject. Show no ability to combine a skills in possession and application of the or or no ability to collect data from other so	systematize, analyze and earning outcomes of the and/or to apply theories, methods and software for		
ntensive Course	N	molecular evolutionary analysevaluate them appropriately.  Demonstrate poor or no knc course. Demonstrate very principles, and methods taug molecular evolutionary analyse	sis of real data. Show poor abil Poor presentational skills. wiledge and skills required for oor or no understanding of the ht in the course. Poor or no s sis of real data. Show very poor opropriately. Very poor or no pr	lity to collect data from various sources, to r accomplishing the goals and expected I he subject. Show no ability to combine a skills in possession and application of the or or no ability to collect data from other so	systematize, analyze and earning outcomes of the and/or to apply theories, methods and software for		
ntensive Course Course Type	N	molecular evolutionary analysevaluate them appropriately. Demonstrate poor or no kno course. Demonstrate very principles, and methods taug molecular evolutionary analyse and evaluate them apprinciples and evaluate them apprinciples are some content of the course of th	sis of real data. Show poor abil Poor presentational skills. wiledge and skills required for oor or no understanding of the ht in the course. Poor or no s sis of real data. Show very poor opropriately. Very poor or no pr	lity to collect data from various sources, to r accomplishing the goals and expected I he subject. Show no ability to combine a skills in possession and application of the or or no ability to collect data from other so	systematize, analyze and earning outcomes of the and/or to apply theories, methods and software for		
ntensive Course Course Type Course Teaching	N Lecture w	molecular evolutionary analysevaluate them appropriately. Demonstrate poor or no kno course. Demonstrate very principles, and methods taug molecular evolutionary analyse analyze and evaluate them apprinciples and evaluate them apprinciples are some control of the course of the cour	sis of real data. Show poor abil Poor presentational skills. wiledge and skills required for oor or no understanding of the int in the course. Poor or no s sis of real data. Show very poor oppropriately. Very poor or no pr	lity to collect data from various sources, to r accomplishing the goals and expected I he subject. Show no ability to combine a skills in possession and application of the or or no ability to collect data from other so	systematize, analyze and earning outcomes of the and/or to apply theories, methods and software fo urces and to systematize		
intensive Course Course Type Course Teaching	N Lecture w	molecular evolutionary analysevaluate them appropriately.  Demonstrate poor or no kno course. Demonstrate very principles, and methods taug molecular evolutionary analyse analyze and evaluate them apprinciples and evaluate them apprint laboratory components.	sis of real data. Show poor abil Poor presentational skills. wiledge and skills required for oor or no understanding of the int in the course. Poor or no s sis of real data. Show very poor oppropriately. Very poor or no pr	lity to collect data from various sources, to r accomplishing the goals and expected I he subject. Show no ability to combine a skills in possession and application of the ror or no ability to collect data from other so resentational skills.	systematize, analyze and earning outcomes of the and/or to apply theories, methods and software for urces and to systematize  No. of Hours		
intensive Course Course Type Course Teaching	N Lecture w Activitie Lectures Laborato	molecular evolutionary analysevaluate them appropriately.  Demonstrate poor or no kno course. Demonstrate very principles, and methods taug molecular evolutionary analyse analyze and evaluate them apprinciples the course of th	sis of real data. Show poor abil Poor presentational skills. whedge and skills required for oor or no understanding of the sistensial of t	lity to collect data from various sources, to r accomplishing the goals and expected I he subject. Show no ability to combine a skills in possession and application of the ror or no ability to collect data from other so resentational skills.	systematize, analyze and earning outcomes of the and/or to apply theories, methods and software fources and to systematize  No. of Hours  24		
Communication- intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting	N Lecture w Activitie Lectures Laborato	molecular evolutionary analysevaluate them appropriately.  Demonstrate poor or no kno course. Demonstrate very principles, and methods taug molecular evolutionary analyse analyze and evaluate them apprint laboratory component s	sis of real data. Show poor abil Poor presentational skills. whedge and skills required for oor or no understanding of the sistensial of t	lity to collect data from various sources, to r accomplishing the goals and expected I he subject. Show no ability to combine a skills in possession and application of the ror or no ability to collect data from other so resentational skills.	earning outcomes of the and/or to apply theories, methods and software fources and to systematize  No. of Hours  24  36		
Intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture w Activitie Lectures Laborato Reading	molecular evolutionary analysevaluate them appropriately. Demonstrate poor or no kno course. Demonstrate very principles, and methods taug molecular evolutionary analyse analyze and evaluate them applications to the course. The course is a course of the	sis of real data. Show poor abil Poor presentational skills. whedge and skills required for oor or no understanding of the sis of real data. Show very poor opropriately. Very poor or no process.	lity to collect data from various sources, to r accomplishing the goals and expected I he subject. Show no ability to combine a skills in possession and application of the ror or no ability to collect data from other so resentational skills.   Weighting in final	earning outcomes of the and/or to apply theories, methods and software for urces and to systematize  No. of Hours  24  36  100  Assessment Methods		
Intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture w Activitie Lectures Laborato Reading Methods	molecular evolutionary analysevaluate them appropriately. Demonstrate poor or no kno course. Demonstrate very principles, and methods taug molecular evolutionary analyse analyze and evaluate them appropriately the second course. The second course is a second course. Demonstrate very principles, and methods taug molecular evolutionary analyze and evaluate them appropriately component is second course. The second course is a second course of the se	sis of real data. Show poor abil Poor presentational skills. whedge and skills required for oor or no understanding of the sis of real data. Show very poor opropriately. Very poor or no process.	lity to collect data from various sources, to r accomplishing the goals and expected I he subject. Show no ability to combine a skills in possession and application of the roor or no ability to collect data from other so resentational skills.   Weighting in final course grade (%)	earning outcomes of the and/or to apply theories, methods and software fources and to systematize  No. of Hours  24  36  100  Assessment Methods to CLO Mapping CLO 2,3,4		
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended	N Lecture w Activitie Lectures Laborato Reading Methods Assignme Examina Nei M., K	molecular evolutionary analysevaluate them appropriately. Demonstrate poor or no knocourse. Demonstrate very principles, and methods taugmolecular evolutionary analyse analyze and evaluate them appropriately. The second strip is a second se	sis of real data. Show poor abil Poor presentational skills. wheldge and skills required for our or no understanding of the sist of real data. Show very poor or no sis of real data. Show very poor oppropriately. Very poor or no procourse  Details  computer laboratory/tuto  Details  tion and Phylogenetics (	lity to collect data from various sources, to r accomplishing the goals and expected I he subject. Show no ability to combine a skills in possession and application of the ror or no ability to collect data from other so resentational skills.  Weighting in final course grade (%)	earning outcomes of the and/or to apply theories methods and software fo urces and to systematize  No. of Hours  24  36  100  Assessment Methods to CLO Mapping CLO 2,3,4 CLO 1,2,3		
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	N Lecture w Activitie Lectures Laborato Reading Methods Assignm Examina Nei M., K Trees Ma	molecular evolutionary analysevaluate them appropriately. Demonstrate poor or no knocourse. Demonstrate very principles, and methods taugmolecular evolutionary analyse analyze and evaluate them appropriately the second	sis of real data. Show poor abil Poor presentational skills. wheldge and skills required for our or no understanding of the sist of real data. Show very poor or no sis of real data. Show very poor oppropriately. Very poor or no procourse  Details  computer laboratory/tuto  Details  tion and Phylogenetics (	lity to collect data from various sources, to r accomplishing the goals and expected I he subject. Show no ability to combine a skills in possession and application of the ror or no ability to collect data from other so resentational skills.  Weighting in final course grade (%)  40 60	earning outcomes of the and/or to apply theories methods and software fo urces and to systematize  No. of Hours  24  36  100  Assessment Methods to CLO Mapping CLO 2,3,4 CLO 1,2,3		
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	N Lecture w Activitie Lectures Laborato Reading Methods Assignm Examina Nei M., K Trees Ma TBC	molecular evolutionary analysevaluate them appropriately. Demonstrate poor or no kno course. Demonstrate very principles, and methods taug molecular evolutionary analyse analyze and evaluate them apprinciples and evaluate them apprinciples are some component services. The services are some control of the services are services as a service of the services are services as a services are services as	sis of real data. Show poor abil Poor presentational skills. wheldge and skills required for our or no understanding of the sist of real data. Show very poor or no sis of real data. Show very poor oppropriately. Very poor or no procourse  Details  computer laboratory/tuto  Details  tion and Phylogenetics (	lity to collect data from various sources, to r accomplishing the goals and expected I he subject. Show no ability to combine a skills in possession and application of the ror or no ability to collect data from other so resentational skills.  Weighting in final course grade (%)  40 60	earning outcomes of the and/or to apply theories methods and software fo urces and to systematize  No. of Hours  24  36  100  Assessment Methods to CLO Mapping CLO 2,3,4 CLO 1,2,3		
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	N Lecture w Activitie Lectures Laborato Reading Methods  Assignme Examina Nei M., K Trees Ma TBC http://moo	molecular evolutionary analysevaluate them appropriately.  Demonstrate poor or no kno course. Demonstrate very principles, and methods taug molecular evolutionary analyse analyze and evaluate them apprinciples and evaluate them apprinciples are selected by the selected selected by the selected selected by the selected selected by the selected	sis of real data. Show poor abil Poor presentational skills. Welledge and skills required for oor or no understanding of the sis of real data. Show very poor or no sis of real data. Show very poor opropriately. Very poor or no procourse  Details  computer laboratory/tuto  Details  tion and Phylogenetics (2nd ed.)	lity to collect data from various sources, to r accomplishing the goals and expected I he subject. Show no ability to combine a skills in possession and application of the ror or no ability to collect data from other so resentational skills.  Weighting in final course grade (%)  40 60	systematize, analyze and earning outcomes of the and/or to apply theories methods and software fources and to systematize   No. of Hours 24 36 100 Assessment Methods to CLO Mapping CLO 2,3,4 CLO 1,2,3 all B.G.: Phylogeneti		

BIOL4505	Oyster aquaculture: business and technology (6 credits)	Academic Year	2021			
Offering Department	Biological Sciences	Quota	20			
Course Co-ordinator	Dr T Vengatesen, Biological Sciences (rajan@hku.hk)					
Teachers Involved	(Dr T Vengatesen, School of Biological Sciences)					
Course Objectives	-Introduce oyster biology and hatchery technology and aquaculture business; -Provide scientific basis for oyster aquaculture through field demonstrations and laboratory exercises; -Enable students to design, construct and maintain oyster hatchery for production of seeds for sustainable aquaculture and restoration of wild oysters; -Facilitate transfer of academic knowledge to oyster growers and aquaculture industry for sustainable, healthy and safe sea-food production;					
Course Contents & Topics	This experiential learning course is to enhance students' knowledge in one hatchery technology and coastal aquaculture business that will enable the maintain coastal aquaculture facilities and small-scale 'green and envishellfish production and restoration of wild benthic biodiversity in coastal endeavor encompassing larval hatchery technology, seafood quality, a aquaculture business. After reading about basic oyster biology and oyster a marine larvae will be useful for human society through hatchery technoromental issues, legislation pertaining to coastal aquaculture business covered using oyster aquaculture in Hong Kong as an example. Students facilities in Hong Kong, Zhanjiang, and Qingdao to learn industrial and bus course is designed to meet the needs of an expanding sustainable aquaculture and small scale business opportunities in aquaculture industry will be	nem to design, construction and the conomic dimension and economic dimension according to the conology and aquacts and community interacts will be exposed to sessiness skills of oyster culture in Hong Kong	uct, operate and object business for interdisciplinary sions of coasta will focus on how the business action will also be veral aquaculture. This aguaculture.			
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 gain scientific knowledge required for setting up oyster hatchery, far understanding biology and ecology of larvae and shellfishes and con hatchery and farming  CLO 2 acquire skills and experiential learning opportunities (e.g. hands-on	onsider potential envir	onmental effect			

	CLO 3 e	explain the importance of	oyster farming in coastal habitat restora	ation			
		•	ercially important research project in m		al aquaculture		
			hink creatively, about hatchery product				
Pre-requisites		Pass in BIOL3109 or BIOL3203 or BIOL3301 or BIOL3303 or ENVS3004 or ENVS3313;					
and Co-requisites		and Pass in at least 24 credits of advanced level disciplinary core/elective courses in the Ecology and Biodiversity					
and Impermissible	Major or	Environmental Science M	lajor or Biological Science Major.				
combinations)	Not for s	tudents who have passed	in BIOL3505				
Offer in 2021 - 2022	N O	ffer in 2022 - 2023 : Y		Examination			
Grade Descriptors (A+ to F)	A	multidimensional thinking ab outcomes. Demonstrate exc project data. Show highly eff	pht during the analysis of larval biology is: bout the study subject. Extensive knowledge an ellent ability to apply what you have learned in ective organizational, presentational and field tri	d skills required for attaining the class room to critically and p skills.	all the course learning the larval biolog		
	В	analytical, critical and multid course learning outcomes. I	e and thought during the analysis of marine I imensional thinking about the study subject. Go Demonstrate good ability to apply what you hav ss. Show effective organizational, presentational	od knowledge and skills requi re learned in the class room t	red for attaining all th		
	С	and skills required for attain	e knowledge and original thought during the an ing all the course learning outcomes. Demonstr ze the real marine life science issues. Show cor	ate fair ability to apply what y	ou have learned in th		
	D	Evidence to show a minimus science issues. Show insuffi ability to apply what you have	um knowledge (i.e. knowledge is very incomplicient knowledge and skills required for attaining re learned in the class room to critically analyzed and field trin skills	all the course learning outcom	nes. Demonstrate pod		
	organizational, presentational and field trip skills.  Fail Evidence of meager or inadequate knowledge and understanding of marine life science issues. Show no evidence of knowledge and skills required for attaining all the course learning outcomes. Demonstrate no ability to apply what you have learned in the class room to critically analyze the real marine life science issues. Show no evidence of familiarity with relevant reading material						
Communication-	N	and held trip demonstrations	, or any knowledge of organizational and presen	nauviiai SNIIS.			
ntensive Course	IN .						
Course Type	Field car	mne					
Course Teaching			Details		No. of Hours		
Learning Activities	Activities		including tutorial	40			
Learning Activities	Lectures Field work		including tutorial	50			
			hands on training		30		
Naccomment Matheda	Laborate	•	hands on training	144 - 1 - 1 - 1 - 1 - 1 - 1 - 1			
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignm	nents	Practical	25	CLO 3,4		
	Report		Presentation: developing innovative ideas for sustainable and economically viable aquacultre in Hong Kong	50	CLO 4,5		
	Test		Written exam.	25	CLO 1,2		
Required/recommended reading and contine materials		•	ironment (S.E. Shumway, John Wiley & n Spencer, John Wiley & Sons)	& Sons)			
Course Website	http://mo	odle.hku.hk					
Additional Course nformation	Offer in alternate year from 20172018  Offered in after 2nd Sem. during May 24th to June 12th, 2021.						
	The course date may be slightly change depending on the situation and there will Not be any overseas or mainland field trips, the field course will be conducted in HK.  The course results of BIOL4505 will be released as usually longer than the other 2nd Semester courses by the						
	Faculty of	of Science.			·		
	For more course details, please email to Dr Rajan rajan@hku.hk or Ms. Jessie Lai hylaia@hku.hk						

BIOL4861	Ecology &	biodiversity interns	ship (6 credits)	Academic Ye	<b>ar</b> 2021	
Offering Department	Biological Sc	ciences		Quota		
Course Co-ordinator	Dr T Vengate	esen, Biological Science	s (rajan@hku.hk)			
Teachers Involved	(All academi	c staff in Ecology & Biod	iversity Major,Biological Scier	ces)		
Course Objectives	knowledge a		or all Ecology & Biodiversity Note the Ecology & Biodiversity Majed to the major of study.			
Course Contents & Topics		0	rk as an intern for at least ent department or NGO. The		,	
			n the latter case, the internsh are taking and prior approval b			
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 gain first hand work experience in a job placement related to their Ecology & Biodiversity Major					
	CLO 2 apply the knowledge in their Ecology & Biodiversity Major in solving practical problems in the work place					
	CLO 3 acquire an understanding and appreciation of the real work environment					
	CLO 4 exte	nd their network in their	field of study			
Pre-requisites (and Co-requisites	Major.		ced level disciplinary core / e	elective courses in the Ecolo	egy and Biodiversity	
and Impermissible			sity Major students only.			
combinations)			to take this course is their Ye	-		
Offer in 2021 - 2022	Y 1st se	m 2nd sem Summer	Offer in 2022 - 2023 : Y	Examination	No Exam	
Grade Descriptors Distinction/Pass/Fail	Distincti on	performance in handling an	lity in applying knowledge to sold d carrying out the work required in communication with supervisor(s), c	the job or assigned by supervise	or(s). Establishes highly	

		requirements set out in and excellent evaluation	the Course Description regarding working hou by supervisor(s), etc.	irs, with excellent performance	in written and oral report,
	Pass	or assigned by superv	e to solve problems in the workplace. Success sor(s). Establishes effective collaboration an ssfully fulfills the requirements set out in the ( on by supervisor(s), etc.	nd communication with superv	visor(s), colleagues, and
	Fail	assigned by supervisor(	y to solve problems in the workplace. Fails s). Fails to establish effective collaboration or o satisfy the requirements set out in the Cour supervisor(s), etc	communication with supervisor	or(s), other colleagues, or
Communication- intensive Course	N				
Course Type	Internship				
Course Teaching	Activities		Details	No. of Hours	
& Learning Activities	Internship	work	at least 160 hours	east 160 hours	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Written re	eport	written report, supervisor's feedback and oral presentation	100	CLO 1,2,3,4
Course Website	http://moo	dle.hku.hk			
Additional Course Information	about the institution Enrolmen relevant D	ir internships, which v offering the internship t of this course is not c	e to submit a written report of not les will be assessed by internal superv will also submit an assessment repor onducted via the online course select e after approval has been obtained fra a Capstone Course.	isors. Student's supervis t to the University. tion system and should b	sor at work i.e. the pe made through the

BIOL4911	Conserva	tion science in practice (6 credits)	Academic Year	2021				
Offering Department	Biological S	ciences	Quota	9				
Course Co-ordinator	TBC, Biolog	TBC, Biological Sciences ()						
Teachers Involved								
Course Objectives	environment produce and science in economic, a scientific rea	the foundation acquired by students in the Biological Scital science by using case studies that stimulate them to it discressfully debate a topic in conservation science. Conservation graphics achieving meaningful conservation outcomes taking it and political contexts. Students will be expected to present asoning. This course is a capstone course for Ecology Major students.	integrate the principles and of case studies will specifically a nto account the need for co ent their cases orally using so	oncepts learned to address the use considering social bund practical an				
Course Contents & Topics	specific prol wider conte conducted the address rea wildlife trad instruments	This course will use directed case studies to give students the opportunity to consider and synthesize solutions to specific problems in conservation and the application of conservation science in the modern world, and within the wider context of economic development, political considerations and scientific uncertainty. Projects will be conducted through collaborations with local organizations, such as WWF-Hong Kong and Ocean Park, and address real-life questions and issues. Possible case studies range from ecosystem services, biological footprints wildlife trade, to assessment of conservation risk, effectiveness of international conservation and biodiversity instruments, and the relationship between biodiversity and human livelihoods. Tutorials by the course coordinator will introduce practical conservation concepts, develop critical thinking and address specific issues of relevance						
Course Learning	On success	ful completion of this course, students should be able to:						
Outcomes	CLO 1 have	e an in-depth understanding of the topic studied, the	e major issues involved and	I the needs and				
	prospects for further work in the area							
	CLO 2 have developed investigative skills associated with the case study selected which include synthesis, organization and presentation of information and innovative and creative thinking around problem solving CLO 3 understand the importance and complexities of conserving biodiversity							
	CLO 4 be able to identify practical and scientifically defensible initiatives and measures for successful							
	conservation intervention							
	CLO 5 be able to competently present the case study and convincingly argue their case							
Pre-requisites (and Co-requisites and Impermissible combinations)	BIOL4XXX) This capstor	east 24 credits of advanced level disciplinary core/elect in the Ecology & Biodiversity Major / Ecology & Biodiver ne course is for Ecology & Biodiversity Major / Ecology & that a student is allowed to take this capstone course is	sity (Intensive) Major includin Biodiversity (Intensive) Majo	g BÌOL3303.				
Offer in 2021 - 2022	N Offer	in 2022 - 2023 : N	Examination					
Grade Descriptors (A+ to F)	( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( )	Demonstrate thorough mastery at an advanced level of extensive kno outcomes. Show strong analytical and critical abilities and logical t synthesize information across subject areas, including from practical vrange of complex, familiar and unfamiliar situations and showing addressing conservation challenges. Apply highly effective presentative reflective thinking and consideration of the wider issues of biodiversity.	hinking, with strong evidence of all work undertaken, and ability to apply consideration of practical and pol onal skills. Strong evidence of atten	cility to integrate and knowledge to a wide litical dimensions for				
	- 	Demonstrate substantial command of a broad range of knowledge an learning outcomes. Show evidence of analytical and critical abilities a ability to apply knowledge to familiar and some unfamiliar situations. De of clear attention to thoughtful and reflective thinking and attentic conservation management must be demonstrated including the importa-	nd logical thinking, with some integromenstrate effective presentational on to detail. Consideration of practices are consideration of practices and the control of the control of practices are consideration.	ation of materials an skills. Some evidenc ctical components in				
	5							
	D  Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities and little attempt a integration. Have basic understanding of importance of biodiversity for Society. Show limited ability to apply knowledge to solve problems or consider the practical challenges of biodiversity conservation. Apply limited effectiveness in presentational skills Lack of attention to thoughtful and reflective thinking.							
	. 4	Demonstrate little or no evidence of command of knowledge and skills of analytical and critical abilities, logical and coherent thinking or a knowledge or practical thinking to solve problems. Organization and pr	ttention to detail. Show very little	or no ability to apply				

Communication- intensive Course	N						
Course Type	Project-based course						
Course Teaching	Activities	Details		No. of Hours			
& Learning Activities	Reading / Self study	supervised practical work of a written & oral reports. Tuto coordinator	120				
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Oral presentation		40	CLO 1,2,4,5			
	Research report	project report	60	CLO 1,2,3,4,5			
Course Website	http://www.biosch.hku.hk/ecology/lsc/						
Additional Course Information	This course will be offered in alternate year from 2017-2018 This course will be offered subject to a minimum enrollment number and availability of teachers.						

BIOL4912	Sensory	evaluation of foo	od (6 credits)	Academic Ye	ar 2021			
Offering Department	Biological		,	Quota	15			
Course Co-ordinator	DrJČYL	ee, Biological Scienc	ces (jettylee@hku.hk)					
eachers Involved		, ,	,					
Course Objectives	perception	To provide a broad understanding of the physiological and psychological basis of human sensory perception of food. To develop expertise in the choice and application of sensory techniques, and analysis of sensory data, in food science and consumer research.						
Course Contents & Topics	in mainlan lectures w perception descriptive food oral	This course will be offered in July in a 2-week intensive workshop format at a collaborating facility in mainland China, to enable close study of food products in the Chinese marketplace. Preliminary lectures will take place at the University of Hong Kong. Physiology and psychology of sensory perception. Objectives, planning and conduct of sensory testing. Discrimination testing, thresholds, descriptive analysis, affective testing. Instrument-sensory relationships, texture and aroma profiles, food oral processing, shelf-life studies, expert panels. Case studies of sensory applications in product development, quality management, and consumer research.						
Course Learning			is course, students should be a	able to:				
Outcomes		•	physiological basis for human					
			echniques used in sensory test					
	CLO 3 int	· · · · · · · · · · · · · · · · · · ·	uation reports, and to desig	n and conduct sensory evalua	tion projects usino			
Pre-requisites		OL3201; and						
and Co-requisites		,	advanced level disciplinary con	re/elective biological sciences co	urses (BIOL3XXX o			
and Impermissible		() in the Food & Nutri		ŭ	`			
combinations)			od & Nutrional Science Major s					
	The earlie	st that a student is al	lowed to take this capstone co	urse is their year 3 study.				
Offer in 2021 - 2022	N Offe	er in 2022 - 2023 : N		Examination				
Grade Descriptors (A+ to F)	A Demonstrate thorough grasp of the subject matter covered. Show strong analytical and critical abilities and logical thinking, with evidence of creative ability and competence in professional-level problem solving. Critically use lab skills and techniques and analysis of data and results to draw appropriate and insightful conclusions to real-world problems. Demonstrate highly effective team-based organizational and presentational skills.							
	B Demonstrate substantial grasp of the subject matter covered. Show evidence of analytical and critical abilities and logical thinking with some evidence of competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw generally appropriate conclusions to real-world problems. Demonstrate effective team-based organizational and presentational skills.							
	С	Demonstrate general but incomplete grasp of the subject matter covered. Show some evidence of analytical and critical abilities and logical thinking with limited competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw moderately appropriate but sometimes erroneous conclusions to real-world problems. Demonstrate moderately effective team-based organizational and presentational skills.						
	D	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Show some evidence of coherent and logical thinking, but lacking competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw sometimes appropriate but often erroneous conclusions to real-world problems. Demonstrate team-based organizational and presentational skills of limited effectiveness.						
	Fail	Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of coheren and logical thinking, and minimal competence in professional-level problem solving. Use lab skills and techniques and analysis o data and results ineffectively, leading generally to inappropriate and usually erroneous conclusions to real-world problems. Demonstrate ineffectiveness team-based organizational and presentational skills.						
Communication- Intensive Course	N		·					
Course Type	Laboratory	and workshop cours	se					
Course Teaching	Activities		Details		No. of Hours			
Learning Activities	Laborator	у			48			
	Project wo	•			48			
	Tutorials		lectures/tutorials		24			
		Self study		iodai oo/tatoriaio				
Assessment Methods	Methods	•	Details	Weighting in final	30 Assessment			
and Weighting	Metrious		Betails	course grade (%)	Methods to CLO Mappin			
	Laboratory reports			20	CLO 2,3			
	Project reports			60	CLO 2,3			
	Test			20	CLO 1,2,3			
Required/recommended reading and			) Sensory Evaluation Practices by Exercises for Sensory Evalu					
online materials								
Course Website	http://moo	dle.hku.hk/						
Additional Course	This cours	e will be offered subj	ect to a minimum enrollment n	umber and availability of teachers	<b>)</b> _			

BIOL4913	Advance	ed practicum on fo	od and nutrient analysis (6 cre			
Offering Department	Biological			Quota	8	
Course Co-ordinator	Dr J C Y L	ee, Biological Science	s (jettylee@hku.hk)			
Teachers Involved	(Dr El-Nezami Hani,School of Biological Sciences) (Dr J C Y Lee,School of Biological Sciences)					
Course Objectives	Food products are analysed to follow the compliance with legal and labelling requirements, assessment of product quality, determination of nutritive value, research and development. The lectures and laboratory sessions will cover the analytical procedures and techniques used to provide information about the food labelling and toxicology of the products. The purpose of the laboratory classes is to give students experience in direct performance of food analysis and toxicology experiments, analysing data and reporting their findings. The students are to work individually on food products where they will analytically assess components using advanced techniques					
Course Contents & Topics	Key lectu technique will have equivalent materials	s and contaminant ass hands-on experience it methods. The stude are assessed in food	ques and cases studies demonstratessment for certain class of foods or fin analysing food products and will unts will learn how mycotoxins assay products. In-depth learning in the cand procedures for sample preparatio	ood components will be tilise analytical techniques, allergens and general se of different chromat	discussed. Student ues under AOAC o ically modified raw tography and mass	
Course Learning		•	course, students should be able to:			
Outcomes	CLO 1 Be	e familiar with the food	labeling system			
	CLO 2 Ui	nderstand the use of ap	propriate analytical techniques for foo	d analysis		
			iety of analytical techniques for evalua			
	CLO 4 Ha	ave a detailed knowle	edge of the state of the art of the olication in complex food systems	·	cal methods, their	
			ssment and compare the outcomes w	th governmental regulat	ed levels	
Pre-requisites and Co-requisites and Impermissible	BIOL4XXX This caps	X) included BIOL3207 attone course is for Food	vanced level disciplinary core/elective and / or BIOL3209 in the Food & Nutric & Nutrional Science Major students o	onal Science Major. nly.	ırses (BIOL3XXX o	
combinations)			wed to take this capstone course is the			
Offer in 2021 - 2022		er in 2022 - 2023 : N		Examination	in a second to add and the factories	
Grade Descriptors (A+ to F)	Demonstrate a thorough grasp of the subject matter covered. Show strong analytical and critical abilities and logical thinking with evidence of creative ability and competence in professional-level problem solving. Critically use lab skills and techniquet and analysis of data and results to draw appropriate and insightful conclusions to real-world problems. Demonstrate highly effective team-based organizational and presentational skills.  Demonstrate substantial grasp of the subject matter covered. Show evidence of analytical and critical abilities and logical thinking with some evidence of competence in professional-level problem solving. Use lab skills and techniques and analysis or					
	С					
	and logical thinking with limited competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw moderately appropriate but sometimes erroneous conclusions to real-world problems. Demonstrate moderately effective team-based organizational and presentational skills.					
	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Show some evidence of coherent and logical thinking, but lacking competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw sometimes appropriate but often erroneous conclusions to real-world problems. Demonstrate team-based organizational and presentational skills of limited effectiveness.					
	Fail  Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of coherent and logical thinking, and minimal competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results ineffectively, leading generally inappropriate and usually erroneous conclusions to real-world problems. Demonstrate ineffectiveness team-based organizational and presentational skills.					
Communication- Intensive Course	N					
Course Type	Lecture w	ith laboratory compone	nt course			
Course Teaching	Activities	3	Details		No. of Hours	
Learning Activities	Lectures			24		
	Laborator			48		
	Reading / Self study				100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Project report			50	CLO 1,2,3,4	
	Test			50	CLO 1,2,3,4,5	
Required/recommended reading and contine materials	Y. Pico, C	hemical Analysis of Fo	Edition (2010 Springer USA) od Techniques and Applications (2012 DAC International 19th Ed (2012, AOA		on-line)	
Course Website	http://moo	dle.hku.hk	•	,		
Additional Course			t to a minimum enrollment number an	d availability of teachers		
		,				

BIOL4921	Animal behaviour and behavioural ecology: field course (6 credits)	Academic Year	2021			
Offering Department	Biological Sciences	Quota	15			
Course Co-ordinator	, Biological Sciences ()					
Teachers Involved						
Course Objectives	This course is offered as a capstone experience and unique experiential learning opportunity. It introduces students to scientific reasoning and conceptual basis of studying animal behaviour and behavioural ecology. It exposes students to 'research-in-making' and 'day-to-day logistics' of a field research, with all the excitement it generates and all demanding challenges it brings along, with hands-on experience in designing, conducting, analysing, and successfully completing field studies of animal behaviour and behavioural ecology.					
Course Contents & Topics	Conducted in a field research site outside Hong Kong, this course teaches students how to think analytically about animal behaviour, how to design a field research protocol, construct a conceptual framework of a research project and how to put this framework into a practice of collecting and analysing data. The course includes lectures, informal discussions, review of research techniques, and extensive field component with daily research activities. It					

	experience data, and location. S techniques individual contribute application componen	e in application of dive (iv) engagement in sci Students will be guided s and will exercise their research projects contra to advancing science n of the knowledge ac	rough (i) direct participation in an orarse research techniques, (iii) handsientific debates with researchers and through the scientific reasoning and skills in data gathering and interpretaribute to a greater understanding of be at large. The emphasis is placed quired previously during relevant class do to give a seminar-type presentation.	on involvement in collect research teams directly methodology, will learn tion, and will develop an ehavioural and evolution on independent thinkits ssroom courses. Follow	eting and analysing in their field study a suite of research understanding how hary processes and ing and thoughtfuling the field-based	
Course Learning	Report.	seful completion of this	course students should be able to:			
Outcomes	On successful completion of this course, students should be able to:  CLO 1 understand of the biodiversity and primary habitats in the ecosystem studied  CLO 2 establish the basic skills needed to identify target species associated with the field course  CLO 3 be knowledgeable about and able to implement sampling techniques for organisms in the particular ecosystems studied					
Pre-requisites (and Co-requisites and Impermissible combinations)	CLO 4 understand the basic ecology of target species and how biotic and abiotic factors shape focal communities Pass in BIOL3101; and Pass in at least 24 credits of advanced level disciplinary core/elective biological sciences courses (BIOL3XXX o BIOL4XXX) in the Ecology & Biodiversity Major. This capstone course is for Ecology & Biodiversity Major students only. The earliest that a student is allowed to take this capstone course is their year 3 study.					
Offer in 2021 - 2022			ved to take this capstone course is the			
Grade Descriptors (A+ to F)	A	A Evidence of a thorough grasp of the subject and relevant research techniques. Eagerness and enthusiasm to learn and excellent familiarity with relevant background reading and case studies. Exemplary handling of field data collection and excellent analytical skills. Ample evidence of independent critical thought with excellent use of a broad range of fundamental concepts and broader comparative perspective to draw insightful and logical conclusions. Show outstanding abilities of independent work, effective presentation skills with excellent analytical argumentation. Excellent or outstanding work relative to what is required at degree				
	B Evidence of a good grasp of the subject and relevant research techniques. Interest in learning and good-to-moderate familiarity with relevant background reading and case studies. Good handling of field data collection and commendable analytical skills. Good evidence of critical thought (although not always independent), with an appreciable use of fundamental concepts and consideration of broader comparative perspective in drawing logical conclusions. Good abilities of independent work, effective presentation skills with logical and analytical argumentation. Work more than sufficient for what is required at degree level.					
	Demonstrate an adequate, but incomplete grasp of the subject and relevant research techniques. Moderate familiarity with relevant background reading and case studies, but no interest in learning beyond the adequate average level. Evidence of logical critical thinking (although not always independent), with mostly good use of fundamental concepts to draw logical conclusions. Fair presentation skills, with mostly correct argumentation, but limited (or no) abilities to integrate broader concepts. Work sufficient for what is required for degree level.					
	D Demonstrate some grasp of the subject, but only partial and with limited understanding of relevant research concepts and research techniques. Some familiarity with relevant case studies, but insufficient evidence of background reading and limited abilities of critical independent thinking. Ineffective presentation skills with generally weak logical argumentation with restricted ability of drawing appropriate conclusions. Work barely meets what is required at degree level.					
	Fail	background reading and n	minimum grasp of the subject and the minir o familiarity with any relevant examples and of tation skills with poor argumentation and no a	ase studies. Inadequate evide	ence of coherent logical	
Communication- intensive Course Course Type	N					
Course Teaching	Field camp  Activities		Details		No. of Hours	
& Learning Activities	Lectures		lectures and tutorials		10	
	Field work	<		72		
	Presentat		interactive debates		10	
		Self study			100	
A 4 M - 4b d -	-	Assessment group project			15	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents	project report (35%), group	35	CLO 1,2,3,4	
	Report		investigation & presenation (30%)	65	CLO 1,2,3,4	
Required/recommended reading and online materials	Required/recommended reading and online materials (at most 400 characters) Lehner, P.N. 1996 (reprint 2002). Handbook of ethological methods. Cambridge University Press. Dugatkin, L.A. (ed.) 2001. Model systems in behavioral ecology. Integrating conceptual, theoretical, and empirical approaches. Princeton University Press. Yamagiwa, J. & Karczmarski, L. (eds.) 2014. Primates and Cetaceans: Field research and conservation of complex mammalian societies. Springer Science.					
Course Website Additional Course Information	http://www.biosch.hku.hk/ecology/lsc/ Enrollment Procedure: The course is open to enrollment only during the add/drop period of the 2nd semester. Students are required to submit a brief (maximum 1-page) application letter (PDF file) via e-mail to the Course Coordinator (leszek@hku.hk.not later than 10th January. The application shall include the following:  1. Personal and academic details 2. ID photograph 3. Brief description of academic interests 4. GPA 5. Pre-requisite courses taken and grades received (if pre-requisites are not met, a reasoned request for waiver) All applications will be reviewed prior to the commencement of the 2nd semester and results will be announced within the 1st week of the add/drop period of the 2nd semester.					

BIOL4922	Food product development and evaluation (6 credits)	Academic Year	2021
Offering Department	Biological Sciences	Quota	20
Course Co-ordinator	TBC, Biological Sciences ()		
Teachers Involved	(TBC,Biological Sciences)		

Course Objectives	To introduce the key concepts and techniques used in food product development. To provide small group experience in the design, development and production of a new food product.						
Course Contents & Topics	History and future of the food industry; industrial products development process; idea generation and prototype development for new food products; quality management and legal protection; marketing strategies; food labeling; food package design; new product development for different food industries.						
Course Learning	On successful completion of this course, students should be able to:					u100.	
Outcomes							
		CLO 1 understand the food product development cycle CLO 2 know the key steps in new product development					
		CLO 3 demonstrate enhanced insight and understanding of current and future trends in the food industry					
	CLO 4 h	ave professional leve	el practical experience in new prod	uct develo	opment	•	
	CLO 5 k	now the main charac	cteristics of different sectors of the f	food indus	stry		
Pre-requisites	Pass in a	t least 24 credits of	advanced level disciplinary core/e	lective bio	ological sciences cours	ses (BIOL3XXX o	
(and Co-requisites			3 and / or BIOL4205 in the Food &				
and Impermissible			od & Nutritional Science Major stud	,			
combinations)			llowed to take this capstone course				
Off ! 0004 0000			ssed in BIOL4210 Food product dev	velopmen			
Offer in 2021 - 2022		fer in 2022 - 2023 : N			Examination		
Grade Descriptors (A+ to F)	A Demonstrate thorough grasp of the subject matter covered. Show strong analytical and critical abilities and logical thinking, with evidence of creative ability and competence in professional-level problem solving. Critically use lab skills and techniques and analysis of data and results to draw appropriate and insightful conclusions to real-world problems. Demonstrate highly effective team-based organizational and presentational skills.						
	В						
	C Demonstrate general but incomplete grasp of the subject matter covered. Show some evidence of analytical and critical abilities and logical thinking with limited competence in professional-level problem solving. Use lab skills and techniques and analysis of data and results to draw moderately appropriate but sometimes erroneous conclusions to real-world problems. Demonstrate moderately effective team-based organizational and presentational skills.						
	С	and logical thinking with data and results to dra	n limited competence in professional-level pay moderately appropriate but sometimes	problem solv erroneous (	ing. Use lab skills and tech	iniques and analysis o	
	D	and logical thinking with data and results to dra moderately effective the Demonstrate partial bu evidence of coherent techniques and analys	n limited competence in professional-level paw moderately appropriate but sometimes am-based organizational and presentational t limited grasp, with retention of some releand logical thinking, but lacking competen is of data and results to draw sometimes	problem solverroneous of skills. Evant informace in profess appropriate	ving. Use lab skills and tech conclusions to real-world p lation, of the subject matter ssional-level problem solvin te but often erroneous con	niques and analysis o roblems. Demonstrate covered. Show some ng. Use lab skills and	
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intensive Course Course Type	D Fail N Laborator	and logical thinking with data and results to dra- moderately effective tea  Demonstrate partial bu  evidence of coherent a  techniques and analys  problems. Demonstrate  Demonstrate little or no  and logical thinking, and  data and results ineffe  Demonstrate ineffective   y and workshop cour	n limited competence in professional-level pay moderately appropriate but sometimes am-based organizational and presentational t limited grasp, with retention of some releand logical thinking, but lacking competent is of data and results to draw sometimes team-based organizational and presentation grasp, with retention of little relevant inford minimal competence in professional-level citively, leading generally to inappropriate enness team-based organizational and prese	problem solverroneous of skills.  Evant informote in profess appropriational skills of rmation, of the problem solvend usually	ving. Use lab skills and tech conclusions to real-world p lation, of the subject matter ssional-level problem solvin te but often erroneous con limited effectiveness. he subject matter covered, living. Use lab skills and tech y erroneous conclusions to	iniques and analysis or orbitems. Demonstrate covered. Show some ing. Use lab skills and clusions to real-world. Show lack of coheren iniques and analysis of oreal-world problems.	
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intensive Course Course Type Course Teaching	D Fail N Laborator Activities Laborator	and logical thinking with data and results to dra- moderately effective tea  Demonstrate partial bu  evidence of coherent at  techniques and analys  problems. Demonstrate  Demonstrate little or no  and logical thinking, and  data and results ineffer  Demonstrate ineffective   y and workshop courses	n limited competence in professional-level paw moderately appropriate but sometimes am-based organizational and presentational t limited grasp, with retention of some releand logical thinking, but lacking competent is of data and results to draw sometimes team-based organizational and presentation grasp, with retention of little relevant inford minimal competence in professional-level excitively, leading generally to inappropriate enness team-based organizational and presentations.	problem solverroneous of a skills.  evant informoce in profess appropriat  problem sol and usually  national skill  ntational skil	ving. Use lab skills and tech conclusions to real-world p lation, of the subject matter ssional-level problem solvin te but often erroneous con limited effectiveness. he subject matter covered, living. Use lab skills and tech y erroneous conclusions to	iniques and analysis of roblems. Demonstrate covered. Show some ng. Use lab skills and clusions to real-world. Show lack of coheren niques and analysis of preal-world problems.  No. of Hours 48	
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intensive Course Course Type Course Teaching	D Fail N Laborator Activities Laborator Group wo Tutorials	and logical thinking with data and results to dra moderately effective tea Demonstrate partial bu evidence of coherent a techniques and analys problems. Demonstrate Demonstrate little or no and logical thinking, an data and results ineffe Demonstrate ineffective  y and workshop cour s ry	n limited competence in professional-level paw moderately appropriate but sometimes am-based organizational and presentational t limited grasp, with retention of some releand logical thinking, but lacking competent is of data and results to draw sometimes team-based organizational and presentation grasp, with retention of little relevant inford minimal competence in professional-level excitively, leading generally to inappropriate enness team-based organizational and presentations.	problem solverroneous of a skills.  evant informoce in profess appropriational skills of remation, of the problem sol and usually intational skills.	ving. Use lab skills and tech conclusions to real-world p lation, of the subject matter ssional-level problem solvin te but often erroneous con limited effectiveness. he subject matter covered, living. Use lab skills and tech y erroneous conclusions to	iniques and analysis or orbitems. Demonstrate covered. Show some one clusions to real-world show lack of coheren or covered and analysis or real-world problems.  No. of Hours  48  100  12	
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Communication- intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting	D Fail N Laborator Activities Laborator Group wo Tutorials Reading	and logical thinking with data and results to dra moderately effective tea Demonstrate partial bu evidence of coherent a techniques and analys problems. Demonstrate Demonstrate little or not and logical thinking, and data and results ineffective Demonstrate ineffective and workshop courts.  Ty and workshop courts.  Y Self study	n limited competence in professional-level paw moderately appropriate but sometimes am-based organizational and presentational t limited grasp, with retention of some releand logical thinking, but lacking competent is of data and results to draw sometimes team-based organizational and presentation or grasp, with retention of little relevant infor diminmal competence in professional-level ectively, leading generally to inappropriate eness team-based organizational and presentations team-based organizational and presentations.  **Botalis**  **Bota	group  problem solverroneous of skills.  evant inform toe in profeis sa appropriational skills of rmation, of the problem sol and usually notational skills of the problem sol and usually notational skills of the problem sol and usually notational skills or the problem sol and usually notational skills or the problem sol and usually notational skills or the problem sol and usually notational skills or the problem sol and usually notational skills or the problem sol and the problem s	wing. Use lab skills and tech conclusions to real-world p lation, of the subject matter ssional-level problem solvir te but often erroneous con limited effectiveness. he subject matter covered limited solving. Use lab skills and tech y erroneous conclusions to list.	niques and analysis o roblems. Demonstrate covered. Show some g. Use lab skills and clusions to real-world Show lack of coheren niques and analysis of preal-world problems.  No. of Hours 48 100 12 100 Assessment Methods	
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	D Fail N Laborator Activities Laborator Group wo Tutorials Reading Methods  Assignme	and logical thinking with data and results to dra moderately effective tea Demonstrate partial bu evidence of coherent a techniques and analys problems. Demonstrate Demonstrate little or no and logical thinking, an data and results ineffe Demonstrate ineffective  ry and workshop cour s ry ork / Self study  defents  dy and J. B. Lord: Defend I. S. Saguy: Food	n limited competence in professional-level paw moderately appropriate but sometimes am-based organizational and presentational t limited grasp, with retention of some releand logical thinking, but lacking competents of data and results to draw sometimes team-based organizational and presentation or grasp, with retention of little relevant infor diminmal competence in professional-level ectively, leading generally to inappropriate eness team-based organizational and presentations.    Details	group  group  group  group  group  group  group  group  group  group  group  ject  ttation  Changing  1991)	wing. Use lab skills and tech conclusions to real-world p lation, of the subject matter ssional-level problem solvite but often erroneous con limited effectiveness. he subject matter covered. Iving. Use lab skills and tech y erroneous conclusions to lils.  Weighting in final course grade (%)	niques and analysis or orbitems. Demonstrate recovered. Show some ag. Use lab skills and ciclusions to real-world show lack of coheren niques and analysis or real-world problems.  No. of Hours 48 100 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5	
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BIOL4962	Food & nutritional science internship (6 credits)	Academic Year	2021				
Offering Department	Biological Sciences	Quota					
Course Co-ordinator	Dr J C Y Lee, Biological Sciences (jettylee@hku.hk)						
Teachers Involved	(All academic staff in Food & Nutritional Science Major, Biological Sciences)						
Course Objectives	To provide a stimulating experience for all Food & Nutritional Science Major undergraduates to integrate and apply their knowledge and skills obtained from the Food & Nutritional Science Major through gaining work experience in the field of Food & Nutritional Science that are related to the major of study.						
Course Contents & Topics	Students taking this course will work as an intern for at least 160 hours in at least 20 working days within the University or outside the University in a company, government department or NGO. The internship may be arranged by the School or obtained by students themselves. In the latter case, the internship must be in a relevant field to the Food & Nutritional Science Major that the students are taking and prior approval by the course coordinator is required						
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 gain first hand work experience in a job placement related to their Food & Nutritional Science Major						
	CLO 2 apply the knowledge in their Food & Nutritional Science Major in solving practical problems in the work place						
	CLO 3 acquire an understanding and appreciation of the real work environment						
	CLO 4 extend their network in their field of study						
Pre-requisites	Pass in at least 24 credits of advanced level disciplinary core/elective biological sciences courses (BIOL3XXX or						
(and Co-requisites	BIOL4XXX) in the Food & Nutritional Science Major. This capstone course is for Food & Nutritional Science Major students only.						
and Impermissible							
combinations)	The earliest that a student is allowed to take this capstone course is their year 3						
Offer in 2021 - 2022	Y 1st sem 2nd sem Summer Offer in 2022 - 2023 : Y	Examination	No Exam				
Grade Descriptors	Distincti  Demonstrates excellent ability in applying knowledge to solve problems in	the workplace. Den	nonstrates excellent				

Distinction/Pass/Fail	on	on performance in handling and carrying out the work required in the job or assigned by supervisor(s). Establishes highly effective collaboration and communication with supervisor(s), colleagues, and clients in the job. Successfully fulfills the requirements set out in the Course Description regarding working hours, with excellent performance in written and oral report, and excellent evaluation by supervisor(s), etc.				
	Pass	or assigned by super clients in the job. Succ	visor(s). Establishes effective colla essfully fulfills the requirements set uation by supervisor(s), etc. Stude	ce. Successfully handles and carries out the aboration and communication with superv t out in the Course Description regarding w ents demonstrating excellent performance	isor(s), colleagues, and orking hours, written and	
	Fail	assigned by superviso	r(s). Fails to establish effective coll to satisfy the requirements set out	place. Fails to handle or carry out the wor aboration or communication with superviso in the Course Description regarding workin	r(s), other colleagues, or	
Communication- intensive Course	N					
Course Type	Internship					
Course Teaching	Activities		Details	Details		
& Learning Activities	Internship	Internship work at least160 h working days		60 hours (lunch hour excluded) in at least 20 days		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Oral presentation			25	CLO 1,2,3,4	
	Supervisor's feedback			50	CLO 1,2,3,4	
	Written rep	ort		25	CLO 1,2,3,4	
Course Website	http://mood	le.hku.hk				
Additional Course Information	presentation supervisor the University Satisfactory be recorded interested the Enrolment	n about their internst at work i.e. the institu ity. / completion of this c d on the student's to o enrol in this course of this course is not	nips, which will be assessed ution offering the internship we course can be counted towar transcript. This course will be should contact the Departm conducted via the online cou	of not less than 1,000 words and an by internal supervisors. Student's will also submit an assessment reporteds the Capstone requirement. Detuble assessed on "Pass/Fail" basis nent to obtain the approval.  Jurse selection system and should be betained from the course coordinate.	ort to tails of internship will Students who are the made through the	

BIOL4963	Molecular	biology & biote	echnology internship (6 credits)	Academic Ye	ar 2021	
Offering Department	Biological So	ciences		Quota		
Course Co-ordinator	Dr A Yan (1s	st/2nd), Dr J C Y Le	ee (Summer), Biological Sciences (ayai	n8@hku.hk; jettylee@hki	ı.hk)	
Teachers Involved	(All academi	(All academic staff in Molecular Biology & Biotechnology Major, Biological Sciences)				
Course Objectives	To provide a	a stimulating exper	ience for all Molecular Biology & Biote	echnology Major undergr	aduates to integrate	
-	and apply th	neir knowledge and	skills obtained from the Molecular Bio	ology & Biotechnology M	ajor through gaining	
	work experience in the field of Molecular Biology & Biotechnology that are related to the major of study.					
Course Contents	Students taking this course will work as an intern for at least 160 hours in at least 20 working days within the					
& Topics			versity in a company, government de			
			lined by students themselves. In the la			
	field to the Molecular Biology & Biotechnology Major that the students are taking and prior approval by					
	coordinator					
Course Learning			is course, students should be able to:			
Outcomes			perience in a job placement related to t			
		y the knowledge in k place	their Molecular Biology & Biotechnolo	gy Major in solving pract	ical problems in the	
	CLO 3 acqu	uire an understandi	ng and appreciation of the real work en	vironment		
	CLO 4 exte	nd their network in	their field of study			
Pre-requisites	Pass in at	least 24 credits of	advanced level disciplinary core / e	lective courses in the N	/lolecular Biology &	
(and Co-requisites	Biotechnolog	gy Major.				
and Impermissible			lecular Biology & Biotechnology Major s			
combinations)			lowed to take this capstone course is the	neir year 3 study.		
Offer in 2021 - 2022	Y 1st se	em 2nd sem Su	mmer Offer in 2022 - 2023 : Y	Examination	No Exam	
Grade Descriptors Distinction/Pass/Fail	Distincti on	performance in hand effective collaboration requirements set out it	ent ability in applying knowledge to solve p ling and carrying out the work required in the n and communication with supervisor(s), collea in the Course Description regarding working hou on by supervisor(s), etc.	e job or assigned by supervise agues, and clients in the job.	or(s). Establishes highly Successfully fulfills the	
	Pass	Pass  Able to apply knowledge to solve problems in the workplace. Successfully handles and carries out the work required in the job or assigned by supervisor(s). Establishes effective collaboration and communication with supervisor(s), colleagues, and clients in the job. Successfully fulfills the requirements set out in the Course Description regarding working hours, written and oral report, and evaluation by supervisor(s), etc. Students demonstrating excellent performance in the above would be awarded a grade of "Distinction".				
	Fail					
Communication-	N					
intensive Course						
Course Type	Internship					
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Internship w	vork	at least 160 hours (lunch hour exworking days	at least 160 hours (lunch hour excluded) in at least 20		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Written repo	ort	written report, supervisor's feedback and oral presentation	100	CLO 1,2,3,4	

Course Website	http://moodle.hku.hk
Additional Course Information	Students taking this course have to submit a written report of not less than 1,000 words and an oral presentation about their internships, which will be assessed by internal supervisors. Student's supervisor at work i.e. the institution offering the internship will also submit an assessment report to the University.  Satisfactory completion of this course can be counted towards the Capstone requirement. Details of internship will be recorded on the student's transcript. This course will be assessed on "Pass/Fail" basis. Students who are interested to enrol in this course should contact the Department to obtain the approval.  Enrolment of this course is not conducted via the online course selection system and should be made through the relevant Department/School office after approval has been obtained from the course coordinator.

BIOL4964	Biological	sciences internsh	nip (6 credits)	Academic Yea	ar 2021
Offering Department	Biological So	ciences		Quota	
Course Co-ordinator	Dr Y W Cha	n, Biological Sciences	(gywchan @hku.hk)		
Teachers Involved	(All academi	ic staff in Biological Sc	iences Major,Biological Sciences)		
Course Objectives	knowledge a Biological So	and skills obtained from	ce for all Biological Sciences major in the Biological Sciences Major the d to the major of study.	rough gaining work exper	ience in the field of
Course Contents			ork as an intern for at least 160 h		
& Topics	University or outside the University in a company, government department or NGO. The internship may be arranged by the School or obtained by students themselves. In the latter case, the internship must be in a relevan field to the Biological Sciences major that the students are taking and prior approval by the course coordinator is required				
Course Learning	On successful completion of this course, students should be able to:				
Outcomes	CLO 1 gain first hand work experience in a job placement related to their Biological Sciences Major				
			eir Biological Sciences Major in solv	• • •	he work place
	CLO 3 acq	uire an understanding	and appreciation of the real work er	nvironment	
	CLO 4 exte	end their network in the	eir field of study		
Pre-requisites			anced level disciplinary core/electiv	e biological sciences cou	rses (BIOL3XXX or
(and Co-requisites		in the Biological Scien			
and Impermissible			cal Sciences Major students only.		
combinations)			ed to take this capstone course is the		
Offer in 2021 - 2022	Y 1st se		er Offer in 2022 - 2023 : Y	Examination	No Exam
Grade Descriptors Distinction/Pass/Fail	On Distincti on  Demonstrates excellent ability in applying knowledge to solve problems in the workplace. Demonstrates excellent performance in handling and carrying out the work required in the job or assigned by supervisor(s). Establishes highly effective collaboration and communication with supervisor(s), colleagues, and clients in the job. Successfully fulfills the requirements set out in the Course Description regarding working hours, with excellent performance in written and oral report, and excellent evaluation by supervisor(s), etc.				
	Able to apply knowledge to solve problems in the workplace. Successfully handles and carries out the work required in the job or assigned by supervisor(s). Establishes effective collaboration and communication with supervisor(s), colleagues, and clients in the job. Successfully fulfills the requirements set out in the Course Description regarding working hours, written and oral report, and evaluation by supervisor(s), etc. Students demonstrating excellent performance in the above would be awarded a grade of "Distinction".				
	Very limited or no ability to solve problems in the workplace. Fails to handle or carry out the work required in the job or assigned by supervisor(s). Fails to establish effective collaboration or communication with supervisor(s), other colleagues, or clients in the job. Fails to satisfy the requirements set out in the Course Description regarding working hours, written and oral report, or evaluation by supervisor(s), etc				
Communication- intensive Course	N				
Course Type	Internship				
Course Teaching	Activities		Details		No. of Hours
& Learning Activities	Internship w	/ork	at least160 hours (lunch hour excluded) in at least 20 working days		160
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Written report		written report, employer's feeback and oral presentation	100	CLO 1,2,3,4
Course Website	http://moodle				
Additional Course Information	presentation supervisor a the Universit Satisfactory be recorded interested to Enrolment o	about their internship t work i.e. the institution ty. completion of this cou i on the student's trait enrol in this course ship f this course is not course	o submit a written report of not less s, which will be assessed by internation offering the internship will also surse can be counted towards the Canscript. This course will be assess nould contact the Department to obtain ducted via the online course selection after approval has been obtained from the course of the course selection of the	al supervisors. Student's abmit an assessment report postone requirement. Details basis. It is a provided in the approval. It is a provided by the system and should be approved by the system and should be approved.	rt to ails of internship will Students who are e made through the

BIOL4991	Ecology & biodiversity project (12 credits)	Academic Year	2021
Offering Department	Biological Sciences	Quota	
Course Co-ordinator	Dr S W Y Sin, Biological Sciences (sinyw@hku.hk)		
Teachers Involved	(All academic staff in E&B Major / E&B Intensive Major, Biological Sciences)		
Course Objectives	To provide a stimulating capstone experience for Ecology & Biodiversity Ma (Intensive) undergraduates to integrate and apply their knowledge and sk Biodiversity Major / Ecology & Biodiversity (Intensive) through planning and ca the supervision of a member of staff.	ills obtained from	the Ecology &
Course Contents & Topics	Students should seek approval from a prospective supervisor prior to selecting t admission to the course is approved by the course coordinator, students will cor work under the guidance of their supervisor.		t
Course Learning	On successful completion of this course, students should be able to:		

Outcomes	CLO 1 critique and review appropriate scientific literature					
	CLO 2 us	se this information to	generate a scientifically relevant resea	rch question		
	CLO 3 de	evelop and formulate	innovative scientific hypotheses to test	t this question		
	CLO 4 design and undertake practical research work to formally test the hypotheses proposed					
		nalyse and evaluate ustrate the outcomes	the data collected to test the hypothes	ses, present data in a pro	fessional manner to	
	CLO 6 d	raw an objective serie	es of conclusions based on the experim	nental work		
			discuss their research findings and plac		entific context	
Pre-requisites and Co-requisites and Impermissible combinations)	Pass in a Major / Ed This caps	CLO 8 submit their work following a specified journal format, present their work as a scientific conference talk  Pass in at least 24 credits of advanced level disciplinary core / elective courses in the Ecology & Biodiversit  Major / Ecology & Biodiversity Major (Intensive); and  This capstone course is for Ecology & Biodiversity Major / Ecology & Biodiversity Major (Intensive) students only.  The earliest that a student is allowed to take this capstone course is their year 3 study.				
Offer in 2021 - 2022	Y Ye	ar long Offer in 202	2 - 2023 : Y	Examination	No Exam	
Grade Descriptors (A+ to F)	Α	attainment of all learn hypothesis. Well design	or near-complete understanding and a thoro ing outcomes. Excellent critique and knowled ned experimental approach to test research hyp eldwork techniques. Demonstrate comprehens n work.	ge of relevant literature and in pothesis. Show excellent organi	dentification of research zational and/or analytical	
	В					
	С	Evidence of adequate understanding and grasp of the subject matter as demonstrated by general but incomplete attainment of most of the learning outcomes. Acceptable critique and knowledge of relevant literature and identification of research hypothesis. Adequately designed experimental approach to test research hypothesis. Show fair organizational and/or analytical skills and laboratory/fieldwork techniques. Demonstrate adequate but not necessarily critical, assessment of results and presentation of research work.				
	D					
	Fail  Evidence of poor or inadequate understanding and grasp of the subject matter such that most of the learning outcomes are not attained. Poor critique and knowledge of relevant literature and identification of research hypothesis. Badly designed experimental approach to test research hypothesis. Show little evidence of appropriate organizational and/or analytical skills and laboratory/fieldwork techniques. Demonstrate incorrect interpretation and assessment of results and poor presentation of research work.					
Communication- ntensive Course	N					
Course Type	Project-ba	ased course				
Course Teaching	Activitie		Details		No. of Hours	
& Learning Activities		/ Self study	formal lectures, seminars & practic	cal work	144	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Dissertat	ion	Written report (<12000 words)	70	CLO 1,2,3,4,5,6,7,8	
	Oral pres	sentation		30	CLO 1,2,3,4,5,6,7	
Course Website	http://mod	odle.hku.hk				

BIOL4992	Food & nutritional science project (12 credits)	Academic Year	2021				
Offering Department	Biological Sciences	Quota					
Course Co-ordinator	Dr C B Chan, Biological Sciences (chancb@hku.hk)						
Teachers Involved	(All academic staff in Food & Nutritional Science Major, Biological Science	es)					
Course Objectives	To provide a stimulating capstone experience for Food & Nutritional S and apply their knowledge and skills obtained from the Food & Nutriti carrying out a research project under the supervision of a member of sta	onal Science Major throu					
Course Contents & Topics		Students should seek approval from a prospective supervisor prior to selecting this course. After admission to the course is approved by the course coordinator, students will complete their project					
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 critique and review appropriate scientific literature						
	CLO 2 use this information to generate a scientifically relevant research	question					
	CLO 3 develop and formulate scientific hypotheses to test this question						
	CLO 4 design and undertake practical research work to formally test the hypotheses proposed						
	CLO 5 analyse and evaluate the data collected to test the hypotheses, present data in a professional manner to illustrate the outcomes						
	CLO 6 draw an objective series of conclusions based on the experimental work						
	CLO 7 highlight and discuss their research findings and place them into a holistic scientific context						
	CLO 8 submit their work following a specified journal format, present their work as a scientific conference talk						
Pre-requisites (and Co-requisites	Pass in at least 24 credits of advanced level disciplinary core/elective IBIOL4XXX) in the Food & Nutritional Science Major; and	biological sciences course	es (BIOL3XXX or				
and Impermissible	Cumulative GPA of 3.0 or above.						
combinations)	This capstone course is for Food & Nutritional Science Major students only.						
	The earliest that a student is allowed to take this capstone course is their						
Offer in 2021 - 2022	Y Year long Offer in 2022 - 2023 : Y	Examination	No Exam				
Grade Descriptors (A+ to F)	A Evidence of complete or near-complete understanding and a thorough attainment of all learning outcomes. Excellent critique and knowledge of hypothesis. Well designed experimental approach to test research hypothesis wills and laboratory/fieldwork techniques. Demonstrate comprehensive, presentation of research work.	of relevant literature and ident esis. Show excellent organization	ification of research onal and/or analytical				
	B  Evidence of near-complete understanding and a good grasp of the subject of learning outcomes. Good critique and knowledge of relevant literature and designed experimental approach to test research hypothesis. Show	nd identification of research hypo	othesis. Appropriately				

		laboratory/fieldwork techni	ques. Demonstrate effective, critica	al, assessment of results and good presenta	ation of research work.
	С	most of the learning outco	mes. Acceptable critique and know erimental approach to test researc	ct matter as demonstrated by general but ledge of relevant literature and identificatio ch hypothesis. Show fair organizational an not necessarily critical, assessment of res	n of research hypothesis. nd/or analytical skills and
	D	learning outcomes. Limite designed experimental a	ed critique and knowledge of rele approach to test research hypo	matter as demonstrated by incomplete at evant literature and identification of rese othesis. Show fair organizational and/o poorly organized assessment of results ar	arch hypothesis. Poorly r analytical skills and
	Fail	attained. Poor critique a experimental approach to	and knowledge of relevant literat test research hypothesis. Show littl	the subject matter such that most of the le ture and identification of research hypo le evidence of appropriate organizational a prepretation and assessment of results ar	thesis. Badly designed nd/or analytical skills and
Communication- intensive Course	N				
Course Type	Project-ba	ased course			
Course Teaching	Activitie	S	Details		No. of Hours
& Learning Activities	Reading	/ Self study	formal lectures, seminars	& practical work	144
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Dissertat	ion		80	CLO 1,2,3,4,5,6,7,8
	Oral pres	sentation	research seminar	20	CLO 5,7
Course Website	http://mod	odle.hku.hk/			
Additional Course Information	As BIOL4	1992 "FNS project"is a		) and a research seminar (20% was should enrol this course during	

BIOL4993	Molecula	r biology & biotechnology project (12 credits)	Academic Yea	r 2021	
Offering Department	Biological S		Quota		
Course Co-ordinator	Dr A Yan, E	Biological Sciences (ayan8@hku.hk)			
Teachers Involved	(All acaden	nic staff in MBB Major / MBB Intensive Major, Biological Science	ces)		
Course Objectives	& Biotechn the Molecu	a stimulating capstone experience for all Molecular Biology ology Major (Intensive) undergraduates to integrate and applular Biology & Biotechnology Major / Molecular Biology & and carrying out a research project under the supervision of a major.	y their knowledge and Biotechnology Major	skills obtained fron	
Course Contents & Topics	Students should seek approval from a prospective supervisor prior to selecting this course. After admission to the course is approved by the course coordinator, students will complete their project work under the guidance of their supervisor.				
Course Learning	On success	sful completion of this course, students should be able to:			
Outcomes	CLO 1 cr	itique and review appropriate scientific literature			
	CLO 2 us	se this information to generate a scientifically relevant researc	h question		
	CLO 3 de	evelop and formulate scientific hypotheses to test this question	1		
	CLO 4 de	esign and undertake practical research work to formally test th	e hypotheses proposed		
	CLO 5 ar	nalyse and evaluate the data collected to test the hypotheses			
	CLO 6 pr	resent data in a professional manner to illustrate the outcomes	;		
	CLO 7 dr	aw an objective series of conclusions based on the experiment	ntal work		
	CLO 8 his	ghlight and discuss their research findings and place them into	o a holistic scientific cor	ntext	
Pre-requisites	Pass in at	least 24 credits of advanced level disciplinary core / elec	tive courses in the M	olecular Biology 8	
(and Co-requisites and Impermissible combinations)	Cumulative This capsto (Intensive)	ogy Major / Molecular Biology & Biotechnology Major (Intensive GPA of 3.0 or above. One course is for Molecular Biology & Biotechnology Major / students only. It that a student is allowed to take this capstone course is their	Molecular Biology & B	iotechnology Majo	
Offer in 2021 - 2022		long Offer in 2022 - 2023 : Y	Examination	No Exam	
Grade Descriptors (A+ to F)	Α	Evidence of complete or near-complete understanding and a thorough attainment of all learning outcomes. Excellent critique and knowledge of hypothesis. Well designed experimental approach to test research hypothesis and laboratory/fieldwork techniques. Demonstrate comprehensive, presentation of research work.	grasp of the subject matter of relevant literature and ideasis. Show excellent organization	r as demonstrated by entification of research ational and/or analytica	
	В	Evidence of near-complete understanding and a good grasp of the subject of learning outcomes. Good critique and knowledge of relevant literature an designed experimental approach to test research hypothesis. Show laboratory/fieldwork techniques. Demonstrate effective, critical, assessment	d identification of research h good organizational and/or of results and good presental	/pothesis. Appropriately analytical skills and ion of research work.	
	С	Evidence of adequate understanding and grasp of the subject matter as demost of the learning outcomes. Acceptable critique and knowledge of releva Adequately designed experimental approach to test research hypothesis. laboratory/fieldwork techniques. Demonstrate adequate but not necessarily research work.	nt literature and identification Show fair organizational and	of research hypothesis or analytical skills and	
	Evidence of limited understanding and grasp of the subject matter as demonstrated by incomplete attainment of many of the learning outcomes. Limited critique and knowledge of relevant literature and identification of research hypothesis. Poorly designed experimental approach to test research hypothesis. Show fair organizational and/or analytical skills and laboratory/fieldwork techniques. Demonstrate confused and poorly organized assessment of results and limited presentation of research work.				
	Fail  Evidence of poor or inadequate understanding and grasp of the subject matter such that most of the learning outcomes are not attained. Poor critique and knowledge of relevant literature and identification of research hypothesis. Badly designed experimental approach to test research hypothesis. Show little evidence of appropriate organizational and/or analytical skills and laboratory/fieldwork techniques. Demonstrate incorrect interpretation and assessment of results and poor presentation of research work.				
		research work.			
Communication- intensive Course	N	research work.			
	N Project-bas				

& Learning Activities	Reading / Self study	formal lectures, seminars &	formal lectures, seminars & practical work	
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Dissertation		80	CLO 1,2,3,4,5,6,7,8
	Oral presentation	research seminar	20	CLO 1,6,7,8
Course Website	http://moodle.hku.hk/			
Additional Course Information	A dissertation of about 9,00	0 - 12,000 words (80% weighting) a	and a research seminar (20% we	eighting).

BIOL4994	Biologic	al sciences proje	ct (12 credits)	Academic Yea	ar 2021		
Offering Department	Biological		-	Quota			
Course Co-ordinator	Dr C Schu	ınter, Biological Scier	nces (schunter@hku.hk)	'			
eachers Involved	(All acade	mic staff in Biological	Sciences Major, Biological Science	es)			
Course Objectives	To provide	To provide a stimulating capstone experience for all Biological Sciences Major undergraduates to integrate and apply their knowledge and skills obtained from the Biological Science Major through planning and carrying out a receased project under the supervision of a member of staff.					
2	research project under the supervision of a member of staff.						
Course Contents & Topics	Students should seek approval from a prospective supervisor prior to selecting this course. After admission to the course is approved by the course coordinator, students will complete their project work under the guidance of their supervisor.						
Course Learning	On succes	ssful completion of thi	is course, students should be able	to:			
Outcomes	CLO 1	ritique and review ap	propriate scientific literature				
	CLO 2	ise this information to	generate a scientifically relevant i	research question			
	CLO 3	levelop and formulate	e scientific hypotheses to test this	question			
	CLO 4	lesign and undertake	practical research work to formally	y test the hypotheses proposed	d		
	CLO 5	inalyse and evaluate	the data collected to test the hypo	theses			
	CLO 6 p	resent data in a profe	essional manner to illustrate the ou	ıtcomes			
	CLO 7	lraw an objective seri	es of conclusions based on the ex	perimental work			
			their research findings and place tl		ntext		
re-requisites			advanced level disciplinary core/el				
and Co-requisites		() in the Biological Sc	. ,	g	(=:		
ind Impermissible		e GPA of 3.0 or abov					
combinations)	1 -		logical Sciences Major students or	nlv.			
,			lowed to take this capstone course				
Offer in 2021 - 2022		ar long Offer in 2022	·	Examination	No Exam		
rade Descriptors	Α		or near-complete understanding and a t				
			ad avnarimental annroach to test research	hynothesis Show excellent organize	ational and/or analytic		
	B C D	skills and laboratory/fie presentation of research Evidence of near-comple of learning outcomes. Godesigned experimental laboratory/fieldwork tech Evidence of adequate ur most of the learning outcomes. Lim designed experimental laboratory/fieldwork tech research work. Evidence of limited und learning outcomes. Lim designed experimental laboratory/fieldwork tech research work. Evidence of poor or inact attained. Poor critique experimental approach telaboratory/fieldwork tech laboratory/fieldwork tech research work.	eldwork techniques. Demonstrate compre	subject matter as demonstrated by at rature and identification of research h. Show good organizational and/or essment of results and good presental ter as demonstrated by general but in of relevant literature and identification to thesis. Show fair organizational and ecessarily critical, assessment of rester as demonstrated by incomplete att. literature and identification of research. Show fair organizational and/or organized assessment of results and ubject matter such that most of the lead of the demonstrated by the conditional and/or organization of research hypothere of appropriate organizational and such descriptions.	sults and professional tainment of the majority pothesis. Appropriate analytical skills and tion of research work. Incomplete attainment of research hypothesis. It is an ults and presentation of analytical skills and the trip of the profession of analytical skills and dimitted presentation of analytical skills and dimitted presentation of arming outcomes are no neesis. Badly designed d/or analytical skills and		
ntensive Course	C D Fail	skills and laboratory/fie presentation of research Evidence of near-comple of learning outcomes. Gresigned experimental laboratory/fieldwork tech Evidence of adequate ur most of the learning outc Adequately designed experimental laboratory/fieldwork tech research work.  Evidence of limited und learning outcomes. Lim designed experimental laboratory/fieldwork tech research work.  Evidence of poor or inactatained. Poor critique experimental approach taboratory/fieldwork tech research work.	eldwork techniques. Demonstrate compre- work.  ete understanding and a good grasp of the ood critique and knowledge of relevant lite approach to test research hypothesis. iniques. Demonstrate effective, critical, ass nderstanding and grasp of the subject ma- zomes. Acceptable critique and knowledge perimental approach to test research hyp- niques. Demonstrate adequate but not no- erstanding and grasp of the subject matte- ited critique and knowledge of relevant approach to test research hypothesis uniques. Demonstrate confused and poorly dequate understanding and grasp of the and knowledge of relevant literature a o test research hypothesis. Show little evic	subject matter as demonstrated by al rature and identification of research h. Show good organizational and/or essment of results and good presentatter as demonstrated by general but ir of relevant literature and identification othesis. Show fair organizational and excessarily critical, assessment of result literature and identification of reseas. Show fair organizational and/or organized assessment of results and identification of reseas. Show fair organizational and/or organized assessment of results and identification of research hypotification of research hypotification of research hypotification of appropriate organizational and	sults and professiona ttainment of the majorit ypothesis. Appropriatel analytical skills and tion of research work. Incomplete attainment of of research hypothesis. I/or analytical skills and the rich hypothesis. Poorly analytical skills and d limited presentation of arming outcomes are no tensis. Badly designed d/or analytical skills and drimited presentation of arming outcomes are no tensis. Badly designed d/or analytical skills and drimited presentation of arming outcomes are no tensis. Badly designed d/or analytical skills and d/or analytical skills and d/or analytical skills and d/or analytical skills and		
ntensive Course Course Type	C D Fail N Project-ba	skills and laboratory/fie presentation of research Evidence of near-comple of learning outcomes. Gresigned experimental laboratory/fieldwork tech Evidence of adequate ur most of the learning outcomes. Gresigned experimental laboratory/fieldwork tech research work.  Evidence of limited und learning outcomes. Lim designed experimental laboratory/fieldwork tech research work.  Evidence of poor or inactatained. Poor critique experimental approach taboratory/fieldwork tech research work.	eldwork techniques. Demonstrate compre- work.  ete understanding and a good grasp of the cod critique and knowledge of relevant lite approach to test research hypothesis, iniques. Demonstrate effective, critical, ass nderstanding and grasp of the subject ma- comes. Acceptable critique and knowledge operimental approach to test research hyp- niques. Demonstrate adequate but not not erstanding and grasp of the subject mati- tied critique and knowledge of relevant approach to test research hypothesis uniques. Demonstrate confused and poorly- dequate understanding and grasp of the su- and knowledge of relevant literature a to test research hypothesis. Show little evic nniques. Demonstrate incorrect interpreta-	subject matter as demonstrated by al rature and identification of research h. Show good organizational and/or essment of results and good presentatter as demonstrated by general but ir of relevant literature and identification othesis. Show fair organizational and excessarily critical, assessment of result literature and identification of reseas. Show fair organizational and/or organized assessment of results and identification of reseas. Show fair organizational and/or organized assessment of results and identification of research hypotification of research hypotification of research hypotification of appropriate organizational and	sults and professiona trainment of the majorit ypothesis. Appropriatel analytical skills and tion of research work. In complete attainment of research hypothesis (for analytical skills and utils and presentation of the complete attainment of many of the complete of the		
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ENVS1301	Environmental life science (6 credits)	Academic Year	2021		
Offering Department	Biological Sciences	Quota	60		
Course Co-ordinator	Dr T Vengatesen, Biological Sciences (rajan@hku.hk)				
Teachers Involved	(Dr T Vengatesen,Biological Sciences)				
Course Objectives	This course intended for students who wish to understand the fundamentals of and importantly the relationship (connection) between environment and life. He		0,		

				l science which are needed for c numan ecology, urbanization, e		
		ite change.	nonnental issues molading i	raman coology, arbanization, c	oological coolicitios,	
Course Contents & Topics	This cours fundamen life at var urbanizati students v that huma students v	This course is a combination of lectures, group discussion/debate and field trips cum tutorials. We first explore the fundamental interactions between organisms and their environment. We then explore environmental constraints on life at various ecosystems (like marine, freshwater, and terrestrial). Students will also learn how factors such as urbanization, climate change, and anthropogenic impacts affect life at population and ecosystem levels. Similarly, students will be exposed to the incredible interrelationships that are basic to ecological principles and the impact that human development has upon these interrelationships. After learning basics of environmental life science, students will be stimulated to think about current life science issues such as biodiversity loss, organisms adaptation to climate change, tragedy of commons (human ecology) and applied life science topics such as biomaterial				
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 ur	nderstand life, environm	nent and their interactions			
	CLO 2 ar	ppreciate species and $\epsilon$	ecosystem responses to huma	an-induced environmental chang	е	
	CLO 3 at	tain ability to critically the	hink and discuss about curren	nt environ-life science issues		
		e motivated and equipp	· ·	nmental science questions and	to choose advanced	
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL					
Offer in 2021 - 2022	Y 2nd	d sem Offer in 2022 -	2023 : Y	Examination	May	
Grade Descriptors (A+ to F)	Α	multidimensional thinking outcomes. Demonstrate environmental life science	about the study subject. Extensive kexcellent ability to apply what you issues. Show highly effective organize	ntal life science issues. Show evidence knowledge and skills required for attaini have learned in the class room to c zational, presentational and field trip skill	ng all the course learning ritically analyze the real s.	
	B Show substantial knowledge and thought during the analysis of environmental life science issues. Show some evidence of some analytical, critical and multidimensional thinking about the study subject. Good knowledge and skills required for attaining all the course learning outcomes. Demonstrate good ability to apply what you have learned in the class room to critically analyze the real environmental life science issues. Show effective organizational, presentational and field trip skills.					
	C Show general but incomplete knowledge and original thought during the analysis of environmental life science issues. Fair knowledge and skills required for attaining all the course learning outcomes. Demonstrate fair ability to apply what you have learned in the class room to critically analyze the real environmental life science issues. Show considerable organizational, presentational and field trip skills.					
	Evidence to show a minimum knowledge (i.e. knowledge is very incomplete) and thought during the analysis of environmental life science issues. Show insufficient knowledge and skills required for attaining all the course learning outcomes. Demonstrate poor ability to apply what you have learned in the class room to critically analyze the real environmental life science issues. Show very little organizational, presentational and field trip skills.					
	Fail  Evidence of meager or inadequate knowledge and understanding of environmental life science issues. Show no evidence of knowledge and skills required for attaining all the course learning outcomes. Demonstrate no ability to apply what you have learned in the class room to critically analyze the real environmental life science issues. Show no evidence of familiarity with relevant reading material and field trip demonstrations, or any knowledge of organizational and presentational skills.					
Communication- intensive Course	N					
Course Type	Lecture w	ith laboratory compone	ent course			
Course Teaching	Activities	s	Details		No. of Hours	
& Learning Activities	Lectures				24	
	Field wor	¹k	3-12 hours field work		12	
	Tutorials				12	
	Reading	/ Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme			10	CLO 2,3	
	Examinat			70	CLO 1,3	
	Presenta	tion	group presentation	10	CLO 3,4	
	Test			10	CLO 1	
Required/recommended reading and	Appropria	Appropriate reading materials/handouts will be provided during the course.				
online materials						
		odle.hku.hk		umber and availability of teacher		

ENVS2001	Methods in environmental science (6 credits)  Academic Year   2021						
Offering Department	Biological Sciences	Quota	42				
Course Co-ordinator	Dr M Yasuhara, Biological Sciences (yasuhara@hku.hk)						
Teachers Involved	(Dr M Yasuhara, Biological Sciences)	(Dr M Yasuhara,Biological Sciences)					
Course Objectives	To introduce students to a broad spectrum of field and laboratory methods for data collection in environmental science. Through exposure to environmental data collection, experimental design, data analysis, interpretation and reporting, students will gain a deeper appreciation of the process that underlies environmental science research and it's relevancy to critical thinking and future careers in the sciences.						
Course Contents & Topics	This course will involve environmental data collection in both field and laboratory settings. In-class lectures will cover basic principles of specific methodologies and relevant applications in preparation for laboratory and field-based experiential learning. Having an interdisciplinary focus, the course will cover topics relevant to the study of the biosphere, encompassing terrestrial, aquatic, and atmospheric systems. Students will gain hands-on experience with the operation of standard and advanced sampling and analytical equipment, quality control, basic data analysis and reporting.						
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 understand how scientific data is used to address environmental problems						
	CLO 2 have a basic understanding of the techniques and methodologies necessary for collecting environmental data						

	CLO 3 understand some of the problems inherent in data collection, and how this impacts data interpretation					
	CLO 4 ur	CLO 4 understand how data collected in the lab and field can be used to critically evaluate ideas				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BIOL1309 or EASC1401 or ENVS1301 or ENVS1401					
Offer in 2021 - 2022	Y 1st	sem Offer in 2022	- 2023 : Y	Examination	No Exam	
Grade Descriptors (A+ to F)	A	original thought. Apply h		ng analytical and critical abilities and logical ills and techniques. Critical use of data and re ational and presentational skills.		
	В			of analytical and critical abilities and logical thi sults to draw appropriate conclusions. Apply e		
	С	Apply moderately effect draw appropriate conclu	tive lab / fieldwork skills and tech sions. Apply moderately effective	ct. Evidence of some analytical and critical ab nniques. Mostly correct but some erroneous of proganizational and presentational skills.	use of data and results to	
	D					
	Fail	analytical and critical al	bilities, logical and coherent thin ata and results and/or unable to o	vledge and understanding of the subject. Eviking. Apply minimally effective or ineffective draw appropriate conclusions. Organization ar	lab / fieldwork skills and	
Communication- intensive Course	N					
Course Type	Laborator	y and workshop cours	se			
Course Teaching	Activities	3	Details		No. of Hours	
& Learning Activities	Laborator	У			30	
	Field work				10	
	Project work				20	
	Tutorials				12	
	Reading /	Self study			60	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents		10	CLO 1,2,3	
				20	CLO 1,2,3,4	
	Laboratory reports			-		
	Presentat	tion		20	CLO 2.3	
	Presentat Project re			20 50	CLO 2,3 CLO 1,2,3,4	

ENVS2002	Environ	nmental data analysis (6 credits)	Academic Year	2021			
Offering Department	Biologica	l Sciences	Quota	65			
Course Co-ordinator	Dr T C Bo	Dr T C Bonebrake, Biological Sciences (tbone@hku.hk)					
Teachers Involved	(Dr T C B	Bonebrake, School of Biological Sciences)					
Course Objectives	environm environm approach sensing,	To provide students with the ability to analyze data; especially data which are relevant to issues and questions in environmental science. This course will enable students to accurately interpret, organize, display, test and analyze environmental data. The course will also introduce students to principles of a variety of important advanced approaches in analyzing environmental data including spatial analysis, geographic information systems, remote sensing, risk assessment, and time series analysis.					
Course Contents	The cour	rse will feature lectures on aspects of sampling, distribution	s, uncertainty, probability	, and hypothesis			
& Topics	most env	addition to lectures on advanced analysis topics. Special emprironmental datasets such as large size, multivariate, and spatinmental science contexts (e.g. chemistry, ecology, geology and outer laboratory setting using the 'R Project for Statistical Comp	al. All material will be app d oceanography) using a v	lied and practiced variety of datasets			
Course Learning		essful completion of this course, students should be able to:					
Outcomes	CLO 1	accurately interpret methods and approaches in the scientific					
	CLO 2	evaluate critically data analyses in the environmental sciences					
	CLO 3 perform standard and appropriate statistical analyses on a variety of data sources						
	CLO 4 work comfortably with large datasets using applied software (e.g. R)						
	CLO 5	present results of data analyses in a clear and transparent ma	anner				
Pre-requisites (and Co-requisites and Impermissible combinations)		BIOL1309 or EASC1401 or ENVS1301 or ENVS1401					
Offer in 2021 - 2022	Y 2n	d sem Offer in 2022 - 2023 : Y	Examination	May			
Grade Descriptors (A+ to F)	A	Demonstrate thorough grasp of the subject and skills required for attair analytical and critical abilities and logical thinking, with evidence of origina and techniques for basic statistical analyses. Be able to critically use of insightful conclusions. Apply highly effective organizational and presentation	I thought. Apply a highly effectived data and statistical results to d	e computational skills			
	B Demonstrate substantial grasp of the subject and skills required for attaining at least most of the course learning outcomes. Present evidence of analytical and critical abilities and logical thinking. Apply effective computational skills and techniques for basic statistical analyses. Be able to correctly use data and statistical results to draw appropriate conclusions. Apply effective organizational and presentational skills.						
	C Demonstrate general but incomplete grasp of the subject and skills required for attaining some of the course learning outcomes. Present evidence of some analytical and critical abilities and logical thinking. Apply moderately effective computational skills and techniques for basic statistical analyses. Demonstrate mostly correct but some erroneous use of data and statistical results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.						
	D						
	Fail	Demonstrate limited or no grasp of the subject and skills required for attevidence of little or lack of analytical and critical abilities, logical or cohe					

		Ils and techniques for basic statistical analyses. propriate conclusions. Apply minimally effective or				
Communication- intensive Course	N					
Course Type	Lecture with laboratory co	mponent course				
Course Teaching & Learning Activities	Activities	Details		No. of Hours		
	Lectures			24		
-	Laboratory	problem-based learning/compu	ter laboratory	24		
	Tutorials	j	,	6		
	Reading / Self study			100		
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Examination		25	CLO 1,2,3		
	Project report		25	CLO 1,2,3,4,5		
	Test	problem-based exercises	50	CLO 1,2,3,4,5		
Required/recommended reading and online materials	F					
Course Website		iliais oi Environmentai Sampling and Ana	aiysis. John Wiley & Sons, N	iew Jersey.		
Jourse website	http://moodle.hku.hk					

ENVS3004	Environ	ment, society	and economics (6 credits)	Academic Ye	ear  2021		
Offering Department	Biological	Sciences	,	Quota			
Course Co-ordinator	Dr C Ding	le, Biological Scie	ences (cdingle@hku.hk)	'			
Teachers Involved	(Dr C Ding	gle,School of Biol	ogical Sciences)				
Course Objectives	urban env natural en environme environme water and	This course follows up issues highlighted in the introductory course and provides in-depth studies about rural and urban environments for students to examine the problems of resource scarcity and pollutant accumulation in the natural environment, which are the problems human society is currently confronted. The course will focus on major environmental problems and explore how Environmental Economics can be applied for resource management and environmental restoration/protection. Students will analyze the nature of key natural resources such as land, air, water and biomass, and explore ways to improve resource management, protect the environment and develop sustainable economies.					
Course Contents & Topics	Basic con - Identifica Resourse Managem Energy po	Valuing the environment Basic concepts of Environmental Economics - Identification of and engagement with relevant stakeholders Resourse management for land, air, water and biomass Management of waste Energy policies and economics Planning and regulations for a sustainable future					
Course Learning Outcomes	CLO 1 de hu	emonstrate know uman society and ecognise appropri	of this course, students should be able ledge and critical understanding of the natural environment ate use and misuse of natural resource olutions and policies for solving environal course.	he complexity and interconnes	ectedness between		
Pre-requisites	CLO 3 assess economic solutions and policies for solving environmental problems  Pass in one of the following courses: CHEM2041, EASC2404, ENVS2001 or ENVS2002						
and Co-requisites and Impermissible	1 455 111 51		, coalesco. G. (2.11.20 F), E. (6.62 F) (7. 2.	W02001 01 ENV02002			
and Co-requisites and Impermissible combinations)		sem Offer in 20	,	Examination	Dec		
and Co-requisites and Impermissible combinations) Offer in 2021 - 2022		sem Offer in 20 Demonstrate thoro evidence of origins Demonstrate highly Demonstrate subst situations. Show	022 - 2023 : Y  ugh mastery of the course material. Show stall thought, and ability to apply knowledge to a effective organizational and presentational skill antial command of the course material and an evidence of analytical, critical thought to se	Examination trong ability for analytical, critical a a wide range of complex, familiar a s. n ability to apply knowledge to fami	and logical thinking, with and unfamiliar situations liar and some unfamilia		
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 1st	sem Offer in 20 Demonstrate thoro evidence of origina Demonstrate highly Demonstrate subst situations. Show presentational skills Demonstrate gene situations. Show of	ugh mastery of the course material. Show stall thought, and ability to apply knowledge to effective organizational and presentational skill antial command of the course material and arevidence of analytical, critical thought to so.	Examination trong ability for analytical, critical as a wide range of complex, familiar as. n ability to apply knowledge to famiome complex issues. Apply effective analytical and an ability to apply knowledge and an ability to apply knowledge.	and logical thinking, with and unfamiliar situations williar and some unfamiliar tive organizational and weldge to most familia		
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 1st A B C	sem Offer in 20 Demonstrate thore ovidence of origina Demonstrate highly Demonstrate subst situations. Show presentational skills Demonstrate gene situations. Show of presentational skills Demonstrate partial evidence of some organizational and	D22 - 2023 : Y  ugh mastery of the course material. Show stall thought, and ability to apply knowledge to a effective organizational and presentational skill antial command of the course material and an evidence of analytical, critical thought to stall but incomplete command of the course material but incomplete command of the course material but incomplete command of the course material an coherent and logical thinking, but with limited a presentational skills.	Examination trong ability for analytical, critical a a wide range of complex, familiar a s. n ability to apply knowledge to fami ome complex issues. Apply effect naterial and an ability to apply kno g abilities. Apply moderately effect d a limited ability to apply knowledge unalytical and critical abilities. Apply	and logical thinking, with and unfamiliar situations and unfamiliar and some unfamiliar tive organizational and wiledge to most familiar tive organizational and to solve problems. Sho limited or barely effective.		
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and Co-requisites and Impermissible combinations)  Offer in 2021 - 2022  Grade Descriptors (A+ to F)  Communication- Intensive Course Course Type	Y 1st A B C D Fail N	sem Offer in 20 Demonstrate thore ovidence of origina Demonstrate highly Demonstrate subst situations. Show presentational skills Demonstrate gene situations. Show e presentational skills Demonstrate partia evidence of some organizational and Demonstrate little problems. Lack of or ineffective.	ugh mastery of the course material. Show stal thought, and ability to apply knowledge to a effective organizational and presentational skill antial command of the course material and an evidence of analytical, critical thought to so a scral but incomplete command of the course meterial and logical thinking. I but limited command of the course material an coherent and logical thinking, but with limited a presentational skills.  To no evidence of command of course material an coherent and logical thinking, but with limited a presentational skills.	Examination trong ability for analytical, critical as a wide range of complex, familiar as s. n ability to apply knowledge to fami ome complex issues. Apply effect naterial and an ability to apply knowledge g abilities. Apply moderately effect d a limited ability to apply knowledge nalytical and critical abilities. Apply ial with very little or no ability to a	and logical thinking, with and unfamiliar situations iliar and some unfamiliar tive organizational and wledge to most familia tive organizational and to solve problems. Sho limited or barely effective pply knowledge to solve lls are minimally effective		
and Co-requisites and Impermissible combinations)  Offer in 2021 - 2022  Grade Descriptors (A+ to F)  Communication- ntensive Course Course Type Course Teaching	Y 1st A B C D Fail N Lecture-ba Activities	sem Offer in 20 Demonstrate thore ovidence of origina Demonstrate highly Demonstrate subst situations. Show presentational skills Demonstrate gene situations. Show e presentational skills Demonstrate partia evidence of some organizational and Demonstrate little problems. Lack of or ineffective.	ugh mastery of the course material. Show stall thought, and ability to apply knowledge to a effective organizational and presentational skill antial command of the course material and an evidence of analytical, critical thought to stall the course of analytical command of the course revidence of some critical and logical thinkins.  I but limited command of the course material an coherent and logical thinking, but with limited a presentational skills.  To no evidence of command of course material and coherent and logical thinking, but with limited a presentational skills.	Examination trong ability for analytical, critical as a wide range of complex, familiar as s. n ability to apply knowledge to fami ome complex issues. Apply effect naterial and an ability to apply knowledge g abilities. Apply moderately effect d a limited ability to apply knowledge nalytical and critical abilities. Apply ial with very little or no ability to a	and logical thinking, with and unfamiliar situations iliar and some unfamiliar tive organizational and weledge to most familia tive organizational and to solve problems. Shot limited or barely effective pply knowledge to solve lis are minimally effective No. of Hours		
and Co-requisites and Impermissible combinations)  Offer in 2021 - 2022  Grade Descriptors (A+ to F)  Communication- Intensive Course Course Type Course Teaching	Y 1st A B C D Fail N Lecture-ba Activities Lectures	sem Offer in 20 Demonstrate thoro evidence of origina Demonstrate highly Demonstrate subst situations. Show opresentational skills Demonstrate gene situations. Show opresentational skills Demonstrate partia evidence of some organizational and Demonstrate little problems. Lack of or ineffective.  ased course	ugh mastery of the course material. Show stal thought, and ability to apply knowledge to a effective organizational and presentational skill antial command of the course material and an evidence of analytical, critical thought to so a scral but incomplete command of the course meterial and logical thinking. I but limited command of the course material an coherent and logical thinking, but with limited a presentational skills.  To no evidence of command of course material an coherent and logical thinking, but with limited a presentational skills.	Examination trong ability for analytical, critical as a wide range of complex, familiar as s. n ability to apply knowledge to fami ome complex issues. Apply effect naterial and an ability to apply knowledge g abilities. Apply moderately effect d a limited ability to apply knowledge nalytical and critical abilities. Apply ial with very little or no ability to a	and logical thinking, with and unfamiliar situations and unfamiliar situations are unfamiliar and some unfamiliar tive organizational and the situational and the situ		
and Co-requisites and Impermissible combinations)  Offer in 2021 - 2022  Grade Descriptors (A+ to F)  Communication- ntensive Course Course Type Course Teaching	Y 1st A B C D Fail N Lecture-ba Activities Lectures Project w	sem Offer in 20 Demonstrate thoro evidence of origina Demonstrate highly Demonstrate subst situations. Show presentational skills Demonstrate gene situations. Show opresentational skills Demonstrate partia evidence of some organizational and Demonstrate little problems. Lack of or ineffective.  ased course s	ugh mastery of the course material. Show stall thought, and ability to apply knowledge to a effective organizational and presentational skill antial command of the course material and an evidence of analytical, critical thought to so a stall but incomplete command of the course mevidence of some critical and logical thinking.  I but limited command of the course material an coherent and logical thinking, but with limited a presentational skills.  To no evidence of command of course material thinking abilities and incoherent thinking.  Details  12 sessions of 2 hrs	Examination trong ability for analytical, critical as a wide range of complex, familiar as s. n ability to apply knowledge to fami ome complex issues. Apply effect naterial and an ability to apply knowledge g abilities. Apply moderately effect d a limited ability to apply knowledge nalytical and critical abilities. Apply ial with very little or no ability to a	nd logical thinking, with and unfamiliar situations unfamiliar and some unfamiliar and some unfamiliar and some unfamiliar and some unfamiliar tive organizational and the solve problems. Shoulimited or barely effective pply knowledge to solve problems are minimally effective places.  No. of Hours  24  12		
and Co-requisites and Impermissible combinations)  Offer in 2021 - 2022  Grade Descriptors (A+ to F)  Communication- ntensive Course Course Type Course Teaching	Y 1st A B C D Fail N Lecture-b: Activities Lectures Project w Discussion	sem Offer in 20 Demonstrate thoro evidence of origina Demonstrate highly Demonstrate subst situations. Show presentational skills Demonstrate gene situations. Show opresentational skills Demonstrate partia evidence of some organizational and Demonstrate little problems. Lack of or ineffective.  ased course s	ugh mastery of the course material. Show stall thought, and ability to apply knowledge to a effective organizational and presentational skill antial command of the course material and an evidence of analytical, critical thought to stall the course of analytical command of the course revidence of some critical and logical thinkins.  I but limited command of the course material an coherent and logical thinking, but with limited a presentational skills.  To no evidence of command of course material and coherent and logical thinking, but with limited a presentational skills.	Examination trong ability for analytical, critical as a wide range of complex, familiar as s. n ability to apply knowledge to fami ome complex issues. Apply effect naterial and an ability to apply knowledge g abilities. Apply moderately effect d a limited ability to apply knowledge nalytical and critical abilities. Apply ial with very little or no ability to a	nd logical thinking, with and unfamiliar situations unfamiliar and some unfamiliar and		
and Co-requisites and Impermissible combinations)  Offer in 2021 - 2022  Grade Descriptors (A+ to F)  Communication-intensive Course Course Type Course Teaching & Learning Activities	Y 1st A B C D Fail N Lecture-b: Activities Lectures Project w Discussion Reading	sem Offer in 20 Demonstrate thoro evidence of origina Demonstrate highly Demonstrate subst situations. Show presentational skills Demonstrate gene situations. Show opresentational skills Demonstrate partia evidence of some organizational and Demonstrate little problems. Lack of or ineffective.  ased course s	ugh mastery of the course material. Show stal thought, and ability to apply knowledge to a effective organizational and presentational skill antial command of the course material and an evidence of analytical, critical thought to so a state of the course material and logical thinking.  I but limited command of the course material an coherent and logical thinking, but with limited a presentational skills.  To no evidence of command of course material incoherent and logical thinking, but with limited a presentational skills.  Details  12 sessions of 2 hrs  Interactive learning	Examination trong ability for analytical, critical as a wide range of complex, familiar as. In ability to apply knowledge to famiome complex issues. Apply effect anaterial and an ability to apply knowledge abilities. Apply moderately effect dia limited ability to apply knowledge analytical and critical abilities. Apply ital with very little or no ability to a Organization and presentational ski	Ind logical thinking, with and unfamiliar situations and unfamiliar situations are unfamiliar and some unfamiliar tive organizational and the situation of the		
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 1st A B C D Fail N Lecture-b: Activities Lectures Project w Discussion	sem Offer in 20 Demonstrate thoro evidence of origina Demonstrate highly Demonstrate subst situations. Show presentational skills Demonstrate gene situations. Show opresentational skills Demonstrate partia evidence of some organizational and Demonstrate little problems. Lack of or ineffective.  ased course s	ugh mastery of the course material. Show stall thought, and ability to apply knowledge to a effective organizational and presentational skill antial command of the course material and an evidence of analytical, critical thought to so a stall but incomplete command of the course mevidence of some critical and logical thinking.  I but limited command of the course material an coherent and logical thinking, but with limited a presentational skills.  To no evidence of command of course material thinking abilities and incoherent thinking.  Details  12 sessions of 2 hrs	Examination trong ability for analytical, critical as a wide range of complex, familiar as s. n ability to apply knowledge to fami ome complex issues. Apply effect naterial and an ability to apply knowledge g abilities. Apply moderately effect d a limited ability to apply knowledge nalytical and critical abilities. Apply ial with very little or no ability to a	nd logical thinking, with and unfamiliar situations unfamiliar and some unfamiliar and		

	Project reports		60	CLO 1,2,3			
Required/recommended	Tietenberg and Lewis: Environmer	ital economics and policy					
reading and	Keller and Botkin: Essential Enviro	Keller and Botkin: Essential Environmental Science (John Wiley & Sons, 2008)					
online materials	Kaufmann and Cleveland: Environ	mental Science (Amazon, 2008)	•				
	Middleton N.: The Global Casino: An Introduction to Environmental Issues (Arnold, 1999)						
Additional Course	Previous course code: ENVS2004						
Information	Compulsory to 4-year students						

ENVS3019	Urban 6	ecology (6 credits)		Academic Y	'ear 2021		
Offering Department		al Sciences		Quota	75		
Course Co-ordinator	Dr T C B	onebrake, Biological Sci	ences (tbone@hku.hk)				
Teachers Involved	,	ngle,School of Biological Bonebrake,School of Bio	,				
Course Objectives			s with an understanding and knowle	edge of the ecology of un	han ecosystems. Th		
	course w	vill highlight the role of cit	ties in a world under environmental	change and rapid develor	pment.		
Course Contents & Topics	concepts developn effects),	Ecological systems within cities and cities as ecological systems will both be covered in this course. Ecologica concepts unique to or specialized within cities will be covered including sustainability, conservation, health, development, globalization, and restoration. Specific topics will include climate change (e.g. urban heat islance effects), invasive species, infectious diseases and pollution. Examples will be taken globally but special emphasis will be placed on Hong Kong.					
Course Learning	On succe	essful completion of this	course, students should be able to:				
Outcomes	CLO 1 d	describe and evaluate the	e processes and patterns that chara	acterize urban ecological s	systems		
		•	nd ecosystem responses to urbaniz				
		ecognize energy flows venvironmental quality	within urban ecosystems and how	energy use and waste in	nprove or deteriorate		
	CLO 4 c	critically evaluate manage	ement and policy solutions to urban	ecological problems			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	31OL2306 or ENVS2001	or ENVS2002				
Offer in 2021 - 2022	Y 1s	st sem Offer in 2022 - 2	2023 : N	Examination	n Dec		
Grade Descriptors	Α	Demonstrate thorough mas	stery at an advanced level of extensive kno				
(A+ to F)		and synthesize information highly effective presentation	nalytical and critical abilities and logical thin n, and ability to apply knowledge to a wide n nal skills. Strong evidence of clear attention	range of complex, familiar and uto thoughtful and reflective think	unfamiliar situations. App king.		
	В	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, integration of materials and ability to apply knowledge to familiar and some unfamiliar situations. Demonstrate effective presentational skills. Evidence of clear attention to thoughtful and reflective thinking.					
	С						
		Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities and little attempt at integration. Show limited ability to apply knowledge to solve problems. Apply limited effectiveness in presentational skills. Lack of attention to thoughtful and reflective thinking.					
	D	Demonstrate partial but lin Show evidence of some integration. Show limited a	coherent and logical thinking, but with limbility to apply knowledge to solve problems.	nited analytical and critical abi	lities and little attempt a		
	D Fail	Demonstrate partial but lin Show evidence of some integration. Show limited a attention to thoughtful and Demonstrate little or no ev of analytical and critical a	coherent and logical thinking, but with lin bility to apply knowledge to solve problems. reflective thinking. idence of command of knowledge and skills abilities, logical and coherent thinking. Sho	nited analytical and critical abit Apply limited effectiveness in pro- required for attaining the cours ow very little or no ability to a	lities and little attempt a resentational skills. Lack se learning outcomes. Lack		
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ntensive Course Course Type	Fail N	Demonstrate partial but lin Show evidence of some integration. Show limited a attention to thoughtful and Demonstrate little or no ev of analytical and critical a	coherent and logical thinking, but with lin bility to apply knowledge to solve problems. reflective thinking. idence of command of knowledge and skills abilities, logical and coherent thinking. Sho	nited analytical and critical abit Apply limited effectiveness in pro- required for attaining the cours ow very little or no ability to a	lities and little attempt a resentational skills. Lack se learning outcomes. Lack		
ntensive Course Course Type Course Teaching	Fail N Lecture-b	Demonstrate partial but lin Show evidence of some integration. Show limited a attention to thoughtful and Demonstrate little or no ev of analytical and critical a problems. Organization and based course	coherent and logical thinking, but with lin bility to apply knowledge to solve problems. reflective thinking. idence of command of knowledge and skills abilities, logical and coherent thinking. Sho	nited analytical and critical abit Apply limited effectiveness in pro- required for attaining the cours ow very little or no ability to a	lities and little attempt a resentational skills. Lack be learning outcomes. Lac apply knowledge to solv		
intensive Course Course Type Course Teaching	Fail  N  Lecture-t  Activitie  Lectures	Demonstrate partial but lin Show evidence of some integration. Show limited a attention to thoughtful and Demonstrate little or no ev of analytical and critical a problems. Organization and based course	coherent and logical thinking, but with lim bility to apply knowledge to solve problems. reflective thinking. idence of command of knowledge and skills abilities, logical and coherent thinking. Sho d presentational skills are minimally effective	nited analytical and critical abit Apply limited effectiveness in pro- required for attaining the cours ow very little or no ability to a	lities and little attempt a resentational skills. Lack the learning outcomes. Lac apply knowledge to solv  No. of Hours  36		
Communication- intensive Course Course Type Course Teaching & Learning Activities	Fail  N  Lecture-t  Activitie  Lectures  Tutorials	Demonstrate partial but lin Show evidence of some integration. Show limited a attention to thoughtful and Demonstrate little or no ev of analytical and critical a problems. Organization and based course	coherent and logical thinking, but with lim bility to apply knowledge to solve problems. reflective thinking. idence of command of knowledge and skills abilities, logical and coherent thinking. Sho d presentational skills are minimally effective	nited analytical and critical abit Apply limited effectiveness in pro- required for attaining the cours ow very little or no ability to a	lities and little attempt a resentational skills. Lack the learning outcomes. Lac apply knowledge to solv  No. of Hours  36 12		
intensive Course Course Type Course Teaching & Learning Activities	Fail  N  Lecture-t  Activitie  Lectures  Tutorials  Reading	Demonstrate partial but lin Show evidence of some integration. Show limited a attention to thoughtful and Demonstrate little or no ev of analytical and critical a problems. Organization and based course	coherent and logical thinking, but with limbility to apply knowledge to solve problems. reflective thinking, idence of command of knowledge and skills abilities, logical and coherent thinking. Shid presentational skills are minimally effective Details	nited analytical and critical abitapply limited effectiveness in purequired for attaining the cours ow very little or no ability to a er or ineffective.	lities and little attempt a resentational skills. Lack the learning outcomes. Lac apply knowledge to solv  No. of Hours  36  12  100		
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail  N  Lecture-t  Activitie  Lectures  Tutorials	Demonstrate partial but lin Show evidence of some integration. Show limited a attention to thoughtful and Demonstrate little or no ev of analytical and critical a problems. Organization and based course	coherent and logical thinking, but with lim bility to apply knowledge to solve problems. reflective thinking. idence of command of knowledge and skills abilities, logical and coherent thinking. Sho d presentational skills are minimally effective	nited analytical and critical abit Apply limited effectiveness in pro- required for attaining the cours ow very little or no ability to a	lities and little attempt a resentational skills. Lack the learning outcomes. Lac apply knowledge to solv  No. of Hours  36 12		
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail  N  Lecture-t  Activitie  Lectures  Tutorials  Reading	Demonstrate partial but lin Show evidence of some integration. Show limited a attention to thoughtful and Demonstrate little or no ev of analytical and critical a problems. Organization and based course	coherent and logical thinking, but with limbility to apply knowledge to solve problems. reflective thinking, idence of command of knowledge and skills abilities, logical and coherent thinking. Shid presentational skills are minimally effective Details	nited analytical and critical abit Apply limited effectiveness in purequired for attaining the cours ow very little or no ability to a corineffective.  Weighting in final	Itities and little attempt a resentational skills. Lack the learning outcomes. Lack apply knowledge to solv    No. of Hours		
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intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail  N Lecture-t Activitie Lectures Tutorials Reading Methods	Demonstrate partial but lin Show evidence of some integration. Show limited a attention to thoughtful and Demonstrate little or no ev of analytical and critical a problems. Organization and based course	cohernt and logical thinking, but with limbility to apply knowledge to solve problems. reflective thinking. idence of command of knowledge and skills abilities, logical and coherent thinking. She dispersional skills are minimally effective.    Details	weighting in final course grade (%)	Itities and little attempt a resentational skills. Lack the learning outcomes. Lac apply knowledge to solv    No. of Hours		
intensive Course Course Type Course Teaching	Fail  N Lecture-t Activitie Lectures Tutorials Reading Methods  Examina Presenta Presenta Trestbook Niemela and Appl	Demonstrate partial but lin Show evidence of some integration. Show limited a attention to thoughtful and Demonstrate little or no ev of analytical and critical a problems. Organization and based course es a line of the state	coherent and logical thinking, but with limbing to apply knowledge to solve problems. reflective thinking, idence of command of knowledge and skills abilities, logical and coherent thinking. Shid presentational skills are minimally effective.  Details  Details  Mid-term exam (20%), Final exam (30%)	weighting in final course grade (%)  Weighting in final course grade (%)  20 30	No. of Hours  36  12  100  Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 CLO 1,2,3,4		
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Fail  N Lecture-t Activitie Lectures Tutorials Reading Methods  Examina Presenta Project r Textbook Niemela and Appl Reference	Demonstrate partial but lin Show evidence of some integration. Show limited a attention to thoughtful and Demonstrate little or no ev of analytical and critical a problems. Organization and based course as a few of the state o	coherent and logical thinking, but with limbility to apply knowledge to solve problems. reflective thinking. idence of command of knowledge and skills abilities, logical and coherent thinking. She dispersion of presentational skills are minimally effective.    Details   Details	weighting in final course grade (%)  Weighting in final course grade (%)  50  20  30  WE (2011) Urban Ecology:	No. of Hours  36  12  100  Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 CLO 1,2,3,4		
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	Fail  N Lecture-t Activitie Lectures Tutorials Reading Methods  Examina Presenta Project r d Textbook Niemela and Appl Referenc Gaston K	Demonstrate partial but lin Show evidence of some integration. Show limited a attention to thoughtful and Demonstrate little or no ev of analytical and critical a problems. Organization and based course es Signal Self Self Study self Self Study self Self Study self Self Self Study self Self Self Study self Self Self Study self Self Self Study self Self Self Study self Self Self Study self Self Self Study self Self Self Study Self Self Study Self Self Self Self Self Self Self Self	coherent and logical thinking, but with limbing to apply knowledge to solve problems. reflective thinking, idence of command of knowledge and skills abilities, logical and coherent thinking. Shid presentational skills are minimally effective.  Details  Details  Mid-term exam (20%), Final exam (30%)	weighting in final course grade (%)  Weighting in final course grade (%)  50  20  30  WE (2011) Urban Ecology:	No. of Hours  36  12  100  Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 CLO 1,2,3,4		
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Fail  N  Lecture-t Activitie Lectures Tutorials Reading Methods  Examina Presenta Project r Textbook Niemela and Appl  Referenc Gaston k http://mo	Demonstrate partial but lin Show evidence of some integration. Show limited a attention to thoughtful and Demonstrate little or no ev of analytical and critical a problems. Organization and based course es so J / Self study sation action action action action action. The properties of the second state of the second s	coherent and logical thinking, but with limbility to apply knowledge to solve problems. reflective thinking. idence of command of knowledge and skills abilities, logical and coherent thinking. She dispersion of presentational skills are minimally effective.    Details   Details	weighting in final course grade (%)  Weighting in final course grade (%)  100  100  100  100  100  100  100  1	No. of Hours  No. of Hours  36  12  100  Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO		

ENVS3020	Global change ecology (6 credits)	Academic Year	2021
Offering Department	Biological Sciences	Quota	65
Course Co-ordinator	Dr C Dingle, Biological Sciences (cdingle@hku.hk)		
Teachers Involved	(Dr C Dingle, School of Biological Sciences)		
Course Objectives	The main goal of this course is to introduce students to the ways in which glue biodiversity from organisms to ecosystems. This course will explore the contribution and globalization have made to increases in greenhouse gases and asso invasions, land degradation, disease, and, ultimately, impacts on biological systems.	tions that human ր ciated climate ch	oopulation growth

Course Contents & Topics	disappear natural va	ring through geologic ti ariation, increasing the	ral phenomenon, with ecosystems cor me with changes in climatic conditions magnitude and speed with which env	The activities of human vironmental change occu	s have added to this urs. This course will		
	focus principally on the effects of climate change on organisms and ecosystems but will also investigate oth topics registering on a global scale including land use change, biological invasions, and pollution, as well a synergistic interactions between all of the environmental stressors. We will explore (1) what climate change is a how it is manifested including climate warming, sea level rise, and ocean acidification; (2) types and extents of la use change; (3) how globalization has contributed to the spread of alien species and disease. The course w investigate how these human-caused stressors affect the morphology, phenology, distribution, and evolution organisms and their impacts on ecosystem functioning and biodiversity in freshwater, marine, and terrestri						
	-	cosystems.					
Course Learning Outcomes	CLO 1 de	evelop a basic underst nange, and how they a	course, students should be able to: anding of climate change and other have re manifested on a global scale	•			
	e	cosystem level	llobal change affects organisms' traits				
			es between climate change on a geolo ships between humans and global char	~	it climate change		
Pre-requisites (and Co-requisites and Impermissible combinations)		IOL2306 or ENVS2001	•	ye .			
Offer in 2021 - 2022	N Off	fer in 2022 - 2023 : Y		Examination			
Grade Descriptors (A+ to F)	В	outcomes. Show strong a and synthesize informatio highly effective presentation	astery at an advanced level of extensive knowle nalytical and critical abilities and logical thinking n, and ability to apply knowledge to a wide rang onal skills. Strong evidence of clear attention to to command of a broad range of knowledge and s	g, with evidence of original tho ge of complex, familiar and un houghtful and reflective thinkin	ought, ability to integrate familiar situations. Apply ig.		
	learning outcomes. Show evidence of analytical and critical abilities and logical thinking, integration of materials and ability to apply knowledge to familiar and some unfamiliar situations. Demonstrate effective presentational skills. Evidence of clear attention to thoughtful and reflective thinking.						
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective presentational skills. Little evidence of clear attention to thoughtful and reflective thinking.						
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities and little attempt at integration. Show limited ability to apply knowledge to solve problems. Apply limited effectiveness in presentational skills. Lack of attention to thoughtful and reflective thinking.						
	Fail	Demonstrate little or no e of analytical and critical	vidence of command of knowledge and skills red abilities, logical and coherent thinking. Show nd presentational skills are minimally effective or	very little or no ability to ap			
Communication- intensive Course	N						
Course Type		ased course					
Course Teaching	Activitie		Details		No. of Hours		
& Learning Activities	Lectures				24		
	Tutorials		Droblem based eversions	12			
	Project w	/ork / Self study	Problem-based exercises		20 100		
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents	problem-based exercises (10%), continuous assessment (10%)	20	CLO 1,2,3,4		
	Essay		Essay and presentation	30	CLO 1,2		
	Examina	tion		30	CLO 1,2,3,4		
	Test		Mid-term test	20	CLO 1,2,3,4		
Required/recommended reading and online materials	Lovejoy,		05. Climate Change and Biodiversity. \angle Biology. CAB International, Oxfo		ew Haven, CT, USA		
	Grimm, N and the e	l.B., and Rahbek, C. 20 l.B., Faeth, S.H., Goluk cology of cities. Scienc	106. How does climate change affect bi piewski, N.E., Redman, C.L., Wu J., Ba e 319:756-760. change ecology. Trends in Ecology an	ai, X., and Briggs, J.M. 2			
Course Website		odle.hku.hk/	•				
Additional Course			ct to a minimum enrollment number an	d availability of teachers			
Information	Offer in a	Offer in alternate year from 2016-2017					

ENVS3022	Environmental science field course (6 credits)	Academic Year	2021		
Offering Department	Biological Sciences	Quota	10		
Course Co-ordinator	Dr M Yasuhara, Biological Sciences (yasuhara@hku.hk)				
Teachers Involved	(Dr C Dingle,Biological Sciences) (Dr M Yasuhara,Biological Sciences)				
Course Objectives	To provide students experiential learning experience in the field of environmental science. The course is primarily based on an array of experiential studies covering essential areas of environmental science during a residential fieldtrip.				
Course Contents & Topics	Students to attend a residential field trip outside Hong Kong to learn about or residential field trip may include marine environmental survey, sediment ecological, paleoecology and environmental problems, environmental geological, students are required to write an independent report on the learning	core sampling, prac gy/paleontology exc	ctical learning of ursion, and othe		

Course Learning	On succe	essful completion of this	course, students should be able	to:	
Outcomes	CLO 1 recognize ways of environmental science in practice				
	CLO 2 gain knowledge of current environmental problems and solutions				
	CLO 3	present and commun	nicate their field observations an	d findings	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in ENVS2001 or Either pass in ENVS2002 or concurrently enrolled in ENVS2002				
Offer in 2021 - 2022	N Of	N Offer in 2022 - 2023 : Y Examination -			
Grade Descriptors (A+ to F)	A	Demonstrate thorough gra original thought. Apply high	sp of the subject. Show strong analyti nly effective lab / fieldwork skills and te Apply highly effective organizational an	cal and critical abilities and logical th chniques. Critical use of data and res	
	В		rasp of the subject. Evidence of analytic ues. Correct use of data of results to dr		
	С	Apply moderately effective	ncomplete grasp of the subject. Eviden lab / fieldwork skills and techniques. Ins. Apply moderately effective organiza	Mostly correct but some erroneous us	
	D	logical thinking, but with li	ited grasp, with retention of some relev- imited analytical and critical abilities. A n and results to draw appropriate cond	Apply partially effective lab / fieldwor	k skills and techniques.
	Fail	analytical and critical abilit	little or no grasp of the knowledge ar ties, logical and coherent thinking. App and results and/or unable to draw app ective.	oly minimally effective or ineffective I	ab / fieldwork skills and
Communication- intensive Course	N				
Course Type	Laborato	ry and workshop course			
Course Teaching	Activitie	s	Details	No. of Hours	
& Learning Activities	Field wo		Students will take part in at and other learning 66 hours	66	
		/ Self study		100	
Assessment Methods and Weighting	Methods	3	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Laborato	ry reports	field reports	30	CLO 1,2,3
	Presenta	ation	group presentations	30	CLO 1,2,3
	Project re	eports	individual report	40	CLO 1,2,3
Course Website	http://ww	w.biosch.hku.hk/ecology	/lsc/		
Additional Course Information	http://www.biosch.hku.hk/ecology/lsc/ Enrollment Procedure: The actual capacity of this course is limited and will vary year by year, regardless quota set. So, interested student must apply for the course with a short proposal (2 pages max.) and CV via to Dr M Yasuhara (yasuhara@hku.hk) and Ms. Maria Lo (gylo@hku.hk) not later than 1st August (Note: this semester course, but we need applications well in advance, by this date). Late applications will not be acc The proposal should include the following: (1) specific reason(s)/motivation why you are interested in joinir course; (2) merit that you expect to receive from this course, especially regarding your future academic/path; (3) brief description of academic interests. The CV should include: (1) Personal & academic details; photograph; (4) GPA; (5) Pre-requisite courses taken & grades received.  The selection will be made based on the quality of proposal and the justification of academic merit, in consi other factors. Only accepted students through this application process will be able to register this course. The residential field trip will be organized in the reading week. Students will need to pay for their own travel of the trip (please contact us for details & financial difficulty). It will be good to take this course before taking the final year project to have relevant hands-on experience. This course will be offered subject to a minimum enrollment no. and availability of teachers.				and CV via e-mail ust (Note: this is 2nd vill not be accepted. rested in joining this are academic/career demic details; (2) ID merit, in considering is course.

ENVS3028	Coastal Sustainability (6 credits)	Academic Year	2021			
Offering Department	Biological Sciences	Quota	8			
Course Co-ordinator	Dr T Vengatesen, Biological Sciences (rajan@hku.hk)					
Teachers Involved	(Dr T Vengatesen,School of Biological Sciences) (Prof G A Williams,School of Biological Sciences)					
Course Objectives	<ul> <li>Understand the primary drivers of biodiversity and ecosystem function in rocky intertidal, mangrove and coral reel ecosystems in USA and SE Asia.</li> <li>Gain an appreciation for how urban ecosystems in this region are being affected by climate change, development and stress from pollution</li> <li>Better understand how history and governance structures of Hong Kong, Malaysia and New England constrain and/or facilitate coastal adaptation strategies</li> <li>Appreciate how cultural practices such as seafood preferences and traditional medicine affect harvesting of marine species, and how this impacts coastal hindiversity.</li> </ul>					
Course Contents & Topics	resources, but are also experiencing ever increasing threats from the ocea the mechanisms by which coastal communities in the US and SE Asia including their impacts on coastal ecosystems. Using a comparative app challenges facing coastal societies, and will gain an in-depth understandir the coasts of New England and Southeast Asia (Hong Kong and Malaysia) By comparing and contrasting both ecosystems and societies, students v commonalities of challenges facing the world's coasts, as well as differe major emphasis of the program will be on solutions, and how by taking methods for climate change adaptation that span traditional cultural barrier	marine species, and how this impacts coastal biodiversity  The majority of the Earth's population now lives in coastal cities, where people not only depend on ocean resources, but are also experiencing ever increasing threats from the ocean environment. This program will explore the mechanisms by which coastal communities in the US and SE Asia are facing these expanding challenges, including their impacts on coastal ecosystems. Using a comparative approach, students will explore the diverse challenges facing coastal societies, and will gain an in-depth understanding of coupled human-natural systems on the coasts of New England and Southeast Asia (Hong Kong and Malaysia).  By comparing and contrasting both ecosystems and societies, students will develop an appreciation for both the commonalities of challenges facing the world's coasts, as well as differences that occur due to local ecology. A major emphasis of the program will be on solutions, and how by taking a global perspective we can accelerate methods for climate change adaptation that span traditional cultural barriers. We will blend studies of threats facing both human and natural systems in Hong Kong, Malaysia and the Gulf of Maine with an in-depth exploration of how				
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 Articulating similarities and differences between how coupled human-natural systems operate in S and in comparable habitats in the U.S.A.					

				and social science	
CLO 3 A	Articulating arguments mpacts on the environ	s about how traditional Chinese, Malay	sian and American cul		
	•	e collaborating with peers from U.S.A,	and gain a greater un	derstanding of the	
		1 or BIOL3305 or BIOL3318 or ENVS200	01 or ENVS2002 or EAS	C3020	
N Of	fer in 2022 - 2023 : Y		Examination		
A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a complex issue of sustainable coastal management in economically and socially developed and developing places.					
В	Demonstrate substantial learning outcomes. Sho	ow evidence of analytical and critical abilities and	logical thinking, and ability to	apply knowledge to a	
С	Demonstrate general boutcomes. Show evide complex issue of sustain	out incomplete command of knowledge and skills ence of some analytical and critical abilities and nable coastal management in economically and soc	required for attaining most ogical thinking, and ability to cially developed and developin	of the course learning apply knowledge to a g places.	
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems.				
Fail Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve coastal problems.					
N					
		Details		No. of Hours	
				40	
		in the site of the second of the site is a		80	
	•	5		30	
Methods	5	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
Assignm	ents	Write ups form the field trips	20	CLO 1	
Report		Final lab notebook and associated materials (video diaries and photos)	50	CLO 2,3,4	
Test			30	CLO 2,3,4	
http://mo	odle.hku.hk/				
- All field - Course 1st week 2nd weel 3rd and 4	http://moodle.hku.hk/  - Duration: around July 9, 2021 to August 10, 2021  - All field trips, including the overseas trip to Malaysia and USA, are compulsory  - Course fee - please contact the course coordinator  1st week: Lectures, practicals and field trips in the University of Hong Kong, Hong Kong 2nd week: Lectures and field trips in University Sains Malaysia, Penang (Malaysia) 3rd and 4th weeks: Lectures and field trips in Northeastern University, New England (Boston, USA  This is an introductory overseas experiential learning course designed for all science students as a especially suitable for students aiming to major in environmental science, ecology & biodiversiciences.  "Note: Field trips in New England (Boston, USA) will NOT be considered for assessment and, then			as free elective. it is	
	CLO 3 A in well and in the course of the cou	literature, and explain  CLO 3 Articulating arguments impacts on the enviro with peers  CLO 4 Becoming comfortable culture of the region  Pass in BIOL2306 or BIOL330  N Offer in 2022 - 2023 : Y  A Demonstrate thorough learning outcomes. She to apply knowledge to developing places.  B Demonstrate substantial learning outcomes. She complex issue of sustain to perform the partial to outcomes. Show evidence of some knowledge to solve profus issue of sustain D Demonstrate partial but Show evidence of some knowledge to solve profus in the problems.  N  Field camps  Activities  Lectures  Field work  Laboratory work  Methods  Assignments  Report  Test  http://moodle.hku.hk/  - Duration: around July 9, 2021  - All field trips, including the overall course fee - please contact to 1st week: Lectures and field to 3rd and 4th weeks: Lectures and This is an introductory overseat	literature, and explain the connections among these diverse app CLO 3 Articulating arguments about how traditional Chinese, Malay impacts on the environment, and to develop potential solution with peers  CLO 4 Becoming comfortable collaborating with peers from U.S.A, culture of the region  Pass in BIOL2306 or BIOL3301 or BIOL3305 or BIOL3318 or ENVS200  N Offer in 2022 - 2023 : Y  A Demonstrate thorough mastery at an advanced level of extensive know learning outcomes. Show strong analytical and critical abilities and logical to apply knowledge to a complex issue of sustainable coastal manag developing places.  B Demonstrate substantial command of a broad range of knowledge and selarning outcomes. Show evidence of analytical and critical abilities and complex issue of sustainable coastal management in economically and soc complex issue of sustainable coastal management in economically and soc complex issue of sustainable coastal management in economically and soc complex issue of sustainable coastal management in economically and soc Demonstrate partial but limited command of knowledge and skillites and complex issue of sustainable coastal management in economically and soc Demonstrate partial but limited command of knowledge and skills required Show evidence of some coherent and logical thinking, but with limited anal knowledge to solve problems.  Fail Demonstrate little or no evidence of command of knowledge and skills required of analytical and critical abilities, logical and coherent thinking. Show very problems.  N  Field camps  Activities Details  Lectures  Field work  Laboratory work including hands on training  Methods Details  Assignments Write ups form the field trips  Final lab notebook and associated materials (video diaries and photos)  Test  http://moodle.hku.hk/  - Duration: around July 9, 2021 to August 10, 2021  - All field trips, including the overseas trip to Malaysia and USA, are con - Course fee - please contact the course coordinator  1st week: Lectures, practicals and field trips in the Un	CLO 4 Becoming comfortable collaborating with peers from U.S.A., and gain a greater unculture of the region  Pass in BIOL2306 or BIOL3301 or BIOL3305 or BIOL3318 or ENVS2001 or ENVS2002 or EAS  N Offer in 2022 - 2023 : Y  A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original to apply knowledge to a complex issue of sustainable coastal management in economically and adversioning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to complex issue of sustainable coastal management in economically and socially developed and developing places.  B Demonstrate general but incomplete command of knowledge and skills required for attaining at learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to complex issue of sustainable coastal management in economically and socially developed and developing Demonstrate general but incomplete command of knowledge and skills required for attaining most outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to complex issue of sustainable coastal management in economically and socially developed and developin Demonstrate partial but limited command of knowledge and skills required for attaining some of the show every limited and critical abilities. Show evidence of some charent and logical thinking, but with limited analytical and critical abilities. Show knowledge to solve problems.  Fail Demonstrate little or no evidence of command of knowledge and skills required for attaining some of the show every little or no ability to apply knowledge to solve problems.  Field camps  Activities Details  Lectures  Field work  Laboratory work including hands on training  Methods Weighting in final course grade (%)  Assignments Write ups form the field trips  To problems of the problems of the probl	

ENVS3202	Plant physiology and climate change (6 credits)  Academic Year				
Offering Department	Biological Sciences	Quota	40		
Course Co-ordinator	Dr J Wu, Biological Sciences (jinwu@hku.hk)				
Teachers Involved	(Dr J Wu,Biological Sciences)				
Course Objectives	In this course students will learn different quantitative methods for measuring and evaluating climate change impacts on terrestrial ecosystems. This interdisciplinary course draws on aspects of plant physiology ecology micrometeorology and ecosystem ecology to describe impacts and patterns of global change. We will explore how the "breathing" of the biosphere impacts and is impacted by climate change by scaling plant physiology from leaf to canopy, and ultimately to global scales. Students will examine the biophysical processes that affect the exchange of material (water, CO2, and atmospheric trace gases) and energy between terrestrial biosphere and the atmosphere. In addition, students will learn cutting-edge techniques to help monitor, model and diagnose these processes.				
Course Contents & Topics	1. Overview of plant physiology, with particular focus on the interactions between plants and climate.  2. Fundamental biophysical principles that regulate the strengths of ecosystem metabolism (i.e. photosynthestranspiration and etc).  3. Introduction to various remote sensing and modelling approaches to quantify the impacts of climate variability plant metabolism (e.g. proximate and satellite remote sensing, ecosystem modelling, biological scaling process etc).  4. Case studies introducing practical applications of cutting edge technology to current ecological an environmental issues.				
Course Learning	On successful completion of this course, students should be able to:				
Outcomes	CLO 1 understand the fundamental principles that regulate terrestrial ecosyste	m metabolism			
	CLO 2 understand the basic of remote sensing data and how to analyz ecophysiology	e remote sensing	data for plant		

Pre-requisites			environmental problems associated	grazar aminata ariang	) <del>-</del>	
(and Co-requisites and Impermissible combinations)	Priority	Pass in BIOL2306 or ENVS2001 or ENVS2002 or EASC2404.  Priority will be given to students majoring in Environmental Science, Biological Science, and Earth System Science.				
Offer in 2021 - 2022	Y 19	st sem Offer in 2022 - 2	2023 : Y	Examination	n Dec	
Grade Descriptors (A+ to F)	A	evidence of original though	astery of the course material. Show strong tht, and ability to apply knowledge to a wid we organizational and presentational skills.			
	В		command of the course material and an abilitie of analytical, critical thought to some			
	С		incomplete command of the course materi e of some critical and logical thinking ab			
	D	Demonstrate partial but limited command of the course material and a limited ability to apply knowledge to solve problems. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Apply limited or barely effective organizational and presentational skills.				
	Fail		evidence of command of course material wi hinking abilities and incoherent thinking. Orga			
Communication- intensive Course	N					
Course Type	Lecture	with laboratory compone	nt course			
Course Teaching	Activiti	es	Details		No. of Hours	
& Learning Activities	Lecture	-			24	
	Laborat	tory			12	
	Tutorial	-			12	
	Reading	g / Self study			90	
Assessment Methods and Weighting	Method	ls	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
and Weighting	Assignments		home work (30%) and lab. assignment (20%)	50	CLO 1,2,3	
and weighting	Assignn	nients	assignificiti (2070)	40	CLO 1,2,3	
ana weighting	Assignn Examin		assignment (2070)	40		
ana weighting		ation	assignment (2070)	10	CLO 1,3	
and Weighting  Course Website  Additional Course	Examin Present http://mo	ation tation podle.hku.hk/	be assessed by examining the bio	10	CLO 1,3	

ENVS3401	Understanding tropical ecosystems in a changing world (6 credits)  Academic Year					
Offering Department	Biological Sciences	Quota	20			
Course Co-ordinator	Dr A L Ashton, Biological Sciences (lashton@hku.hk)					
Teachers Involved	(Dr A L Ashton,Biological Sciences) (Dr C Dingle,Biological Sciences) (Dr T Bonebrake,Biological Sciences)					
Course Objectives	In this field course, students will learn how to use natural history and ecology to answer important environmental questions relevant to tropical ecoystems. Through field studies in both degraded and prisitine habitats, students will gain an understanding of the major drivers of ecosystem change and biodiversity loss in a tropical landscape in Sabah, Borneo and learn about measures to mitigate the impacts of human activities in these vital ecosystems. Students will work in groups to develop and carry out a research project to address ecological or environmental questions. After the field portion of the course, students will write up the results of their projects in the style of a scientific paper.					
Course Contents & Topics	services such as nutrient cycling, carbon storage and new medicines. anthropogenic pressure due to logging, burning and conversion to agriculture conservation efforts over the next few decades are essential if we are to secosystems. In this course, through a series of lectures, tutorials and fieldw rainforest ecosystems, investigate the environmental impacts of land use measures which can help mitigate these impacts. Students will also learn tecl field research projects, and about the importance of data generated from resimpact of human activities in such important ecosystems. The bulk of the Valley, a primary tropical rainforest located in Sabah, Malaysia. We will vactivities, including palm oil plantations, to observe how land-use changes in	Scientific paper.  Tropical rainforests are the most biologically rich terrestrial ecosystems, providing important environmental services such as nutrient cycling, carbon storage and new medicines. Rainforests are under increasing anthropogenic pressure due to logging, burning and conversion to agriculture, as well as climate change. Effective conservation efforts over the next few decades are essential if we are to slow down our impacts on these vital ecosystems. In this course, through a series of lectures, tutorials and fieldwork, students will learn about tropical rainforest ecosystems, investigate the environmental impacts of land use change, and discuss conservation measures which can help mitigate these impacts. Students will also learn techniques for designing and carrying out field research projects, and about the importance of data generated from research to inform efforts to minimize the impact of human activities in such important ecosystems. The bulk of the course will be carried out in Danum Valley, a primary tropical rainforest located in Sabah, Malaysia. We will visit some sites impacted by human activities, including palm oil plantations, to observe how land-use changes impact biodiversity and observe in situ conservation efforts. Students will work in groups to conduct research projects which will tie together the concepts				
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 demonstrate an understanding of the importance of ecological conservation	and natural history	knowledge for			
	CLO 2 understand the major impacts of human activity on tropical rainforest ecosystems					
	CLO 3 work collaboratively to design and carry out a research project (collect and analyze data and present results) on an ecological or environmental topic					
	CLO 4 carry out a range of field sampling and observational techniques for collecting data in the field					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in ENVS2001 or ENVS2002 or BIOL2306					
,						

Offer in 2021 - 2022	N O	ffer in 2022 - 2023 : Y		Examination			
Grade Descriptors (A+ to F)	A	A Demonstrate an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought. Ability to apply knowledge of the natural history of a tropical rainforest and ecological studies to conservation ecology. Produce a scientific paper that is written at high enough quality for publication.					
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show very good analytical and critical abilities and logical thinking, with evidence of original thought. Ability to apply knowledge of the natural history of a tropical rainforest and ecological studies to conservation ecology. Produce a well written scientific paper.					
	С	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show some analytical and critical abilities and logical thinking, with evidence of original thought. Able to apply some knowledge of the natural history of a tropical rainforest and ecological studies to conservation ecology. Produce a scientific paper that communicates your results.					
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show some analytical and critical abilities and logical thinking, but not original thought. Limited ability to use knowledge of natural history of a tropical rainforest and ecological studies to conservation ecology. Produce a scientific paper that communicates your results.					
	Fail	demonstration of analytic	evidence of command of knowledge and skills requical and critical abilities and logical thinking, with history of a tropical rainforest, ecological studies to	evidence of original though	ht. Not able to apply		
Communication- intensive Course	N						
Course Type	Field car	mps					
Course Teaching & Learning Activities	Activities		Details		No. of Hours		
	Lectures		Briefing at HKU on field course activiti	es	2		
	Field work		10 days field work experience		40		
	Laboratory work		Lab work during the field trip		30		
	Tutorials		Lectures/workshops during field trip		10		
	Presentation		Presentation during the field camp, based on the research proejct		5		
	Reading / Self study		Preparation of report after the field trip	)	40		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignn	nents	Field journal: Students will create a natural history field journal, with scientific drawings and observations	20	CLO 2		
	Report		Journal-style paper based on the research carried out on the field course	50	CLO 1,2,3,4		
	Test		Oral presentation: Prentation during the field camp, based on the research proejct	30	CLO 1,2,3		
Course Website		oodle.hku.hk					
Additional Course Information	elective.		ial learning course designed for ENVS, e for students aiming to major in environ				

ENVS3402		ve data, social science methods and decision- in environmental science (6 credits)	Academic Year	2021		
Offering Department	Biological	Sciences	Quota	30		
Course Co-ordinator	Dr Hannal	n Mumby, Biological Sciences (hsmumby@hku.hk)				
Teachers Involved	(Dr Hanna	h Mumby,Biological Sciences)				
Course Objectives	This course will introduce social science and qualitative approaches in environmental science. We will introduce the historical context and philosophical background to different approaches to environmental sciences. The course will then take a case study-based approach, using the case studies to introduce methodologies and methods. These include the ethical process, collection and analysis of qualitative and quantitative data from focus groups, surveys, interviews and questionnaires. We will also discuss wider methodologies including ethnographic approaches. Attention will be paid to suitability of methods to research questions, how studies are conducted and what analyses are used. We will also investigate how these data are or can be integrated into decision-making processes, including different tools that can be used for decision-making.					
Course Contents & Topics	-Research -Ethical co -Methodol -Methods,	philosophy- how researchers approach questions in environment methodology- the rationale and framework for research onsiderations, concepts of 'bias', objectivity, truths and the role of ogies including biographical techniques, ethnography and case sampling data and analyses, including questionnaires and taking tools.	f the researcher studies.	cus groups, an		
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 Determine and distinguish a range of social science approaches and qualitative data analysis techniques					
	CLO 2 Design a study appropriate for the research question using those approaches and techniques					
	CLO 3 Discuss the philosophical and epistemological background of different approaches to environmental science questions					
	CLO 4 Critically evaluate studies using social science and/or qualitative approaches.					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in EN	NVS2002				
Offer in 2021 - 2022	Y 2nd	sem Offer in 2022 - 2023 : Y	Examination	May		
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery of the course material. Show strong ability evidence of original thought, and ability to apply knowledge to a wide range Demonstrate highly effective organizational and presentational skills.				
	В	Demonstrate substantial command of the course material and an ability to	apply knowledge to familiar	and some unfamilia		

		situations. Show evid presentational skills.	ence of analytical, critical thou	ght to some complex issues. Apply effect	ctive organizational and	
	С			course material and an ability to apply kno al thinking abilities. Apply moderately effe		
	D		erent and logical thinking, but with	aterial and a limited ability to apply knowledge limited analytical and critical abilities. Apply		
	Fail		emonstrate little or no evidence of command of course material with very little or no ability to apply kno oblems. Lack of critical thinking abilities and incoherent thinking. Organization and presentational skills are no ineffective.			
Communication- intensive Course	N					
Course Type	Lecture-b	ased course				
Course Teaching & Learning Activities	Activities		Details	Details		
	Lectures					
	Tutorials		Lab sessions		12	
	Reading / Self study				100	
Assessment Methods and Weighting	Methods	3	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignm	ents		70	CLO 1,2,3,4	
	Examina	tion		30	CLO 1,2,3,4	
Required/recommended reading and online materials	making, \ Moon et methodol  Mukherje	/olume 9, Issue 1, pp al. (2019) Expanding ogy, and methods. M e et al. (2019) Respo	o 1-206. This entire special is githe role of social science i lethods in Ecology and Evol onse to Expanding the role o	e: Qualitative methods for eliciting juc ssue contains papers on the topic. in conservation through an engagen ution. Volume 10 pp 294-302. of social science in conservation thro- cology and Evolution. Volume 10 pp	nent with philosophy, ough an engagement	

Offering Department	E I I V II O I	nmentai remediai	tion (6 credits)	Academic Year	2021	
mg wopuninont		al Sciences		Quota	30	
Course Co-ordinator	TBC, Bic	ological Sciences ()		· ·		
Teachers Involved	(TBC,Bic	ological Sciences)				
Course Objectives	environm To unde characte To learn	nent erstand the technolog eristics of each techni the fundamental phy	the environmental fate informa- gies available for environmental re iques relevant to the pollutants of c /sical, chemical and biochemical re alysis of the recent technological d	emediation of pollutants in soils at concern eactions involved in the remediatio	nd water, and the	
Course Contents & Topics	Understa aquatic; phytoren biphenol the spec transport	Understanding the types of different pollutants and their fate in the environments including both terrestrial and aquatic; and relevant strategy of pollution control and treatment; advanced oxidation, microbiological treatment and objective mechanisms of biochemical transformation of polyaromatic hydrocarbon, polychlorinated biphenols, agrichemicals and phthalate esters as well as both metals and metalloids; biochemical pathways and the specific genes involved in detoxification; chemotaxis and engineering the degradation pathways in bacteria; transport of microorganisms and monitoring in subsurface environment; survival of introduced organisms; evolution of the degradative genes in bacteria; in situ and ex situ remediation techniques; green technologies.				
Course Learning Outcomes	CLO 1 e CLO 2 p CLO 3 c t	On successful completion of this course, students should be able to:  CLO 1 explain the remediation technologies available to the type of pollutants of concern in remediation practice  CLO 2 propose remediation strategies for polluted sites with the best technologies available considering the type of pollutants and the cost involved  CLO 3 differentiate the technologies available for the specific pollutants and the fundamental process involved in terms of the catalysts and the effectiveness  CLO 4 describe several key chemical and biochemical processes used in environmental remediation with adequate background information on their history and development				
Pre-requisites and Co-requisites and Impermissible combinations)	Pass in E	BIOL3109 or BIOL31	10 or BIOL3401 or ENVS3042			
Offer in 2021 - 2022	N O	ffer in 2022 - 2023 : \	Υ	Examination		
Grade Descriptors (A+ to F)	A B C D	Thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outco Thorough grasp of the subject matter. Show very strong analytical and critical abilities and high logical thinking, with evidency original thought. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate and insig conclusions. Apply highly effective organizational and presentational skills.  B Substantial command of a broad range of knowledge and skills required for attaining at least most of the course lear outcomes. Substantial grasp of the subject. Show evidence of analytical and critical abilities and logical thinking. Apply effe lab skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective organizational presentational skills.  C General but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Get but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Apply moderately effective organizational and presentational skills.  D Partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Partial limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but limited analytical and critical abilities. Partially effective lab skills and techniques. Limited ability to use data and results to appropriate conclusions. Apply limited or barely effective organizational and presentational and presentational skills.				
Communication-	draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.  N					
intensive Course		Lasting with laboratory common out across				
	Lecture v	with laboratory comp	onent course			

	Lectures			24
	Laboratory			8
	Field work			6
	Project work			6
	Tutorials			4
	Reading / Self study			100
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments		10	CLO 1,2,3,4
	Examination		50	CLO 1,2,3,4
	Laboratory reports		25	CLO 1,2,3,4
	Presentation		10	CLO 1,2,3,4
	Test		5	CLO 1,2,3,4
Required/recommended reading and online materials	C.J. Hurst: Manual of Environmer S.C. McCutcheon & J.L. Schnoor R. Mitchell & J-D Gu: Environmer	: Phytoremediation: Trans	formation and Control of Contamina	nts (Wiley)
Course Website	http://moodle.hku.hk/	0, (	,	
Additional Course Information	The course will be offered subject Offer in alternative year from 201		number and availability of teachers	

CAES1000		iversity Englisl	n (6 credits)	Academic Ye	ear 2021		
Offering Department	English			Quota			
Course Co-ordinator	Dr P Won	g (1st sem); Dr A \	′au (2nd sem), English <i>(pmtw</i> 2 <i>@hl</i>	ku.hk; aliceyhy@hku.hk)			
Teachers Involved		(Dr A Yau,Centre for Applied English Studies) (Dr P Wong,Centre for Applied English Studies)					
Course Objectives							
Course Contents & Topics	proficience Common written ace for and use the Mood skills and	The Core University English (CUE) course aims to enhance first-year students' academic English language proficiency in the university context. CUE focuses on developing students' academic English language skills for the Common Core Curriculum. These include the language skills needed to understand and produce spoken and written academic texts, express academic ideas and concepts clearly and in a well-structured manner and search for and use academic sources of information in their writing and speaking. Four online-learning modules through the Moodle platform on academic speaking, academic grammar, academic vocabulary, citation and referencing skills and avoiding plagiarism will be offered to students to support their English learning. This course will help students to participate more effectively in their first-year university studies in English, thereby enriching their first-					
Course Learning			this course, students should be ab	le to:			
Outcomes	CLO 1 id de CLO 2 fo CLO 3 ar	CLO 1 identify and distinguish between main ideas and supporting details in lectures and written texts and demonstrate an understanding of the arguments / facts expressed  CLO 2 form and express personal opinions through critical reading and listening  CLO 3 argue for and defend a position in a clear and structured way using academic sources, through writing an speaking  CLO 4 demonstrate control of grammatical accuracy and lexical appropriacy in academic communication					
Pro roquicitos	NIL	emonstrate control	or grammatical accuracy and lexica	п арргорнасу птасацение сот	munication		
Pre-requisites and Co-requisites and Impermissible combinations)							
Offer in 2021 - 2022			Offer in 2022 - 2023 : Y	Examination	No Exam		
Grade Descriptors (A+ to F)	A	appropriately structu position. Students al reference correctly a	ding result. Students are able to produce red. Students can clearly and concisely e ways use appropriate academic sources t t all times. Students demonstrate an ability ge contains very few, if any, systematic e fluent.	explain academic concepts and critical to support their ideas in writing and to fully comprehend and critically inte	ally argue for a detaile speaking. They cite an rpret spoken and writte		
	В	Good to very good result. Students are able to produce spoken and written academic texts which are appropriately structured with only minor errors. Students can almost always clearly and concisely explain academic concepts and almost always critically argue for a detailed position. Students almost always use appropriate academic sources to support their ideas in writing and speaking. They cite and reference correctly with only a few non-systematic errors. Students can comprehend and interpret texts with ease, although they may miss some implied meanings and opinions. Written language is mostly accurate but contains a few systematic errors in complex grammar and vocabulary. Spoken language is mostly comprehensible and fluent.					
	С	Satisfactory to reasonably good result. Spoken and written academic texts produced by students are sometimes not-well structured but there is some evidence of this ability. Students are sometimes unable to clearly and concisely explain academic concepts. While they can argue for a position, it is not very detailed and tend to be simplistic rather than critical. Students sometimes use sources which are nonacademic and/or not appropriate to support their ideas in writing and speaking. There are some systematic errors in citation and referencing but also evidence of correct systematic use. Students have some difficulty comprehending and critically interpreting texts. They can always understand the main ideas but may miss some of the writer's views and attitudes. Written language is sometimes inaccurate, although errors, when they occur, are more often in complex grammar and vocabulary and there is some evidence of control of simple grammatical structures. Spoken language is generally comprehensible and fluent but at times places strain on the listener.					
	D	Barely satisfactory re may be some eviden for a position. There Students often use s are many systematic of citation and refere	isult. Spoken and written academic texts proceed this ability. Students are often unable be is some evidence of an ability to explain ources which are nonacademic and/or not a errors in citation and referencing however the normal students often have difficulty compre writer's views and attitudes. Written languagend vocabulary. Spoken language is only s	duced by students are often inapproprious clearly and concisely explain acade academic concepts but not to critical appropriate to support their ideas in writhere is evidence of an understanding of the chending and interpreting texts, sometime.	emic concepts and argually argue for a position ting and speaking. The some of the convention mes failing to understar		
	Fail	are unstructured and	Productive skills are too limited to be able to unclear. Students are unable to follow anyuage is often incomprehensible. Assessm	nd interpret texts. There are language	e errors in almost ever		
Communication- ntensive Course	Υ						
Course Type	Lecture-b	ased course					
ourse Teaching	Activities	S	Details		No. of Hours		
Learning Activities	Lectures				30		
	Tutorials				6		
	Reading	/ Self study			84		
ssessment Methods nd Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin		
	Assignme	ents	report	40			
	, 100.g		торогс	70			
	Essay		Торон	30			

CAES9820		nic English for sc	eience students (6 credits)	Academic Ye	ar 2021	
Offering Department	English			Quota		
Course Co-ordinator		oynton, English <i>(sbo</i> )	,			
Teachers Involved		•	pplied English Studies)			
Course Objectives	skills for of science a presenting spoken of	This 6-credit English-in-the-Discipline course aims to develop students' professional and technical communication skills for disciplinary studies in the sciences. There are three main components in the course: 1) Writing a popula science article 2) An oral presentation and 3) Independent language learning. Students will learn rhetorical skills for presenting and explaining scientific concepts to a cross-disciplinary and non-specialist audience in both written and spoken communication. Students will also be given an opportunity to design a personalised language learning olden, carry out the plan and reflect on their own independent language learning experience.				
Course Contents		overed in the course v		c learning experience.		
& Topics	- Finding, - Compilir - Contrast - Writing f - Organiz grammar; - Critically	Finding, evaluating and using appropriate academic source materials; Compiling an academic bibliography; Contrasting academic and popular genres of Science; Writing for a specific audience, including stance, shared knowledge, levels of formality; and Organizing and articulating ideas in an academically suitable format including appropriate vocabulary and rammar; and Critically examine their own language proficiency and analyze how that relates to their ability to perform uccessfully within their discipline. Developing self-directed learning strategies.				
Course Learning		•	his course, students should be able to:			
Outcomes			e disciplinary sources related to a spec	ified topic		
	CLO 2 pr	roduce texts (written	and spoken) appropriate for a cross-di-	sciplinary audience based	on their disciplinary	
	kr	nowledge	, , , , ,	•		
	CLO 3 id					
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL					
Offer in 2021 - 2022	Y 1st	sem 2nd sem Of	ffer in 2022 - 2023 : Y	Examination	No Exam	
Grade Descriptors	Α		stently demonstrates ability to summarize salien			
(A+ to F)	using original language. Text uses sources appropriately and demonstrates accurate and appropriate grammatical, lexical and organizational characteristics. Language learning needs are clearly identified and aligned with evidence of planning, self-study and reflection.  B Good to very good result. Usually demonstrates ability to summarize salient points accurately using mostly original language. Text mostly uses sources appropriately and demonstrates mostly accurate and appropriate grammatical, lexical and organizational characteristics. Language learning needs are stated with some reference to evidence of planning and reflection					
	although there is some misalignment between goals and self-study completed.  C Satisfactory to reasonably good result. Demonstrates some ability to summarize salient points using mostly original language although some inaccuracies are present. Text uses some sources appropriately and demonstrates appropriate but simple grammatical and lexical characteristics with some organizational flaws. Language learning needs are stated with some limited evidence of planning and reflection but goals and self-study are misaligned.					
	D Barely satisfactory result. Demonstrates a limited ability to summarize salient points from sources with inaccuracies and little original language. Text uses sources inappropriately and demonstrates grammatical inaccuracy, inappropriate lexical choices and organizational flaws. There is a minimal statement of language learning needs, planning and reflection with little or no apparent alignment between goals and self-study.  Fail Unsatisfactory result. Does not demonstrate ability to summarize salient points identify, interpret or appropriately paraphrase					
	reliable sources. Text uses no sources and demonstrates serious grammatical, lexical and/or organizational errors. Does not demonstrate any meaningful attempt to identify language learning needs or implement a plan.					
Communication- intensive Course	Υ		· · · · ·	·		
Course Type		ased course				
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Tutorials		seminars		36	
		/ Self study			120	
	Assessm	ent	independent learning work		84	
Assessment Methods and Weighting	Methods					
			Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	<b>Methods</b> Assignment		independent learning work	course grade (%)		
				course grade (%) 20 55	Methods	
	Assignme		independent learning work	course grade (%)	Methods	
and Weighting  Required/recommended reading and	Assignme Essay Test	ents	independent learning work	course grade (%)  20 55 25	Methods	
and Weighting  Required/recommended reading and online materials	Assignme Essay Test Course m	ents	independent learning work other genres of writing	course grade (%)  20 55 25	Methods	
	Assignme Essay Test Course m	ents naterials to be provide s.hku.hk/caes9820/	independent learning work other genres of writing	course grade (%)  20 55 25 e.	Methods to CLO Mapp	

CAES9821		ional and techies (6 credits)	nical communication for mathem	atical Academic Yea	2021		
Offering Department	English			Quota			
Course Co-ordinator		oynton, English <i>(s.</i>					
eachers Involved		•	Applied English Studies)				
Course Objectives	This 6-credit English-in-the-Discipline course aims to develop students' professional and technical communication skills for disciplinary studies in mathematical sciences. There are two main components in the course: 1). Case study report writing, 2). professional oral presentation. Students will learn rhetorical skills for presenting and explaining mathematical and statistical data and trends, and justifying analyses and recommendations convincingly in both written and spoken communication. This will be achieved through analysing samples of case study reports and presentations using a genre-based approach.						
Course Contents & Topics	There are two main components in the course:  1. Case study report writing  2. Professional oral presentation  Students will logge restricted skills for presenting and explaining methometical and statistical data and transaction.						
	justifying	Students will learn rhetorical skills for presenting and explaining mathematical and statistical data and trends, an justifying analyses and recommendations convincingly in both written and spoken communication. This will be achieved through analysing samples of case study reports and presentations using a genre-based approach.					
Course Learning Outcomes	CLO 1 processor CLO 2 processor CLO 3 just CLO 4 id	On successful completion of this course, students should be able to:  CLO 1 present and explain mathematical and statistical data and trends using appropriate rhetorical skills  CLO 2 organize and articulate coherent ideas with appropriate language devices in a case study report and an oral presentation  CLO 3 justify analyses and recommendations convincingly in a case study report and an oral presentation  CLO 4 identify their own language learning needs, develop independent learning strategies to address those needs, and reflect on their own independent language learning experience					
Pre-requisites and Co-requisites and Impermissible combinations)	NIL	·	, J				
Offer in 2021 - 2022	Y 1st	sem 2nd sem	Offer in 2022 - 2023 : Y	Examination	No Exam		
	A		productive skills displaying a complete awareness				
Grade Descriptors (A+ to F)	В	data limitations whe specific and relevan contains a sophistic Mostly appropriate occasional lapses in data limitations whe future language lea grammar and vocab Productive skills are successfully. Purpos and make recomme language performar language is general	able to critically analyse a case scenario, convincing relevant. Students are able to successfully evaling truther language learning plans. Spoken languated range of grammar and vocabulary, with very five productive skills displaying good awareness of a reas. Students are able to analyse a case scenar relevant. Students are able to evaluate their lairning plans. Spoken language is comprehensible pulary, making some systematic errors of language e generally appropriate for the intended audience, sees are generally clear and tone is generally suitabendations, but the analysis and recommendations roce in a limited number of areas and proposed fally comprehensible and fluent. Written language	uate their language performance i igge is fully comprehensible and f ew systematic errors. audience, purpose and structu- nario, justify analyses and recomn- nguage performance in most area e and fluent. Written language co- which generally do not impede un- There is an overall sense that the le. Students are generally able to need more justification. Students a uture language learning plans are	n all areas and proposituent. Written languagere, although there are nendations, and discuss and propose relevantains a good range derstanding.  Work is communicating analyse a case scenar rere able to evaluate the rather vague. Spoke		
	D Fail	analyse a case sce links between section proposed future lan and vocabulary, bu comprehensible and Productive skills share unable to analy Students are not at language errors in	I. play weaknesses in awareness of purpose and au mario, and the analyses and recommendations are ons may be lacking. Students are able to evaluat guage learning plans may not be relevant. Writte at the written work can still be followed by a part of quite fluent, but stain is at times placed on the list ow little or no awareness of audience or are too lise a case scenario and make reasonable recommele to evaluate their language performance and proboth simple and complex grammar in written wor juage places considerable strain on the listener the	re vague. The structure is genera their language performance on n language contains frequent erro patient and sympathetic audience ener. mited to be able to successfully c rendations. Ideas are incoherent, v opose future language learning pl k, which impede successful comp k, which impede successful comp	Ily appropriate althoughy in few areas and the ores in complex gramme. Spoken language arry out tasks. Studen yague and unstructure ans. There are freque rehension of ideas ar		
Communication- ntensive Course	Υ	contain plagiansin.					
Course Type	Lecture-b	ased course					
ourse Teaching	Activitie	s	Details		No. of Hours		
Learning Activities	Lectures		seminars		30		
	Tutorials		small group tutorials		6		
	- 0	/ Self study			120		
	Assessm		independent learning work		84		
Assessment Methods and Weighting	Methods	<b>3</b>	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin		
	Assignm			40			
	Presenta			30			
	Project re	•		30			
Additional Course nformation	intend to	major in decision a	arial Science) and BASc(Applied AI) ar analytics, mathematics, risk managemen other science disciplines should take CAI	t, and statistics are strongly			

CHEM1041	Foundat	tions of chemistry	y (6 credits)	Academic Year				
Offering Department	Chemistry		_	Quota	70			
Course Co-ordinator		Γong, Chemistry <i>(apIt</i>	tong@hku.hk)					
Teachers Involved		Tong,Chemistry)						
Course Objectives	interested	The course aims to provide students who do not have HKDSE Chemistry or an equivalent background but are interested in exploring Chemistry further, with an understanding of the essential fundamental principles and concepts of chemistry.						
Course Contents & Topics	Topic 1:	Gases: Their Proper	ties and Behaviour (6 hours etic-molecular theory of gases	) Gas pressure; the gas laws; the i	deal gas law an			
	chemical molecular	change; electronegat shape.	ivity and bond polarity; Lewis	ovalent, ionic and metallic bonds; I structures of molecules and ions; V Changes (8 hours) Physical states ar	SEPR Theory an			
	types of ir	ntermolecular forces; Chemical Equilibrium	properties of liquid state; the	solid state: structure, properties, and tate and the equilibrium constant; th	bonding.			
		•	Compounds (10 hours) An on in organic compounds.	verview of organic compounds and	structures; organ			
Course Learning Outcomes		•	is course, students should be ge and understanding in rela		terminology and			
	CLO 2 de th CLO 3 de or CLO 4 ap pr	<ul> <li>CLO 1 demonstrate knowledge and understanding in relation to some chemical vocabulary, terminology are conventions</li> <li>CLO 2 demonstrate knowledge and understanding of chemical stoichiometry, the properties of liquids and solid the nature of gases, phase changes, chemical bonding and structures, and the nature of chemical equilibits.</li> <li>CLO 3 demonstrate a basic knowledge of organic compounds and structures, nomenclature, and isomerism organic compounds</li> <li>CLO 4 apply the theories and concepts introduced in the course to solve problems, perform calculations, male predictions and rationalize trends</li> <li>CLO 5 organize and present chemical ideas in a clear, logical and coherent way</li> </ul>						
	CLO 6 de	•		relevant applications of chemistry i	n society and ir			
Pre-requisites and Co-requisites and Impermissible combinations)	Students coordinate Not for stu	without such backgro or for consideration. udents with Level 3 o	ound but keen on taking this rabove in HKDSE Chemistry	try component or Integrated Science foundation chemistry course may ap or having taken any level 1 Chemisti	proach the cours			
		uivalent Chemistry co						
Offer in 2021 - 2022		sem Offer in 2022		Examination	Dec			
Grade Descriptors (A+ to F)	A	learning outcomes. Showith ability to apply know and presentational skills	w thorough grasp of the subject. De vledge to a wide range of complex, fa	tensive knowledge and skills required for at monstrate strong analytical and critical abilitie amiliar and unfamiliar situations. Apply highly e	es and logical thinking effective organization			
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show substantial grasp of the subject. Demonstrate evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.						
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show general but incomplete grasp of the subject. Demonstrate evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.						
	D	·						
	Fail	evidence of little or no g	grasp of the knowledge and underst Show very little or no ability to apply	and skills required for attaining the course lea anding of the subject. Lack of analytical and knowledge to solve problems. Organization ar	critical abilities, logic			
Communication- ntensive Course	N							
Course Type	Lecture-b	ased course						
Course Teaching	Activities	3	Details		No. of Hours			
Learning Activities	Lectures				36			
	Tutorials	/ Calf atudy			12			
		/ Self study	D. (. 1)	NAC	100			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin			
	Assignme			30	CLO 1,2,3,4,5			
	Examinat	ion		55	CLO 1,2,3,4,5,6			
	Test			15	CLO 1,2,3,4,5,6			
Required/recommended reading and	Pearson.	<b>Q</b>		y: Principles and Modern Applicatio	ons, latest edition			
online materials		dahl; Zumdahl: Chemistry, latest edition, Cengage.						
online materials Additional Course Information			HEM1042 General Chemistry	<u>'</u>				

CHEM1042	General chemistry I (6 credits)	Academic Year	2021
Offering Department	Chemistry	Quota	450
Course Co-ordinator	Dr A P L Tong, Chemistry (apltong@hku.hk)		
Teachers Involved	(Dr A P L Tong, Chemistry)		

reading and online materials			Principles, latest edition, Cengage atral Science, latest edition, Pearson.	Brown; LeMay; Bursten;	Murphy; Woodward		
•	Pearson.	•	,		•		
Required/recommended		Herring; Madura; B	issonnette: General Chemistry: Prin				
	Test	ry reports		25 15	CLO 1,2,3,4,5,6 CLO 1,2,3,5,6		
	Examina			60	CLO 1,2,3,5,6		
	_			-	to CLO Mapping		
and Weighting	wellous	•	Details	course grade (%)	Methods		
Assessment Methods	Methods	/ Self study	Details	Weighting in final	Assessment		
	Tutorials				6 100		
	Laborato	•			24		
& Learning Activities	Lectures				24		
Course Teaching	Activitie		Details		No. of Hours		
Course Type	Lecture v	vith laboratory compo	onent course				
ntensive Course							
Communication-	N	ineffective lab skills and	d techniques. Organization and presentational	skills are minimally effective or ine	ffective.		
		and coherent thinking.	Show very little or no ability to apply knowle	dge to solve problems. Demonstr	ate minimally effective of		
	Fail	Demonstrate little or no	o evidence of command of knowledge and skill grasp of the knowledge and understanding of				
		presentational skills.		,	•		
		coherent and logical ti	hinking, but with limited analytical and critical te partially effective lab skills and technique	abilities. Show limited ability to a	apply knowledge to solv		
	D		it limited command of knowledge and skills re ed grasp, with retention of some relevant in				
		Apply moderately effect	tive organizational and presentational skills.				
		outcomes. Show gene	ral but incomplete grasp of the subject. Demo- pility to apply knowledge to most familiar situa	nstrate evidence of some analytications. Show moderately effective	al and critical abilities an		
	С	effective organizational and presentational skills.  C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning					
		thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Show effective lab skills and techniques. App					
	В	learning outcomes. Sh	low substantial grasp of the subject. Demons	trate evidence of analytical and ci	ritical abilities and logic		
	В		ly effective organizational and presentational s al command of a broad range of knowledge		least most of the cours		
(Artor)	learning outcomes. Show thorough grasp of the subject. Demonstrate strong analytical and critical abilities and logical thinking, with ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Show highly effective lab skills and tabilities. A sale highly effective graspitational code and the sale of the sal						
Grade Descriptors (A+ to F)	Α		mastery at an advanced level of extensive ow thorough grasp of the subject. Demonstra				
Offer in 2021 - 2022			ffer in 2022 - 2023 : Y	Examination			
combinations)		•					
and Impermissible	Chemistr		tany level i Onemiany course (exc	Special Officiality () of above	vo or arry equivaler		
Pre-requisites (and Co-requisites			hemistry or equivalent or a pass in Con any level 1 Chemistry course (exc		ve or anv equivale		
Dro roquicitos		veryday life r abovo in HKDSE C	homistry or orginal ont on a need in O	⊔⊏M1041			
	CLO 6 d	CLO 5 organize and present chemical ideas in a clear, logical and coherent way CLO 6 demonstrate awareness and appreciation of the relevant applications of chemistry in society and in					
			uate the experimental data chemical ideas in a clear, logical and	coherent way			
			operiments with proper procedures, i	ecord experimental oberse	rvations accurately		
	р	redictions and ration	alize trends				
			d concepts introduced in the course	to solve problems, perform	calculations, mak		
			ge and understanding in relation to th including acid-base equilibria	ermodynamics and kinetics	of reactions as we		
	С	oncepts of chemical	bonding and their relationships with tl	ne bulk properties of matter			
Outcomes		•	knowledge and understanding of the		tomic structure and		
Course Learning		-	acid-base properties of salt solutions; his course, students should be able to		แแสแบบร.		
			a in solutions of weak acids and in				
	5. Acid-B	ase equilibria					
	mechanis		ao iawa. umorenilai anu ililegialeu la	iio iawo, ioniperature and R	Sastion rate, reaction		
	Heat and	work; the first law o	of thermodynamics; heat of reactions ate laws: differential and integrated ra	; spontaneity of changes. F ite laws: temperature and re	ceaction rate; tactor		
		etics and kinetics of r					
		· ·	metallic bond. Covalent bonds and n	nolecular structures (VSEPF	R, VB theory).		
		cal bonding and stru	* •	iaan, ionization energies, ai	ia diconori aminites		
			of the atom; quantum numbers, enerons; periodic trends: atomic radii, ionic				
			d matter; Planck's quantum theory				
		the quantum world	and order of the control of the order of the	mount nguroo.			
			ure; atomic structure and subatomic uncertainty in measurement and sign		ot and stotchiometry		
& Topics			I changes and chemical properties;				
Course Contents		stry: its nature and m			_		
		udies in Chemistry.	у				
			uipped with a good foundation of th				
			hands-on training of basic laborate ation and characterization of chemical				

CHEM1043	General chemistry II (6 credits)	Academic Year	2021
Offering Department	Chemistry	Quota	280
Course Co-ordinator	Dr A P L Tong, Chemistry (apltong@hku.hk)		

Teachers Involved	`	Tong,Chemistry) Phillips,Chemistry)				
Course Objectives	This cou important course p chemistry	rse is a continuation to fundamentals of charged repares students to /.	on of CHEM1042 General Chemi nemistry that underlie many topic pursue a major in chemistry or	s and principles across the phy	sical sciences. The	
Course Contents & Topics	<ol> <li>Gases</li> <li>Simple gas laws; ideal gas equation; gases in chemical reactions; mixture of gases; kinetic-molecular theory of gases; diffusion and effusion; non-ideal gases.</li> <li>Structure and Bonding: The Delocalized Approach: Molecular Orbital Theory</li> </ol>					
	Bonding some sim	in homonuclear and	heteronuclear diatomic molecules ecules; bonding in metals (band th	s of first and second period of e	elements; bonding ir	
	gases; va	apor pressures of s	cular forces and the solution proce colutions; osmotic pressure; freez tions of electrolytes; colloidal mixto p Equilibria	ing-point depression and boilir		
	Solubility limitation analysis.	product constant; s of the Ksp concep	relationship between solubility and pH;			
	A quick r energy cl		nd the second & third laws of therr m; coupled reactions.	nodynamics. Standard Gibbs er	nergy change; Gibbs	
	functions	of concentrations; b	eir measurement; standard electro patteries; corrosion; electrolysis; in	dustrial electrolysis processes.	and K; Ecell as a	
Course Learning Outcomes			this course, students should be ab edge and understanding of the pr		and apply gas laws	
	CLO 2 d	nd kinetic-molecular emonstrate a know	theory to processes involving gas ledge and understanding in relati	ses	,	
			a, and also electrochemistry tal theory to explain the formation	and properties of diatomic mo	olecules of first and	
	s	econd period of elen	nents and of some simple polyator	mic molecules		
	CLO 4 demonstrate a knowledge and understanding of the relationship between free energy and spontaneity of reaction					
	CLO 5 apply the theories and concepts introduced in the course to solve problems, perform calculations, make					
	predictions and rationalize trends CLO 6 organize and present chemical ideas in a clear, logical and coherent way					
	CLO 7 demonstrate awareness of the relevant applications of chemistry in society and in everyday life					
Pre-requisites	Pass in C	CHEM1042; and			,	
(and Co-requisites and Impermissible combinations)	Not for st	udents in 2014-15 c	ohort or before having taken CHE	M2541.		
Offer in 2021 - 2022			Offer in 2022 - 2023 : Y	Examination		
Grade Descriptors (A+ to F)	Α	learning outcomes. Si	<ul> <li>mastery at an advanced level of exten how thorough grasp of the subject. Demor owledge to a wide range of complex, famil lls.</li> </ul>	nstrate strong analytical and critical abil	lities and logical thinking,	
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show substantial grasp of the subject. Demonstrate evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.				
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show general but incomplete grasp of the subject. Demonstrate evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	D	·				
	Fail	Demonstrate little or ne evidence of little or no	to evidence of command of knowledge and o grasp of the knowledge and understand . Show very little or no ability to apply know	I skills required for attaining the course ing of the subject. Lack of analytical ar	nd critical abilities, logical	
Communication- intensive Course	N					
Course Type Course Teaching	Lecture-b	ased course	Details		No. of Hours	
& Learning Activities	Lectures		Dotain		36	
	Tutorials				12	
Assessment Methods and Weighting	Methods	/ Self study	Details	Weighting in final course grade (%)	Assessment Methods	
	Assignm	ents		25	to CLO Mapping CLO 1,2,3,4,5,6,7	
	Examina			60	CLO 1,2,3,4,5,6,7	
	Test		N	15	CLO 1,2,3,4,5,6,7	
Required/recommended reading and online materials	Pearson.		Bissonnette: General Chemistry:			

CHEM1044	Mathematics in chemistry (6 credits)	Academic Year	2021
Offering Department	Chemistry	Quota	80

Course Co-ordinator	Dr A M Y Yuen, Chemistry (maiyan @hku.hk)						
Teachers Involved	(Dr A M Y Yuen,Chemistry) (Dr J Yang,Chemistry) (Dr. J Z Liu,Chemistry)						
Course Objectives	Mathematical calculations are necessary to explore important concepts in chemistry. This course aims to equip students with a basic knowledge of some of the mathematics that will be used in courses covered in the Chemistry-major curriculum to enable them to apply the mathematical skills to problems in chemistry. Students taking this course are expected to already have achieved level 2 or above in Module 1 or Module 2 of HKDSE Mathematics or equivalent, or a pass in MATH1011 University Mathematics I. As far as possible, the mathematical concepts covered in this course will be put in the context of chemical problems.						
Course Contents & Topics	Applying mathematical tools, such as Algebra, Trigonometry, Calculus, Complex number, Vector, Matrix, Linear equation, Differential equation, in solving chemistry problems.						
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 demonstrate knowledge and understanding of the essential mathematics used in chemistry  CLO 2 apply mathematical skills to solve basic problems in chemistry  CLO 3 be more capable of coping with a higher level of mathematics required in relevant courses for chemistry						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Level 2	major, in particular, in physical chemistry courses  Pass in CHEM1042 or already enrolled in this course; and Level 2 or above in Module 1 or Module 2 of HKDSE Mathematics or equivalent, or Pass in MATH1011 or SCNC1111					
Offer in 2021 - 2022	Y 2r	nd sem Offer in 2	022 - 2023 : Y	Examination	n May		
Grade Descriptors (A+ to F)	A Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.						
	В	Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.					
	С	but with some ina	Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.				
	D	Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.  Demonstrates poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not					
	Fail	being able to compl		to being able to identify appropriate theorems to	or their applications, or not		
Communication- intensive Course	N						
Course Type	Lecture-	based course					
Course Teaching	Activiti	es	Details	Details			
& Learning Activities	Lecture	S					
	Tutorial	S					
	Reading	g / Self study					
Assessment Methods and Weighting	Method	ls	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignn	nents		20	CLO 1,2,3		
	Examin	ation		50	CLO 1,2,3		
	Test		mid-term test	30	CLO 1,2,3		
Required/recommended reading and online materials			ockett: Maths for Chemists, 2n ry Maths Book, 2nd Edition, O				

CHEM2041	Principles of chemistry (6 credits)	Academic Year	2021				
Offering Department	Chemistry	Quota	140				
Course Co-ordinator	Dr I K Chu, Chemistry (ivankchu@hku.hk)						
Teachers Involved							
Course Objectives	This course is designed for non-chemistry major students covering basic principles of chemistry.						
Course Contents & Topics	Gas Laws and the Kinetic Theory of Gases Thermodynamics: work, heat, the zeroth and first law of thermodynamic capacities, thermochemistry, Hess's Law, Kirchhoff's Law, the second and the Gibbs free energy, spontaneity, equilibrium, coupled reaction; Transport Phenomena: diffusion, viscosity of gases, diffusion in liquids and viscond Kinetics: rate of reactions, orders of reactions, rate laws, measurement of reaction rates, enzyme kinetics, enzyme inhibition, temperate Chemical Equilibrium; Equilibria in single-, and two component systems: phase transitions, phase dipotential; liquid/liquid systems; Introduction to acids and bases: calculation on concentration of different chand polyprotic acids, activity; Introduction to Spectroscopy: UV/Visible absorption spectroscopy, Beei identification of functional groups; NMR Spectroscopy, Larmor frequency & coupling multiplicities; Mass Spectrometry, isotopic distribution, determination	cs, internal energy, ird laws of thermody cosity of liquids, ion reaction mechanism re effect on rates; agrams and the phatemical species in a r-Lambert Law; IR hemical shift, peak i	rnamics, entropic conduction; n, experimenta se rule, chemic solution, diprot Spectroscopy ntegral, spin-sp				
Course Learning Outcomes  Pre-requisites (and Co-requisites	On successful completion of this course, students should be able to:  CLO 1 explain the principles of the thermochemistry, chemical kinetics, cher of solutions and gases  CLO 2 explain the principles of the spectroscopy, and spectrometry  Pass in CHEM1042; and  Not for students who have passed in CHEM2341, or have already enrolled in the students who have passed in CHEM2341, or have already enrolled in the students who have passed in CHEM2341.	his course; and	ysical propertie				
and Impermissible combinations)	Not for students who have passed in CHEM2441, or have already enrolled in the Not for students who have passed in CHEM2541, or have already enrolled in Not for Chemistry major students.		T				

Offer in 2021 - 2022	N Off	fer in 2022 - 2023 : N		Examination		
Grade Descriptors (A+ to F)	A	chemistry, instrumentations and applications of spectrometry and spectroscopy for chemical analysis. Show strong ability to apply and integrate knowledge and theory, and strong ability to analyze problems related to general chemistry and spectroscopy.				
	В	Demonstrate substantial command of knowledge and understanding of essential facts, concepts, principles and theories relating to the modern chemistry, instrumentations and applications of spectrometry and spectroscopy for chemical analysis. Show evidence to apply and integrate knowledge and theory, and ability to analyze problems related to general chemistry and spectroscopy.				
	С	Demonstrate general but incomplete command of knowledge and understanding of essential facts, concepts, principles and theories relating to the modern chemistry, instrumentations and applications of spectrometry and spectroscopy for chemical analysis. Show evidence of some abilities to apply and integrate knowledge and theory, and to analyze problems to most familiar situations to general chemistry and spectroscopy.				
	D	Demonstrate partial but limited command of knowledge and understanding of essential facts, concepts, principles and theories relating to the modern chemistry, instrumentations and applications of spectrometry and spectroscopy for chemical analysis. Show evidence of limited abilities to apply and integrate knowledge and theory, and limited ability to analyze problems to most familiar situations related to general chemistry and spectroscopy.				
	Fail	theories relating to the ranalysis. Show little or n	modern chemistry, instrumentation	edge and understanding of essential facts, ns and applications of spectrometry and si nd integrate knowledge and theory, and littl nistry and spectroscopy.	pectroscopy for chemical	
Communication- intensive Course	N					
Course Type	Lecture-b	ased course				
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials				12	
	Reading	/ Self study			100	
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignm	ents		25	CLO 1,2	
	Examina	tion		75	CLO 1,2	
Required/recommended reading and online materials	Spectroso	copy for the biological	science, by Gordon G. Ham	nmes, Wiley-Interscience (2005)		

CHEM2241	Analytic	al chemistry I (6 cı	redits)		Academic Year	2021		
Offering Department	Chemistry	,	•		Quota	120		
Course Co-ordinator	Dr I K Chu	u (1st sem); Dr E C M T	Tse (2nd sem);, Chemistry (	ivankchu@hku.hk; e	ecmtse @hku.hk)			
Teachers Involved	(Dr E C M	Tse,Chemistry)	, , , , , , , , , , , , , , , , , , , ,		,			
	(Dr I K Ch	u,Chemistry)						
Course Objectives	The course aims to introduce the basic principles of chemical analysis. The principles of chemical measurement including error analysis, quality assurance and calibration, data acquisition and processing, will be discussed wit reference to methods of chemical analysis that are based on chemical equilibrium and stoichiometric reactions. The laboratory classes will include experiments demonstrating modern approaches of data acquisition and processing as well as chemical analysis based on chemical equilibrium.							
Course Contents	Measuren	Measurement: analog and digital measurement, accuracy and precision, comparing means and deviation						
& Topics	calibration	n curves and least squa	are method for linear plots					
	Chemical	•	analytical procedures nical analysis: aqueous solu y, precipitation reactivity	ution and chemical	equilibrium; analy	rsis by acid-bas		
Course Learning	On succes	ssful completion of this	course, students should be	able to:				
Outcomes	CLO 1 e	xplain the basic princip	oles of chemical measureme	ents				
	CLO 2 e	explain the principles of	classical methods of chemi	cal analysis such as	acid-base neutra	lization		
	CLO 3 u	se laboratory apparatu	s for chemical analysis	•				
•			s admitted in 2014-15 or bef		- /for studouts!	m:Had in 2015 1		
(and Co-requisites and Impermissible combinations)	Pass in C or thereaf	HEM1042; and Pass inter)	n CHEM1043, or already er					
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022	Pass in C or thereaf	HEM1042; and Pass inter) sem 2nd sem Offe	n CHEM1043, or already er r in 2022 - 2023 : Y	nrolled in this course	Examination	Dec May		
Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)	Pass in C or thereaf	HEM1042; and Pass inter)  sem 2nd sem Offe  Demonstrate thorough graability to apply knowledge	r in 2022 - 2023 : Y asp of the subject. Show evidence to a wide range of complex, famil	nrolled in this course e of strong analytical abil liar and unfamiliar situati	Examination ities, logical and indepons. Demonstrate high	Dec May pendent thinking, and		
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Pass in C or thereaf	ter)  sem 2nd sem Offe  Demonstrate thorough graability to apply knowledge and techniques and critica organization and presenta Demonstrate substantial independent thinking, and	r in 2022 - 2023 : Y asp of the subject. Show evidence to a wide range of complex, famil	nrolled in this course of strong analytical abil liar and unfamiliar situati appropriate and insightfu ence of analytical abilitie lilar and some unfamiliar	Examination ities, logical and indepons. Demonstrate high all conclusions. Demonses and logical thinking situations. Demonstra	Dec May pendent thinking, an nly proficient lab skill strate highly effectiv g, some evidence of te proficient lab skill		
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Pass in C or thereaft  Y 1st	sem 2nd sem Offe Demonstrate thorough gra ability to apply knowledge and techniques and critica organization and presenta Demonstrate substantial independent thinking, and and techniques and corre presentation skills. Demonstrate general but evidence of independent ti techniques and mostly or	r in 2022 - 2023 : Y asp of the subject. Show evidence e to a wide range of complex, fami al use of data and results to draw tion skills. grasp of the subject. Show evide ability to apply knowledge to fami ect use of data and results to draw incomplete grasp of the subject. S hinking, and ability to apply knowle orrect but some erroneous use o	e of strong analytical abililiar and unfamiliar situation appropriate and insightful appropriate and insightful and some unfamiliar with appropriate conclusion.  Show evidence of some addge to most familiar situation and some appropriate conclusion.	Examination ities, logical and indepons. Demonstrate high al conclusions. Demonstrate as and logical thinking situations. Demonstrates. Demonstrate effect analytical abilities and ations. Demonstrate at	Dec May bendent thinking, and hip proficient lab skill strate highly effective, g, some evidence of the proficient lab skill tive organization and logical thinking, little dequate lab skills and		
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Pass in C or thereaft  Y 1st  A	sem 2nd sem Offe Demonstrate thorough graability to apply knowledge and techniques and critics organization and presenta Demonstrate substantial independent thinking, and and techniques and correpresentation skills. Demonstrate general but evidence of independent techniques and mostly of techniques and mostly of moderately effective organ Demonstrate partial but lianalytical abilities, little of Demonstrate partially effective organ demonstrate partially effective organitations.	r in 2022 - 2023 : Y asp of the subject. Show evidence to a wide range of complex, famil al use of data and results to draw tion skills. grasp of the subject. Show evide ability to apply knowledge to famil ect use of data and results to draw incomplete grasp of the subject. Shinking, and ability to apply knowle	e of strong analytical abilities and unfamiliar situation appropriate and insightful appropriate and insightful and some unfamiliar with appropriate conclusion. Show evidence of some adde to most familiar situation and insight and limited abilities and limited ability to use of some relevant information, and limited ability to use of some relevant information.	Examination ities, logical and indepons. Demonstrate high all conclusions. Demonstrate and logical thinking situations. Demonstrate effect analytical abilities and ations. Demonstrate arraw appropriate conclusion of the subject. Show yo to apply knowledges edata and results	Dec May  pendent thinking, an hly proficient lab skill strate highly effectiv g, some evidence of the proficient lab skill tive organization an logical thinking, littl dequate lab skills an usions. Demonstrate of evidence of limitee to solve problems		
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Pass in C or thereaft  Y 1st  A  B	HEM1042; and Pass in ter)  sem 2nd sem Offe  Demonstrate thorough graabiliity to apply knowledge and techniques and critica organization and presental Demonstrate substantial independent thinking, and and techniques and correpresentation skills.  Demonstrate general but evidence of independent the techniques and mostly comoderately effective organ Demonstrate partial but lianalytical abilities, little on Demonstrate partially effeconclusions. Demonstrate Demonstrate partially effeconclusions. Demonstrate Demonstrate partially effective or inefinimimally effective or inefinimimally effective or inefinimimally effective or inefinimalismally effective or inefinity.	r in 2022 - 2023 : Y  asp of the subject. Show evidence to a wide range of complex, famil al use of data and results to draw tion skills.  grasp of the subject. Show evide ability to apply knowledge to fami ct use of data and results to draw incomplete grasp of the subject. Shinking, and ability to apply knowle orrect but some erroneous use o nization and presentation skills.  imited grasp, with retention of so or no evidence of independent th ective lab skills and techniques	e of strong analytical abiliar and unfamiliar situation appropriate and insightful appropriate and insightful appropriate and insightful appropriate conclusions appropriate conclusions appropriate conclusions appropriate conclusions appropriate conclusions appropriate conclusions appropriate conclusions appropriate conclusions appropriate a	Examination ities, logical and indepons. Demonstrate high all conclusions. Demonstrate and logical thinking situations. Demonstrate effect analytical abilities and ations. Demonstrate arraw appropriate conclusion of the subject. Show yo to apply knowledge se data and results ills.	Dec May pendent thinking, and ly proficient lab skill strate highly effective g, some evidence of the proficient lab skill titve organization and logical thinking, little dequate lab skills and usions. Demonstrate we evidence of limitede to solve problems to draw appropriate vidence of analytica billems. Demonstrate vidence of analytica billems. Demonstrate		
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)	Pass in C or thereaff  Y 1st  A  B  C	HEM1042; and Pass in ter)  sem 2nd sem Offe  Demonstrate thorough graabiliity to apply knowledge and techniques and critica organization and presental Demonstrate substantial independent thinking, and and techniques and correpresentation skills.  Demonstrate general but evidence of independent the techniques and mostly comoderately effective organ Demonstrate partial but lianalytical abilities, little on Demonstrate partially effeconclusions. Demonstrate Demonstrate partially effeconclusions. Demonstrate Demonstrate partially effective or inefinimimally effective or inefinimimally effective or inefinimimally effective or inefinimalismally effective or inefinity.	or in 2022 - 2023 : Y  asp of the subject. Show evidence to a wide range of complex, fami al use of data and results to draw tion skills. grasp of the subject. Show evide ability to apply knowledge to fami act use of data and results to draw incomplete grasp of the subject. Shinking, and ability to apply knowle orrect but some erroneous use o nization and presentation skills. imited grasp, with retention of so or no evidence of independent th ective lab skills and techniques limited or barely effective organiza grasp of the knowledge and unde pendent thinking, and very little of ffective lab skills and techniques ffective lab skills and techniques	e of strong analytical abiliar and unfamiliar situation appropriate and insightful appropriate and insightful appropriate and insightful appropriate conclusions appropriate conclusions appropriate conclusions appropriate conclusions appropriate conclusions appropriate conclusions appropriate conclusions appropriate conclusions appropriate a	Examination ities, logical and indepons. Demonstrate high all conclusions. Demonstrate and logical thinking situations. Demonstrate effect analytical abilities and ations. Demonstrate arraw appropriate conclusion of the subject. Show yo to apply knowledge se data and results ills.	Dec May pendent thinking, and ly proficient lab skills strate highly effective g, some evidence of the proficient lab skills titve organization and logical thinking, little dequate lab skills and usions. Demonstrate v evidence of limited to draw appropriate vidence of analytical billems. Demonstrate billems. Demonstrate		
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)	Pass in C or thereaff  Y 1st  A  B  C  D	HEM1042; and Pass in ter)  sem 2nd sem Offe  Demonstrate thorough graabiliity to apply knowledge and techniques and critica organization and presental Demonstrate substantial independent thinking, and and techniques and correpresentation skills.  Demonstrate general but evidence of independent the techniques and mostly comoderately effective organ Demonstrate partial but lianalytical abilities, little on Demonstrate partially effeconclusions. Demonstrate Demonstrate partially effeconclusions. Demonstrate Demonstrate partially effective or inefinimimally effective or inefinimimally effective or inefinimimally effective or inefinimalismally effective or inefinity.	r in 2022 - 2023 : Y  asp of the subject. Show evidence to a wide range of complex, fami al use of data and results to draw tion skills. grasp of the subject. Show evide ability to apply knowledge to fami act use of data and results to draw incomplete grasp of the subject. Shinking, and ability to apply knowled incomplete grasp of the subject. Shinking, and ability to apply knowled crect but some erroneous use o nization and presentation skills. imited grasp, with retention of so or no evidence of independent the complete lab skills and techniques limited or barely effective organize grasp of the knowledge and unde pendent thinking, and very little of ffective lab skills and techniques a incoherent organization and poor	e of strong analytical abiliar and unfamiliar situation appropriate and insightful appropriate and insightful appropriate and insightful appropriate conclusions appropriate conclusions appropriate conclusions appropriate conclusions appropriate conclusions appropriate conclusions appropriate conclusions appropriate conclusions appropriate a	Examination ities, logical and indepons. Demonstrate high all conclusions. Demonstrate and logical thinking situations. Demonstrate effect analytical abilities and ations. Demonstrate arraw appropriate conclusion of the subject. Show yo to apply knowledge se data and results ills.	Dec May pendent thinking, and ly proficient lab skills strate highly effective g, some evidence of the proficient lab skills titve organization and logical thinking, little dequate lab skills and usions. Demonstrate v evidence of limited to draw appropriate vidence of analytical billems. Demonstrate billems. Demonstrate		
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Pass in C or thereaff  Y 1st  A  B  C  D	sem 2nd sem Offe Demonstrate thorough gra ability to apply knowledge and techniques and critice organization and presenta Demonstrate substantial independent thinking, and and techniques and corre presentation skills. Demonstrate general but evidence of independent t techniques and mostly comoderately effective organ Demonstrate partial but li analytical abilities, little of conclusions. Demonstrate Demonstrate little or no abilities, logical and inde minimally effective or iner conclusions. Demonstrate	r in 2022 - 2023 : Y  asp of the subject. Show evidence to a wide range of complex, fami al use of data and results to draw tion skills. grasp of the subject. Show evide ability to apply knowledge to fami act use of data and results to draw incomplete grasp of the subject. Shinking, and ability to apply knowled incomplete grasp of the subject. Shinking, and ability to apply knowled crect but some erroneous use o nization and presentation skills. imited grasp, with retention of so or no evidence of independent the complete lab skills and techniques limited or barely effective organize grasp of the knowledge and unde pendent thinking, and very little of ffective lab skills and techniques a incoherent organization and poor	e of strong analytical abiliar and unfamiliar situation appropriate and insightful appropriate and insightful appropriate and insightful appropriate conclusion. Show evidence of some added to most familiar situation and imited ability to unation, and limited ability to unation and presentation skierstanding of the subjection on ability to apply known and misuse of data and misuse of data and misuse of data and misuse of data and ability to apply known and misuse of data and misuse of data and and misuse of data and and misuse of data and and unisuse of data and and misuse of data and and misuse of data and and misuse of data and and unisuse of data and and misuse of data and misuse of dat	Examination ities, logical and indepons. Demonstrate high all conclusions. Demonstrate and logical thinking situations. Demonstrate effect analytical abilities and ations. Demonstrate arraw appropriate conclusion of the subject. Show yo to apply knowledge se data and results ills.	Dec May pendent thinking, and ly proficient lab skill strate highly effective g, some evidence of the proficient lab skill titve organization and logical thinking, little dequate lab skills and usions. Demonstrate we evidence of limitede to solve problems to draw appropriate vidence of analytica billems. Demonstrate vidence of analytica billems. Demonstrate		

	Laboratory			24
	Tutorials			6
	Reading / Self study			100
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments		10	CLO 1,2
	Examination		50	CLO 1,2
	Laboratory reports		20	CLO 3
	Test		20	CLO 1,2
Required/recommended reading and online materials	Skoog, West, Holler and Crouch, "	Fundamentals of Analytical C	Chemistry", latest edition, Cenga	ige Learning
Additional Course Information	Laboratory classes are mandatory course.	v. Students must complete A	LL experiments and laboratory	reports to pass this

CHEM2341	Inorgan	iic chemistry I (6 credits) Academic Yea	r 2021					
Offering Department	Chemistr		120					
Course Co-ordinator	Dr H Y A	u Yeung, Chemistry <i>(hoyuay@hku.hk)</i>						
Teachers Involved	(Dr A M \ (Dr H Y A	(Dr A M Y Yuen,Chemistry) (Dr H Y Au Yeung,Chemistry) (Prof H Z Sun,Chemistry)						
Course Objectives	to biologi	To provide students with the basic principles and knowledge of inorganic chemistry and to introduce their relevance to biological processes and materials science. This course provides the foundation for further studies in inorganic chemistry.						
Course Contents & Topics	absorptio substitution	Acid-base concept; structure and bonding of transition metal complexes and main group compounds; electronic absorption and magnetic properties of metal complexes; chemical reactions of metal complexes: redox and substitution; chemistry of selected main group elements and transition metal complexes and their relevance to biology and materials.						
Course Learning Outcomes	CLO 1 u	essful completion of this course, students should be able to:  nderstand the basic principles and concepts of inorganic chemistry and appreciate elected examples of biological processes and materials science emonstrate knowledge and understanding of the acid-base concept and definition	their relevance to					
	CLO 3 d tr tr tr CLO 4 d tr	emonstrate knowledge and understanding of the structure and bonding of main group ansition metal complexes and their relevance to the electronic absorption and magransition metal complexes emonstrate knowledge and understanding of the thermodynamic stability of metal complete thermodynamic and kinetic aspects of substitution and redox reactions emonstrate knowledge and understanding of the role of main group elements and complexes in bioinorganic chemistry	netic properties o					
Pre-requisites (and Co-requisites and Impermissible combinations)	students Pass in 0 passed in	CHEM1042; and NOT for students who have passed in CHEM2041, or already enrolled admitted in 2014-15 or before); CHEM1042; and Pass in CHEM1043, or already enrolled in this course; and NOT for some CHEM2041, or already enrolled in this course (for students admitted in 2015-16 or the	tudents who hav					
Offer in 2021 - 2022	Y 1st	t sem 2nd sem Offer in 2022 - 2023 : Y Examination	Dec May					
Offer in 2021 - 2022 Grade Descriptors (A+ to F)	В	Demonstrate thorough knowledge and understanding of essential facts, concepts, principles, and theoric foundation knowledge of inorganic chemistry, especially those related to acid-base concept; structure and compounds and metal complexes; electronic absorption spectroscopy, magnetic properties as well as ther aspects of metal complexes and their reactions; and their relevance to biological processes and materials ability to apply and integrate knowledge and theory rell ting to the basic foundation knowledge of inorg strong ability to analyze novel problems and critical use of data and experimental results to draw approaches on the same properties of the same properties and knowledge of inorganic chemistry. Demonstrate highly eff skills and techniques, especially in the synthesis and characterization of inorganic compounds and metal complexes and their dessential facts, concepts, principle to the basic foundation knowledge of inorganic chemistry, especially those related to acid-base concept; smain group compounds and metal complexes; electronic absorption spectroscopy, magnetic properties of metal complexes and their reactions; and their relevance to bic materials science. Show evidence to apply and integrate knowledge and theory relating to the basic foinorganic chemistry. Show evidence to analyze novel problems and correct use of data and experin appropriate conclusions relating to the basic principles and knowledge of inorganic chemistry. Demo	bonding of main grou modynamic and kinetis science. Show stronganic chemistry. Show ropriate and insightfuective basic laborator omplexes. s, and theories relatin ructure and bonding coperties as well as logical processes and undation knowledge chental results to drawnstrate effective basis					
	С	laboratory skills and techniques, especially in the synthesis and characterization of inorganic compounds at Demonstrate general but incomplete command of knowledge and understanding of essential facts, con theories relating to the basic foundation knowledge of inorganic chemistry, especially those related structure and bonding of main group compounds and metal complexes; electronic absorption spectroscop as well as thermodynamic and kinetic aspects of metal complexes and their reactions; and their neprocesses and materials science. Show evidence of some abilities to apply and integrate knowledge and basic foundation knowledge of inorganic chemistry. Show ability to analyze problems to most familiar correct but erroneous use of data and experimental results to draw appropriate conclusions relating to the knowledge of inorganic chemistry. Demonstrate moderately effective basic laboratory skills and technic synthesis and characterization of inorganic compounds and metal complexes.	ncepts, principles, and to acid-base concept by, magnetic propertie elevance to biologica d theory relating to the situations and mostly the basic principles and					
	D	Demonstrate partial but limited command of knowledge and understanding of essential facts, concepts, prelating to the basic foundation knowledge of inorganic chemistry, especially those related to acid-base bonding of main group compounds and metal complexes; electronic absorption spectroscopy, magnetic thermodynamic and kinetic aspects of metal complexes and their reactions; and their relevance to bic materials science. Show evidence of limited abilities to apply and integrate knowledge and theory relating knowledge of inorganic chemistry. Show limited ability to analyze problems to most familiar situations erroneous use of data and experimental results to draw appropriate conclusions relating to the basic princ inorganic chemistry. Demonstrate partially effective basic laboratory skills and techniques, especially characterization of inorganic compounds and metal complexes.	concept; structure an properties as well a logical processes and to the basic foundation and mostly correct buildles and knowledge of					
	Fail	Demonstrate little or no evidence of command of knowledge and understanding of essential facts, con theories relating to the basic foundation knowledge of inorganic chemistry, especially those related structure and bonding of main group compounds and metal complexes, electronic absorption spectroscop as well as thermodynamic and kinetic aspects of metal complexes and their reactions; and their reprocesses and materials science. Show little or no evidence of abilities to apply and integrate knowledge the basic foundation knowledge of inorganic chemistry. Show little or no ability to analyze problems to rand erroneous use of data and experimental results to draw appropriate conclusions relating to the knowledge of inorganic chemistry. Demonstrate minimally effective basic laboratory skills and technic synthesis and characterization of inorganic compounds and metal complexes.	to acid-base concept by, magnetic propertie elevance to biological and theory relating to most familiar situation basic principles and					

Communication- intensive Course	N							
Course Type	Lecture with laboratory componer	Lecture with laboratory component course						
Course Teaching	Activities Details			No. of Hours				
& Learning Activities	Lectures			24				
	Laboratory			24				
	Tutorials			6				
	Reading / Self study			100				
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping				
	Assignments		15	CLO 1,2,3,4,5				
	Examination		50	CLO 1,2,3,4,5				
	Laboratory reports		15	CLO 1,2,3,4,5				
	Test		20	CLO 1,2,3,4,5				
Required/recommended reading and online materials	F. A. Cotton; G. Wilkinson; P. L. Gaus: Basic Inorganic Chemistry (John Wiley & Sons, 1995, 3rd ed.) P. Atkins, T. Overton, J. Rourke, M. Weller and F. Armstrong: Shriver & Atkins Inorganic Chemistry (Oxford University Press, 2006, 4th ed.)							
Additional Course Information	Laboratory classes are mandator course.	y. Students must complete ALL ex	periments and laboratory	reports to pass this				

CHEM2441	Organic	chemistry I (6	credits)	Academic Ye	ear 2021		
Offering Department	Chemistr	у		Quota	200		
Course Co-ordinator	Prof P Ch	niu, Chemistry <i>(pcl</i>	niu @hku.hk)				
Teachers Involved	(Prof P C	hiu,Chemistry)					
Course Objectives	examples This cour	To provide students with the basic principles to understand the structure and reactivity of organic molecules, with examples illustrating the role of organic chemistry in daily life and industry.  This course serves as the first part of the complete program on fundamental organic chemistry, to be followed up by CHEM3441 Organic Chemistry II.					
Course Contents & Topics	Structure and bonding of organic compounds, three dimensional structures of organic molecules, conformational stereochemistry, chirality. Chemistry of alkanes, cycloalkanes, alkenes, alkynes, haloalkanes, dienes, aromatic compounds, alcohols, thiols, and ethers. Organometallic chemistry for organic synthesis. Principles of organic synthesis. Detailed considerations of reaction mechanisms.						
Course Learning	On succe	essful completion o	f this course, students should be able to:				
Outcomes	CLO 1 L	inderstand basic c	oncepts and employ the vocabulary of org	ganic chemistry			
	CLO 2 v	risualize and draw	three-dimensional, stereochemically corre	ect representations of orga	anic molecules		
	CLO 3 r	ecognize, discrimir	nate and name chiral stereoisomers and o	diastereomers			
	CLO 4 L	inderstand the rea	ctivity of the functional groups				
	CLO 5 L	ınderstand reactior	n mechanisms and apply mechanistic kno	wledge to solve chemistry	/ problems		
	CLO 6	apply reactions to t	he synthesis of target molecules				
	CLO 7	appreciate the relev	vance of organic chemistry in biological pr	rocesses and daily life			
Pre-requisites	Pass in C	CHEM1042; and N	OT for students who have passed in CHE	EM2041, or already enroll	ed in this course (fo		
and Co-requisites and Impermissible combinations)	Pass in C		5 or before); ass in CHEM1043, or already enrolled in ady enrolled in this course (for students a				
Offer in 2021 - 2022			Offer in 2022 - 2023 : Y	Examination			
Grade Descriptors (A+ to F)	Α	chemical properties and a strong abilit	ough mastery at an advanced level of knowledge a reactions and mechanisms of organic chemistry. y to analyze and solve novel organic chemistry	Show a strong ability to integrate problems. Demonstrate highly	te knowledge and theory		
	_		execution of lab skills and techniques in organic che		artaining to the chemic		
	B Demonstrate substantial command of knowledge and understanding of essential facts and concepts pertaining to the chemical properties, reactions and mechanisms of organic chemistry. Show evidence of ability to integrate knowledge and theory, and evidence of ability to analyze and solve novel organic chemistry problems. Demonstrate effective organization, understanding, and execution of lab skills and techniques in organic chemistry experiments.						
	С	Demonstrate a general but incomplete command of knowledge and understanding of essential facts and concepts pertaining to the chemical properties, reactions and mechanisms of organic chemistry. Show evidence of some ability to integrate knowledge and theory, and evidence of some ability to analyze novel problems. Show a mostly correct use of knowledge to solve most familiar problems. Demonstrate adequately effective organization, understanding, and execution of lab skills and techniques in organic chemistry experiments.					
	D	Demonstrate a partial but limited command of knowledge and understanding of essential facts and concepts pertaining to the chemical properties, reactions and mechanisms of organic chemistry. Show evidence of limited ability to integrate knowledge and theory, and a limited ability to analyze novel problems. Show some correct but also erroneous use of knowledge to solve most familiar problems. Demonstrate a partially effective organization, understanding and application of lab skills and techniques in organic chemistry experiments.					
	Fail	Demonstrate little or chemical properties, knowledge and theo	no evidence of command of knowledge and under reactions and mechanisms of organic chemistry, ry, and little or no ability to analyze novel problems rate minimal or no organization, understanding a	Show little or no evidence of abi . Show little or no evidence of ab	lity to apply and integra pility to solve most famili		
Communication- ntensive Course	N						
Course Type	Lecture-b	ased course					
Course Teaching	Activitie	s	Details		No. of Hours		
Learning Activities	Lectures						
	Tutorials						
		/ Self study			100		
ssessment Methods nd Weighting	Methods	-	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin		
	Assignm	ents	(Assignments and participation)	30	CLO 1,2,3,4,5,6,		
	Examina		(, i.e.,ge. and paradipation)	50	CLO 1,2,3,4,5,6		
	Test			20	CLO 1,2,3,4,5,6		
	d Organic Chemistry, by Paula Y. Bruice, 8th Global Edition, Chapters 1-12.						

reading and online materials	
Additional Course Information	This course will be conducted as a blended learning course, in which the teaching material will be delivered using videos, along with face-to-face and online tutorials.

CHEM2442	Fundan	nentals of organic	Academic Ye	ar 2021			
Offering Department	Chemistr	у		Quota	100		
Course Co-ordinator	Dr P H T	oy, Chemistry (phtoy@	hku.hk)				
Teachers Involved	(Dr P H 1	Dr P H Toy,Chemistry)					
Course Objectives	the conte	The major objective of this course is to give the students a basic understanding of organic chemistry, especially in the context of daily life. This will be achieved through the introduction of the chemistry of organic functional groups that form the basis of organic molecules. The concepts presented in the lectures will be reinforced by a series of aboratory experiments.					
Course Contents & Topics	carboxyli	The chemistry of organic functional groups such as alkenes, alkynes, alkyl halides, alcohols, aldehydes, ketones carboxylic acids and their derivatives, and amines will be discussed, as will the general concepts of molecula structure, conformation and stereochemistry.					
Course Learning	On succe	On successful completion of this course, students should be able to:					
Outcomes	CLO 1	demonstrate basic ur	nderstanding of the structure of	organic molecules			
	CLO 2	demonstrate basic ur	nderstanding of the reactivity of	organic molecules			
	CLO 3	appreciate how organ	nic chemistry plays an importan	t role in everyday life			
Pre-requisites (and Co-requisites and Impermissible combinations)		ass in CHEM1042; and ot for students who have passed CHEM2441, or have already enrolled in this course.					
Offer in 2021 - 2022	Y 1s	t sem Offer in 2022 -	2023 : Y	Examination	Dec		
Grade Descriptors (A+ to F)	A	all the course learning of		re organic chemistry knowledge, and sk critical abilities and logical thinking, v ex, familiar and unfamiliar problems.			
	B Demonstrate substantial command of organic chemistry with a broad range of knowledge, and skills required for attaining at leas most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar problems.						
	C Demonstrate general but incomplete command of organic chemistry knowledge, and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar problems.						
	D	Demonstrate partial but limited command of organic chemistry knowledge, and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems.					
	Fail  Demonstrate little or no evidence of command of organic chemistry knowledge, and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems.						
Communication- intensive Course	N						
Course Type		vith laboratory compone					
Course Teaching	Activitie		Details		No. of Hours		
& Learning Activities	Lectures				24		
	Laborato	,			20		
	Tutorials				5		
	Reading	/ Self study			100		
Assessment Methods and Weighting	Methods	5	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Examina	ition		60	CLO 1,2,3		
	Test		Test/Quiz	40	CLO 1,2,3		
Required/recommended reading and conline materials	Bruice, P	Y.Y.; Essential Organic (	Chemistry (Pearson, 2016, 3rd	edition)			
Additional Course Information	Laborato		ke CHEM3441 should take CHI ory. Students must complete A	EM2441. LL experiments and take a writt	en laboratory test i		

CHEM2443	Fundamentals of organic chemistry for pharmacy students (6 credits)	Academic Year	2021			
Offering Department	Chemistry	Quota	60			
Course Co-ordinator	Dr P H Toy, Chemistry (phtoy@hku.hk)					
Teachers Involved	(Dr P H Toy, Chemistry)					
Course Objectives	The major objective of this course is to give pharmacy students a basic understanding of organic chemistry, especially in the context of daily life. This will be achieved through the introduction of the chemistry of organic functional groups that form the basis of organic molecules. The concepts presented in the lectures will be reinforced by a series of laboratory experiments.					
Course Contents & Topics	The chemistry of organic functional groups such as alkenes, alkynes, alkyl halides, alcohols, aldehydes, ketones, carboxylic acids and their derivatives, and amines will discussed, as will the general concepts of molecular structure, conformation and stereochemistry.					
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 demonstrate basic understanding of structure of organic molecules					
	CLO 2 demonstrate basic understanding of the reactivity of organic molecules					
	CLO 3 appreciate how organic chemistry plays an important role in everyday life					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in CHEM1042; and Not for students who have passed CHEM2442, or already enrolled in this course. (This course is for BPharm students only)					
Offer in 2021 - 2022	N Offer in 2022 - 2023 : N	Examination				

Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive organic chemistry knowledge, and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar problems.					
	В					
	С					
	D	· ·				
	Fail		f analytical and critical abilities	ic chemistry knowledge, and skills required , logical and coherent thinking. Show very li		
Communication- intensive Course	N	<u> </u>				
Course Type	Lecture w	rith laboratory componen	nt course			
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures				24	
	Laboratory				20	
	Tutorials				5	
	Reading	/ Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Examina	tion		60	CLO 1,2,3	
	Test		Test/Quiz	40	CLO 1,2,3	
Required/recommended reading and online materials	Bruice, P.	Y.; Essential Organic Ch	nemistry (Pearson, 2016,	3rd edition)		
Additional Course Information	Laborator course.	y classes are mandator	y. Students must comple	ete ALL experiments and laboratory	reports to pass this	

CHEM2541	Introductory physical chemistry (6 credits)	Academic Year	2021			
Offering Department	Chemistry	Quota	100			
Course Co-ordinator	Dr J Y Tang, Chemistry (jinyao @hku.hk)					
eachers Involved	(Dr J Y Tang, Chemistry)					
Course Objectives	The course aims to provide a rigorous understanding of equilibrium thermodynamics and chemical kinetics Students are required to apply mathematical skills (derivations and integrations) and basic physics to understar chemical reactions and related processes. Topics include the three laws of thermodynamics, thermodynamic properties of mixtures, solutions, chemical equilibrium, electrochemistry, rates of chemical reactions and reaction dynamics. Students will gain a good foundation of knowledge and skills for further study in Physical Chemistry.					
Course Contents & Topics	Properties of Gases States of gases and the gas laws with applications.					
	The First Law of Thermodynamics Basic concepts of work, heat, energy, expansion work, heat transactions, enthalpy and adiabatic changes an examples in relation to biochemistry and materials science.					
	The Second and Third Laws of Thermodynamics Direction of spontaneous change, entropy and the Third Law of Thermodynamics.					
	Simple Mixtures Thermodynamic description of mixtures, partial molar quantities, and chemical potentials of liquids. Activities of solvent, solute, regular solutions and ions in solution.					
	Chemical Equilibrium Spontaneous chemical reactions, the Gibbs energy minimum and equilibrium. Response of equilibria to pressure temperature.					
	Electrochemistry Electrochemical cell, relationship of electrochemical potential to the electrochemistry in energy, material science, sensing.	ermodynamic functions.	Applications			
	Molecules in Motion Molecular motion in gases and liquids, kinetic model, collisions with suproperties, conductivities of electrolyte solutions.	urfaces, the rate of effusi	on and transp			
	Rates of Chemical Reactions Empirical chemical kinetics including experimental methods, rates temperature dependence of reactions and Reaction mechanism	of reactions, integrated	rate laws a			
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 demonstrate knowledge and understanding of the properties of of chemical reactions	<u> </u>	on and the rat			
	CLO 2 understand and demonstrate knowledge of the three laws of the CLO 3 understand and apply the concepts of chemical equilibrium at		ical equilibria			
	temperature and pressure	•				
	CLO 4 understand and demonstrate knowledge of electrochemistry an build electrochemical cell and calculate thermodynamic functions	s from electrochemical rea	ections			
	CLO 5 demonstrate knowledge and understanding of basic reaction dy how mechanism determines reaction rate law	namics including reaction	mechanism a			
Pre-requisites	Pass in CHEM1042; and NOT for students who have passed CHEM20	041, or already enrolled in	n this course			

(and Co-requisites and Impermissible combinations)	students admitted in 2014-15 or before); Pass in CHEM1042 and CHEM1043; and NOT for students who have passed CHEM2041, or already enrolled in this course (for students admitted in 2015-16 or thereafter)					
Offer in 2021 - 2022		nd sem Offer in 2022		,	amination	May
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show thorough grasp of the subject. Demonstrate strong analytical and critical abilities and logical thinking, with ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations.				
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show substantial grasp of the subject. Demonstrate evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations.				
	С	outcomes. Show general		wledge and skills required for a pject. Demonstrate evidence of so niliar situations.		
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show partial but limited grasp, with retention of some relevant information, of the subject. Demonstrate evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems.				
	Fail	·				
Communication- intensive Course	N	· ·		,		
Course Type	Lecture-l	based course				
Course Teaching	Activitie	es	Details			No. of Hours
& Learning Activities	Lectures	3				36
	Tutorials	3				12
	Reading	/ Self study				100
Assessment Methods and Weighting	Method	S	Details	Weighting course gra	ade (%)	Assessment Methods to CLO Mapping
	Assignm	nents		30		CLO 1,2,3,4
	Examination			50		CLO 1,2,3,4
	Test			20		CLO 1,2
Required/recommended reading and online materials	"Physica	I Chemistry" by P. W. A	Atkins, latest edition			

CHEM3141	Enviro	nmental chemist	ry (6 credits)		Academic Year	2021	
Offering Department	Chemist		,		Quota	50	
Course Co-ordinator	Dr Y X L	Or Y X Li, Chemistry (yxpli@hku.hk)					
Teachers Involved		(Dr Y X Li,Chemistry)					
Course Objectives	principle	es involved in various	dents to Environmental Cher environmental phenomena ar	nd processes.			
Course Contents & Topics	change Water C purificati Pollutan Waste tr	Atmosphere chemistry: atmospheric composition and behavior, ozone, air pollution, carbon cycle and climate change Water Chemistry: water resources and cycle, ocean, chemical quality of natural water, water pollution, water purification and desalination Pollutants: persistent organic pollutants, pesticides, toxic heavy metals, toxicology Waste treatment: domestic and hazardous waste treatment (landfill, incineration) Energy: energy resources, fossil fuels, solar energy, nuclear energy					
Course Learning			this course, students should b				
Outcomes	CLO 1	demonstrate knowled	dge on chemical principles of t	he various environme	ental phenomena a	and processes	
		describe the practication	al processes of chemistry in	atmosphere, water	purification, waste	treatment, and	
	CLO 3 critically discuss local and global environmental issues based on scientific principles and data						
Pre-requisites	CLO 4	apply knowledge to a	nalyze chemical processes in	volved in various env	ironmental proble	ns	
(and Co-requisites and Impermissible combinations)							
Offer in 2021 - 2022	Y 2r		22 - 2023 : Y		Examination	May	
Grade Descriptors (A+ to F)	A - Demonstrate thorough grasp of the subject Demonstrate integration of the full range of appropriate theories, principles, and evidence Show evidence of strong analytical abilities, logical and independent thinking, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations Demonstrate highly effective organization and presentation skills.						
	B - Demonstrate substantial grasp of the subject Demonstrate general integration of theories, principles, and evidence Show evidence of analytical abilities and logical thinking, some evidence of independent thinking, and ability to apply knowledge to familiar and some unfamiliar situations Demonstrate effective organization and presentation skills.						
	-					apply knowledge t	
	С	familiar and some unf - Demonstrate general evidence Show evidence.		ctive organization and present Demonstrate some particular to the control of t	sentation skills. artial integration of the lence of independent t	ories, principles, an	
		familiar and some unf - Demonstrate generic evidence Show evidepply knowledge to m - Demonstrate partial integration of theorie	amiliar situations Demonstrate effer all but incomplete grasp of the subject dence of some analytical abilities and lost familiar situations Demonstrate all but limited grasp, with retention of est, principles, and evidence Sho and limited ability to apply knowless.	ctive organization and pres ct Demonstrate some part I logical thinking, little evic moderately effective organ of some relevant informat w evidence of limited an	sentation skills.  artial integration of the lence of independent thin inite and presentation, of the subject.  allytical abilities, little	ories, principles, an hinking, and ability to on skills. Demonstrate limite or no evidence of	
	С	familiar and some unf - Demonstrate generic evidence Show evidence - Show evidence - Demonstrate partial integration of theoric independent thinking organization and presidence - Demonstrate little otheories, principles, a	amiliar situations Demonstrate effer all but incomplete grasp of the subject dence of some analytical abilities and lost familiar situations Demonstrate all but limited grasp, with retention of est, principles, and evidence Sho and limited ability to apply knowless.	ctive organization and prest Demonstrate some p. I logical thinking, little evic moderately effective organ if some relevant informat we evidence of limited an edge to solve problems. derstanding of the subjectence of analytical abilities,	sentation skills.  artial integration of the tence of independent the ince of independent the initial state of the subject.  analytical abilities, little of Demonstrate limiter.  Demonstrate limiter logical and independe	ories, principles, an hinking, and ability to on skills.  Demonstrate limite or no evidence of d or barely effective or inapt integration of ent thinking, and ver	
	C	familiar and some unf - Demonstrate generic evidence Show evidence - Show evidence - Demonstrate partial integration of theoric independent thinking organization and presidence - Demonstrate little otheories, principles, a	amiliar situations Demonstrate effer all but incomplete grasp of the subjet dence of some analytical abilities and lost familiar situations Demonstrate I but limited grasp, with retention c es, principles, and evidence Sho , and limited ability to apply knowle lentation skills. rong grasp of the knowledge and un- nd evidence Show little or no evid-	ctive organization and prest Demonstrate some p. I logical thinking, little evic moderately effective organ if some relevant informat we evidence of limited an edge to solve problems. derstanding of the subjectence of analytical abilities,	sentation skills.  artial integration of the tence of independent the ince of independent the initial state of the subject.  analytical abilities, little of Demonstrate limiter.  Demonstrate limiter logical and independe	ories, principles, an hinking, and ability to on skills.  Demonstrate limite or no evidence of d or barely effective or inapt integration of ent thinking, and ver	
ntensive Course	C D Fail	familiar and some unf - Demonstrate generic evidence Show evidence - Show evidence - Demonstrate partial integration of theoric independent thinking organization and presidence - Demonstrate little otheories, principles, a	amiliar situations Demonstrate effer all but incomplete grasp of the subject dence of some analytical abilities and lost familiar situations Demonstrate I but limited grasp, with retention c es, principles, and evidence Sho , and limited ability to apply knowlentation skills. r no grasp of the knowledge and unind evidence Show little or no eviding evidence.	ctive organization and prest Demonstrate some p. I logical thinking, little evic moderately effective organ if some relevant informat we evidence of limited an edge to solve problems. derstanding of the subjectence of analytical abilities,	sentation skills.  artial integration of the tence of independent the ince of independent the initial state of the subject.  analytical abilities, little of Demonstrate limiter.  Demonstrate limiter logical and independe	ories, principles, an hinking, and ability on skills. Demonstrate limite or no evidence of d or barely effectiv or inapt integration ent thinking, and ver	
ntensive Course Course Type Course Teaching	C D Fail	familiar and some unt - Demonstrate gener- evidence Show evi- apply knowledge to rr - Demonstrate partia- integration of theorie- independent thinking organization and pres - Demonstrate little o theories, principles, a little or no ability to ap	amiliar situations Demonstrate effer all but incomplete grasp of the subject dence of some analytical abilities and lost familiar situations Demonstrate I but limited grasp, with retention c es, principles, and evidence Sho , and limited ability to apply knowlentation skills. r no grasp of the knowledge and unind evidence Show little or no eviding evidence.	ctive organization and prest Demonstrate some p. I logical thinking, little evic moderately effective organ if some relevant informat we evidence of limited an edge to solve problems. derstanding of the subjectence of analytical abilities,	sentation skills.  artial integration of the tence of independent the ince of independent the initial state of the subject.  analytical abilities, little of Demonstrate limiter.  Demonstrate limiter logical and independe	ories, principles, ar hinking, and ability on skills. Demonstrate limite or no evidence of d or barely effectiv or inapt integration ent thinking, and ve	
ntensive Course Course Type Course Teaching	C D Fail N Lecture-	familiar and some unt - Demonstrate gener- evidence Show evi- apply knowledge to rr - Demonstrate partia- integration of theorie- independent thinking organization and pres - Demonstrate little o theories, principles, a little or no ability to ap	amiliar situations Demonstrate effect all but incomplete grasp of the subject dence of some analytical abilities and lost familiar situations Demonstrate all but limited grasp, with retention cost, principles, and evidence Sho, and limited ability to apply knowled the apply showled the state of	ctive organization and prest Demonstrate some p. I logical thinking, little evic moderately effective organ if some relevant informat we evidence of limited an edge to solve problems. derstanding of the subjectence of analytical abilities,	sentation skills.  artial integration of the tence of independent the ince of independent the initial state of the subject.  analytical abilities, little of Demonstrate limiter.  Demonstrate limiter logical and independe	ories, principles, ar hinking, and ability on skills. Demonstrate limite or no evidence of d or barely effectiv or inapt integration ent thinking, and ve esentation skills.	
ntensive Course Course Type Course Teaching	C D Fail N Lecture- Activiti Lecture: Tutorial	familiar and some unf - Demonstrate gener- evidence Show evi- apply knowledge to m - Demonstrate partia- integration of theoric independent thinking organization and pres - Demonstrate little o theories, principles, a little or no ability to ap	amiliar situations Demonstrate effect all but incomplete grasp of the subject dence of some analytical abilities and lost familiar situations Demonstrate all but limited grasp, with retention cost, principles, and evidence Sho, and limited ability to apply knowled the apply showled the state of	ctive organization and prest Demonstrate some p. I logical thinking, little evic moderately effective organ if some relevant informat we evidence of limited an edge to solve problems. derstanding of the subjectence of analytical abilities,	sentation skills.  artial integration of the tence of independent the ince of independent the initial state of the subject.  analytical abilities, little of Demonstrate limiter.  Demonstrate limiter logical and independe	ories, principles, an hinking, and ability on skills.  Demonstrate limite or no evidence of or barely effective or inapt integration ent thinking, and versentation skills.  No. of Hours  36 12	
Communication- intensive Course Course Type Course Teaching & Learning Activities	C D Fail N Lecture- Activiti Lecture: Tutorial	familiar and some unt - Demonstrate gener- evidence Show evi- apply knowledge to m - Demonstrate partia- integration of theoric independent thinking organization and pres - Demonstrate little o theories, principles, a little or no ability to ap	amiliar situations Demonstrate effect all but incomplete grasp of the subject dence of some analytical abilities and lost familiar situations Demonstrate all but limited grasp, with retention cost, principles, and evidence Sho, and limited ability to apply knowled the apply showled the state of	ctive organization and prest Demonstrate some p. I logical thinking, little evic moderately effective organ if some relevant informat we evidence of limited an edge to solve problems. derstanding of the subjectence of analytical abilities,	sentation skills.  artial integration of the tence of independent the ince of independent the initial state of the subject.  analytical abilities, little of Demonstrate limiter.  Demonstrate limiter logical and independe	nories, principles, ar hinking, and ability on skills.  Demonstrate limite or no evidence of or barely effective or inapt integration ent thinking, and ve sentation skills.  No. of Hours  36	

and Weighting			course grade (%)	Methods to CLO Mapping
	Assignments	(poster presentation)	50	CLO 1,2,3,4
	Examination		50	CLO 1,2,3,4
	C. Baird and M. Cann: Environmer S.E. Manahan: Environmental Che			

CHEM3142	Chemica	al process indu	stries and analysis (6 credits)	Academic Yea	ar 2021			
Offering Department	Chemistry	,	<u>, , , , , , , , , , , , , , , , , , , </u>	Quota	60			
Course Co-ordinator	Prof G K	Y Chan, Chemistry	(hrsccky@hku.hk)					
eachers Involved	(Prof G K	(Prof G K Y Chan, Chemistry)						
	(Visiting P	(Visiting Professor,Chemistry)						
Course Objectives			chemical industries important in local nufacturing and chemical processes in ge		o understand the			
Course Contents & Topics	processes	rocess flow charts, units and conversions, materials and energy balances, unit operations. Selection of chemica rocesses to include variation in products, scale, and types of operation, e.g. for petrochemical industries, idustrial gases, beverage processes, chloroalkaline manufacturing.						
Course Learning	On succes	ssful completion of	this course, students should be able to:					
Outcomes	CLO 1 s	olve basic problem	ns of energy and mass balances in chemi	cal and environmental pro	cesses			
	CLO 2 b	e familiarized with	a few common chemical industries and c	hemical processes				
	CLO 3 u	inderstand some g	eneral principles of industrial practice thro	ough plant visits				
Pre-requisites and Co-requisites and Impermissible combinations)		Pass in CHEM2241 or CHEM2341 or CHEM2441 or CHEM2442 or CHEM2541						
Offer in 2021 - 2022	Y 2nd		22 - 2023 : Y	Examination	May			
Grade Descriptors (A+ to F)	A	attaining all of the co original thought, and Critical use of data ar	th knowledge of industrial chemical processes and burse learning outcomes. Show strong analytical a ability to apply knowledge to solve problems in a vand sourcing of references. Apply highly effective org	nd critical abilities and logical th vide range of complex, familiar a panizational and presentational sl	inking, with evidence on and unfamiliar situations kills.			
	В	B Demonstrate substantial knowledge of industrial chemical processes and command of mass and energy balance skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to solve problems in familiar and some unfamiliar situations. Correct use of data and sourcing of references. Apply effective organizational and presentational skills.						
	С							
	D	Demonstrate partial but limited knowledge of industrial chemical processes and command of mass and energy balance skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Limited ability to use data and source references. Apply limited or barely effective organizational and presentational skills.						
	Fail  Demonstrate little or no evidence of knowledge of industrial chemical processes and command of mass and energy balance skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Misuse of data and references. Organization and presentational skills are minimally effective or ineffective.							
Communication- intensive Course	N		,					
Course Type	Lecture w	ith laboratory comp	onent course					
Course Teaching	Activities	•	Details		No. of Hours			
Learning Activities	Lectures	2	Details	Details				
	Laborator	٧	computational laboratory	computational laboratory				
	Field wor	,	1 - 2 plant visits					
		Self study	1 - 2 plant visits		12 100			
Assessment Methods		•	Detelle	Maintelin nin fin al				
and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin			
	Assignments		(Continuous Assessment)	15	CLO 1,2			
	Examination			50	CLO 1,2,3			
	Laboratory reports			5	CLO 2,3			
	Test		(test/quiz)	30	CLO 1,2			
Required/recommended reading and contine materials	Felder and	Felder and Rousseau: Elementary Principles of Chemical Processes						
Additional Course	Laborator course.	y courses are man	datory. Students must complete ALL ex	periments and laboratory	reports to pass th			

CHEM3143	Introduction to materials chemistry (6 credits)	Academic Year	2021				
Offering Department	Chemistry	Quota	60				
Course Co-ordinator	Dr Y F Wang, Chemistry (wanglab @hku.hk)						
Teachers Involved	(Dr Y F Wang, Chemistry)						
Course Objectives	This course provides an introduction to materials chemistry. The goal is to present the fundamental knowledge of various types of materials including their structure, synthesis, and properties. This course is essential for students who wish to take advanced materials course.						
Course Contents & Topics	Classification of materials; structure of crystalline solids; phases and phase transformation; defects and mechanical properties; alloys and ceramics; introduction to soft matter; structure, synthesis, and properties of polymers; colloids; liquid crystals; viscoelasticity; applications of materials; characterization techniques.						
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 describe different materials classification and their composition, structures, and properties, and to apprehend the concept of structure/property relationship  CLO 2 explain different structures and phases, phase transformation in solid materials						

	CLO 3 u	nderstand defects in crys	stalline solid materials and relate the	m with mechanical prope	erties	
	CLO 4 appreciate soft materials and some examples and characteristics CLO 5 understand the concept of molecular weight distribution in polymers, and explain the effect of					
		olymerization kinetics to t				
			important materials, and explain the	eir structure-property rela	tionship	
			n materials characterizations			
Pre-requisites (and Co-requisites and Impermissible combinations)			CHEM2541 or CHEM2341			
Offer in 2021 - 2022	Y 1st	t sem Offer in 2022 - 20		Examination		
Grade Descriptors (A+ to F)	A	deep understanding of mate classical solid materials ar common polymers. Demons of materials. Show strong at	vledge of essential facts, concepts, principles, prials structures at different length scales and nd soft materials. Show extensive knowled strate strong ability to apply/integrate knowled bility to analyze novel problems and critical u d to materials synthesis/characterization.	the relationship with materials ge in synthesis, characteriza tge and theory related to the s	properties particularly for tion and applications of ynthesis and applications	
	В	deep understanding of mate classical solid materials an common polymers. Demons materials. Show evidence t	vledge of essential facts, concepts, principles, erials structures at different length scales and nd soft materials. Show extensive knowled strate evidence to apply/integrate knowledge to analyze novel problems and critical use d to materials synthesis/characterization.	the relationship with materials ge in synthesis, characteriza and theory related to the synt	properties particularly for tion and applications of hesis and applications of	
	C Demonstrate general but incomplete command of knowledge of essential facts, concepts, principles, and theories related to classification of materials. Show some but insufficient understanding of materials structures at different length scales and the relationship with materials properties particularly for classical solid materials and soft materials. Show some knowledge in synthesis, characterization and applications of common polymers. Demonstrate evidence to apply/integrate knowledge and theory related to the synthesis and applications of materials. Show ability to analyze problems to most familiar situations and mostly correct but erroneous use of data/experimental results to draw appropriate conclusions related to materials synthesis/characterization.					
	Demonstrate partial but limited command of knowledge of essential facts, concepts, principles, and theories related to classification of materials. Show deep understanding of materials structures at different length scales and the relationship with materials properties particularly for classical solid materials and soft materials. Show limited knowledge in synthesis, characterization and applications of common polymers. Demonstrate evidence but limited ability to apply/integrate knowledge and theory related to the synthesis and applications of materials. Show limited ability to analyze problems to most familiar situations and mostly correct but erroneous use of data/experimental results to draw appropriate conclusions related to materials synthesis/characterization.					
	Fail  Demonstrate little or no evidence of command of knowledge of essential facts, concepts, principles, and theories related to classification of materials. Show little or no understanding of materials structures at different length scales and the relationship with materials properties particularly for classical solid materials and soft materials. Show little or no knowledge in synthesis, characterization and applications of common polymers. Demonstrate limited or no evidence of ability to apply/integrate knowledge and theory related to the synthesis and applications of materials. Show little or no ability to analyze novel problems and use of data/experimental results to draw appropriate and insightful conclusions related to materials synthesis/characterization.					
Communication-	N					
intensive Course	1					
Course Type		ased course				
Course Teaching	Activities		Details	No. of Hours		
& Learning Activities	Lectures				36	
	Tutorials				12	
A		/ Self study			100	
Assessment Methods and Weighting	Methods	<b>;</b>	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Examinat	tion		50	CLO 1,2,3,4,5,6,7	
	Test		(mid-term tests and assignments)	50	CLO 1,2,3,4,5,6,7	
Required/recommended reading and online materials	F. W. Billr	W. D. Callister: Materials Science and Engineering: An Introduction (8th or 9th edition) F. W. Billmeyer: Textbook of Polymer Science (John Wiley and Sons, 1984) G. Odian: Principles of Polymerizations (John Wiley and Sons, 2004)				

CHEM3146		es and applications of spectroscopic and analytical es (6 credits)	Academic Year	2021				
Offering Department	Chemistry		Quota	200				
Course Co-ordinator	Dr X Li, Ch	nemistry (xiangli@hku.hk)						
Teachers Involved								
Course Objectives		he principles and applications of modern practical spectroscopic a	and analytical technic	ues. This course				
Course Contents & Topics		Absorption Spectroscopy, Nuclear Magnetic Resonance Spectropy, Elemental Analysis, Molecular Formulas and analysis of data.		ometry, Infra-red				
Course Learning	On succes	sful completion of this course, students should be able to:						
Outcomes	CLO 1 understand the basic principles and applications of IR, UV/Vis, MS and NMR spectroscopic techniques							
	CLO 2 de	CLO 2 describe and explain the terminology of IR, UV/Vis, MS and NMR spectroscopies						
	CLO 3 pe	CLO 3 perform chemical structure elucidation and analysis based on UV/Vis, MS and NMR spectroscopic data						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in an	y CHEM2XXX level course						
Offer in 2021 - 2022	N Offe	er in 2022 - 2023 : N	Examination					
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive knowledge learning outcomes. Show strong analytical and critical abilities and logical thinl range of complex, familiar and unfamiliar situations.						
	В							
	C  Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most							

		familiar situations.						
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems.							
	Fail	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcoof analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solv						
Communication- intensive Course	N	N						
Course Type	Lecture-ba	ased course						
Course Teaching & Learning Activities	Activities	S	Details		No. of Hours			
	Lectures				36			
	Tutorials				12			
	Reading / Self study							
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignme	ents		15	CLO 1,2,3			
	Examinat	tion		70	CLO 1,2,3			
	Test		(2 quizzes)	15	CLO 1,2,3			
Required/recommended reading and online materials	4th edition	Donald L. Pavia, Gary M. Lampman, George S. Kriz: Introduction to Spectroscopy (Thomson Learning, 2001, 3rd & 4th edition)  W. Kemp: Organic Spectroscopy (Macmillan, 1991, 3rd ed.)						
Additional Course Information	Suggeste	d follow-up course:	uggested follow-up course: CHEM3241					

CHEM3241	Analytical chemistry II: chemical instrumentation (6 credits)  Academic Yea				ar 2021			
Offering Department	Chemistr		,	Quota	104			
Course Co-ordinator	Dr Y Li, C	Dr Y Li, Chemistry (yingli0e @hku.hk)						
Teachers Involved		(Dr I K Chu,Chemistry) (Dr Y Li,Chemistry)						
Course Objectives		To cover the basic principles and applications of chemical instrumentation. This course aims to provide working knowledge, in addition to the principles, of instruments that are commonly used in chemical laboratories.						
Course Contents			Law; UV-visible, infrared, and atomic s					
& Topics	spectrom Separation chromator Mass spe	spectrometry; grating spectrometer; photon detectors and thermal detectors.  Separation methods: partition; chromatography theories; high performance liquid chromatography (HPLC) and gas chromatography (GC); instrumental set up of HPLC and GC.  Mass spectrometry: fundamental concept of mass spectrometry; electrospray ionization (ESI) and matrix-assisted laser desorption ionization (MALDI); time-of-flight (TOF) and quadrupole (Q) mass analyzers.						
Course Learning		On successful completion of this course, students should be able to:						
Outcomes		•	es of the optical methods, separation method	ds. and mass spectrome	etrv			
			experimental set up and the properties of the					
	ir	n the laboratory cla	asses	•				
			skills in chemical analysis including sample on, and matrix effects correction (standard a	• •	solution preparation			
Pre-requisites		CHEM2241		,				
(and Co-requisites and Impermissible combinations)								
Offer in 2021 - 2022	Y 1st	t sem Offer in 20	022 - 2023 : Y	Examination	Dec			
Grade Descriptors	Α		ough grasp of the subject Show evidence of strong a					
(A+ to F)		ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations Demonstrate highly proficient lab skills and techniques and critical use of data and results to draw appropriate and insightful conclusions Demonstrate highly effective organization and presentation skills						
		<ul> <li>Demonstrate substantial grasp of the subject Show evidence of analytical abilities and logical thinking, some evidence independent thinking, and ability to apply knowledge to familiar and some unfamiliar situations Demonstrate proficient lab sk and techniques and correct use of data and results to draw appropriate conclusions Demonstrate effective organization a presentation skills.</li> </ul>						
	В	independent thinkin and techniques and	ng, and ability to apply knowledge to familiar and some	unfamiliar situations Demon	strate proficient lab skil			
	С	independent thinkin and techniques and presentation skills.  - Demonstrate gene evidence of independent techniques and	ng, and ability to apply knowledge to familiar and some	unfamiliar situations Demon conclusions Demonstrate e uce of some analytical abilities t familiar situations Demons	nstrate proficient lab skil ffective organization an and logical thinking, litt strate adequate lab skil			
		independent thinkin and techniques and presentation skills.  - Demonstrate gene evidence of indeperand techniques and moderately effective.  - Demonstrate partianalytical abilities, Demonstrate partia conclusions Dem	ig, and ability to apply knowledge to familiar and some discorrect use of data and results to draw appropriate and but incomplete grasp of the subject Show eviden indent thinking, and ability to apply knowledge to most of mostly correct but some erroneous use of data and representation and presentation skills. It is a presentation of some relevant it little or no evidence of independent thinking, and limited ally effective lab skills and techniques and limited a constrate limited or barely effective organization and presentation and presentation in the constrate limited or barely effective organization and presentation and p	unfamiliar situations. Demon conclusions. Demonstrate e ace of some analytical abilities t familiar situations. Demons results to draw appropriate con information, of the subject. Sinited ability to apply knowled ability to use data and results entation skills.	istrate proficient lab skil ffective organization an and logical thinking, litt strate adequate lab skil inclusions Demonstral Show evidence of limite ge to solve problems. Its to draw appropriat			
	C	independent thinkin and techniques and presentation skills.  - Demonstrate gene evidence of indeperand techniques and moderately effective.  - Demonstrate partial analytical abilities, Demonstrate partial conclusions Demonstrate ititle abilities, logical and minimally effective.	ig, and ability to apply knowledge to familiar and some discorrect use of data and results to draw appropriate a discorrect use of data and results to draw appropriate and but incomplete grasp of the subject Show eviden indent thinking, and ability to apply knowledge to most discorrect but some erroneous use of data and representation skills. It is the properties of some relevant in the properties of some relevant in the properties of independent thinking, and limited are the properties of	unfamiliar situations. Demonconclusions. Demonstrate e ace of some analytical abilities to familiar situations. Demons results to draw appropriate conformation, of the subject. Sinited ability to apply knowled ability to use data and results esentation skills. The subject. Show little or roapply knowledge to solve port of data and results and/or una	instrate proficient lab skil ffective organization ar and logical thinking, litt strate adequate lab skil inclusions Demonstra Show evidence of limite tige to solve problems, tilts to draw appropriat on evidence of analytic problems Demonstrat			
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ntensive Course Course Type Course Teaching	C D Fail N Lecture w Activitie Lectures Laborato	independent thinkin and techniques and presentation skills.  - Demonstrate gene evidence of indeperand techniques and moderately effective.  - Demonstrate partianalytical abilities, Demonstrate partianalytical abilities, Demonstrate partianalytics.  - Demonstrate partianalytics.  - Demonstrate partianalytics.  - Demonstrate little abilities, logical and minimally effective conclusions Demonstrate of the properties of the properties of the properties.	ig, and ability to apply knowledge to familiar and some discorrect use of data and results to draw appropriate and but incomplete grasp of the subject Show eviden indent thinking, and ability to apply knowledge to most dimostly correct but some erroneous use of data and reorganization and presentation skills. It is is a like the properties of the state of the properties of the state of the	unfamiliar situations. Demonconclusions. Demonstrate e ace of some analytical abilities to familiar situations. Demons results to draw appropriate conformation, of the subject. Sinited ability to apply knowled ability to use data and results esentation skills. The subject. Show little or roapply knowledge to solve portion of data and results and/or una data and results and data and results and data and results and data and data and data and data and data and data and data and data and data and data and data and data and data and	instrate proficient lab skil ffective organization and logical thinking, little strate adequate lab skil inclusions Demonstration or between the strate adequate lab skil inclusions Demonstration or organization of the strategie to solve problems. Its to draw appropriation or evidence of analytic problems Demonstration of the strategie to draw appropriation of the strategie of the strat			
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Communication- Intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting	C D Fail N Lecture w Activitie Lectures Laborato Tutorials Reading Methods	independent thinkin and techniques and presentation skills.  - Demonstrate gene evidence of indeperand techniques and moderately effective.  - Demonstrate partial conclusions Demonstrate partial conclusions Demonstrate partial conclusions Demonstrate partial conclusions Demonstrate partial conclusions Demonstrate partial conclusions Demonstrate partial conclusions Demonstrate interest indicate partial conclusions Demonstrate partial conclusions Demonstrate interest indicate partial conclusions Demonstrate interest indicate partial conclusions Demonstrate	ing, and ability to apply knowledge to familiar and some discorrect use of data and results to draw appropriate dender thinking, and ability to apply knowledge to most discorrect but some erroneous use of data and recognization and presentation skills.  In the state of the stat	unfamiliar situations. Demonconclusions. Demonstrate e ace of some analytical abilities t familiar situations. Demons results to draw appropriate conformation, of the subject. Similar dability to apply knowled ability to use data and results esentation skills. The subject. Show little or no apply knowledge to solve point and results and results and results and results and results.  Weighting in final course grade (%)	Instrate proficient lab skil flective organization are and logical thinking, littstrate adequate lab skil inclusions Demonstra Show evidence of limitege to solve problems. Its to draw appropriate to evidence of analytic problems Demonstratable to draw appropriate to draw appropri			
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reading and online materials	D.A. Skoog, D.M. West, F.J. Holler, and S.R. Crouch: Fundamentals of Analytical Chemistry (Thomson, latest edition)
Additional Course Information	Laboratory classes are mandatory. Students must complete ALL experiments and laboratory reports to pass this course.

CHEM3242	Food an	d water analysis (6	credits)	Academic Yea	r 2021			
Offering Department	Chemistry			Quota	50			
Course Co-ordinator		Ng, Chemistry <i>(kkhn</i> 3@/	hku.hk)					
Teachers Involved		Ng,Chemistry)						
Course Objectives		To cover areas in the application and new methodology development in analytical chemistry with focus on food and water analysis.						
Course Contents		•	aboratories: Use of standard me	ethods, guidelines and stand	dards for food and			
& Topics		,	actice; reliability and quality issue	. 0				
	sodium co undeclare	ontent); detection of food d components); recent is	tritional labeling; determination of od adulteration and contaminatio ssues and case studies in food an	n (e.g. presence of banned alysis.	I additives, toxins			
	technolog		standards; sampling, pretreatme and automated analysis of so					
	phase ext	raction) and instrumenta	Selection, application and combin al (e.g. GC, LC, MS) techniques f certified reference materials)					
Course Learning			ourse, students should be able to					
Outcomes			rrors and uncertainty of analytical					
			control quality and ensure reliab	· · · · · · · · · · · · · · · · · · ·				
			nowledge in food and water analy					
			blic health protection related to ch	•				
		•	niques used in practicing food and					
Pre-requisites and Co-requisites and Impermissible combinations)	Please no		I or CHEM2341 or CHEM2441 or gical Sciences stipulates that stud nd nutrient analysis.		CHEM3242 are no			
Offer in 2021 - 2022	Y 2nd	l sem Offer in 2022 - 2	023 · Y	Examination	May			
Grade Descriptors	A		rough grasp of the knowledge and skills		-			
(A+ to F)	analysis to acquire accurate results with full interpretation for analytical application as described in all the course learning outcomes. Show strong analytical and critical abilities, logical thinking and capability to apply knowledge learnt to solve a wide range of complex issues and problems related to the analysis of food and water. Apply highly effective organization and presentation skills as shown in class work.  B Demonstrate a substantial command of a broad range of knowledge and skills required for attaining at least most of the course							
	learning outcomes. Show evidence of analytical and critical abilities, logical thinking, and capability to apply knowledge learnt to solve a wide range of complex issues and problems related to the analysis of food and water. Apply effective organization and presentation skills as shown in class work.							
	C Demonstrate a general command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of analytical and critical abilities, logical thinking, and ability to apply knowledge learnt to solve a wide range of complex issues and problems related to the analysis of food and water. Apply effective organization and presentation skills as shown in class work.							
	Demonstrate a partial but limited command of knowledge and skills required for attaining some of the course learning outcomes in Food and Water Analysis. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems related to the analysis of food and water. Apply limited or barely effective organization and presentation skill as shown in class work.							
	Fail  Demonstrate little or no evidence for the command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems related to the analysis of food and water. Organization and presentation skills are minimally effective or ineffective as shown in class work.							
Communication-	N							
ntensive Course								
Course Type		ith laboratory componen						
Course Teaching	Activities	3	Details		No. of Hours			
& Learning Activities	Lectures				24			
	Laborator	ТУ			16			
	Tutorials	( O 15 + 1			8			
	Reading	Self study			100			
	Methods		Details	Weighting in final	Assessment			
				course grade (%)	Methods to CLO Mapping			
	Assignme	ents		5	to CLO Mapping CLO 1,2,3,4			
	Assignme Examinat	ents ion		5 60	to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4			
	Assignme	ents ion	Experiment & Lab report	5 60 20	to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 CLO 2,5			
Assessment Methods and Weighting	Assignme Examinat Laborator Test	ents ion ry reports		5 60 20 15	to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 CLO 2,5 CLO 1,2,3,4			
and Weighting Required/recommended reading and	Assignme Examinat Laborator Test D. A. Sko latest edit	ents ion ry reports log, D. M. West, F. J. H ion)	Holler, S.R. Crouch: Fundamenta	5 60 20 15 Is of Analytical Chemistry (0	to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 CLO 2,5 CLO 1,2,3,4			
	Assignme Examinat Laborator Test D. A. Sko latest edit Reference	ents ion ry reports log, D. M. West, F. J. F ion) es to specialist texts and		5 60 20 15 Is of Analytical Chemistry (0	to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 CLO 2,5 CLO 1,2,3,4 Cengage Learning			

CHEM3243	Introductory instrumental chemical analysis (6 credits)	Academic Year	2021
Offering Department	Chemistry	Quota	30
Course Co-ordinator	Dr X Li, Chemistry (xiangli @hku.hk)		
Teachers Involved	(Dr K C J Wong, Pharmacology and Pharmacy)		

	(Dr X Li,	Chemistry)					
Course Objectives	for chen	This course is designed for non-chemistry major students covering basic principles of separation and spectroscopy for chemical analysis. This course provides a general foundation for further studies in pharmacology, life and environmental sciences.					
Course Contents & Topics	Optical methods: Beer's Law; UV-visible, infrared, and atomic spectrometry; fluorescence; atomic n spectrometry; grating spectrometer; photon detectors and thermal detectors.  Separation methods: partition; chromatography theories; high performance liquid chromatography (HPLC) and chromatography (GC); instrumental set up of HPLC and GC.						
	laser de	ass spectrometry: fundamental concept of mass spectrometry; electrospray ionization (ESI) and matrix-assisted for desorption ionization (MALDI); time-of-flight (TOF) and quadrupole (Q) mass analyzers.  MR: basic principle of nuclear magnetic resonance.  alysis and quality assurance: statistical analysis of small sets of data, control chart.					
Course Learning			course, students should be				
Outcomes			· · · · · · · · · · · · · · · · · · ·	ation methods, mass spectrometry,	and NMR		
	CLO 2			perties of the basic components of t			
Pre-requisites (and Co-requisites and Impermissible combinations)		CHEM2041 or CHEM224 students who have passe	,	eady enrolled in this course.			
Offer in 2021 - 2022	N O	offer in 2022 - 2023 : N		Examination			
Grade Descriptors (A+ to F)	A	ablility to apply knowledge	to a wide range of complex, familiuse of data and results to draw	ice of strong analytical abilities, logical and i liar and unfamiliar situations Demonstrate appropriate and insightful conclusions De	highly proficient lab skills		
	В						
	<ul> <li>Demonstrate general but incomplete grasp of the subject Show evidence of some analytical abilities and logical thinking, little evidence of independent thinking, and ability to apply knowledge to most familiar situations Demonstrate adequate lab skills and techniques and mostly correct but some erroneous use of data and results to draw appropriate conclusions Demonstrate moderately effective organization and presentation skills.</li> </ul>						
	D						
	Fail  - Demonstrate little or no grasp of the knowledge and understanding of the subject Show little or no evidence of analytical abilities, logical and independent thinking, and very little or no ability to apply knowledge to solve problems Demonstrate minimally effective or ineffective lab skills and techniques and misuse of data and results and/or unable to draw appropriate conclusions Demonstrate incoherent organization and poor presentation skills.						
Communication- intensive Course	N	·					
Course Type	Lecture	with laboratory compone	nt course				
Course Teaching	Activiti	es	Details		No. of Hours		
& Learning Activities	Lecture	S			24		
	Laborat	•			28		
	Reading	g / Self study			100		
Assessment Methods and Weighting	Method	ls	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Examin	ation		70	CLO 1,2		
	Laborat	ory reports		15	CLO 1,2		
	Test			15	CLO 1,2		
Required/recommended				ental Analysis (Thomson, latest edit			
reading and		oog, D.M. West, F.J. He	oller, and S.R. Crouch: Fu	undamentals of Analytical Chemis	try (Thomson, latest		
online materials	edition)						
Additional Course		ory classes are mandato	ry. Students must comple	te ALL experiments and laboratory	reports to pass this		
Information	course.						

CHEM3244	Analy	tical techniques for pharmacy students (6 credits)	Academic Year	2021					
Offering Department	Chemis	stry	Quota	35					
Course Co-ordinator	Dr X Li,	Chemistry (xiangli@hku.hk)							
Teachers Involved	١,	(Dr K C J Wong,Pharmacology and Pharmacy) (Dr X Li,Chemistry)							
Course Objectives	Samplii fluoreso chroma	The course covers theories and practicals on various analytical techniques used in pharmaceutical industry. Sampling and data analysis, method validation with respect to regulatory guidelines, ultraviolet/visible, infrared, fluorescence, atomic spectrophotometry, separation techniques such as gas chromatography and liquid chromatography, and modern mass spectrometry with its applications in protein sequencing will be covered in this course.							
Course Contents & Topics	Analysi Optical Separa Moderr	es and applications of different analytical and measurement techniques is and quality assurance: method validation, sampling, statistics, hypothe spectroscopy: Beer's law, UV/Vis, infrared, fluorescence, and atomic spition and purification: gas chromatography and liquid chromatography mass spectrometry: ionization techniques (ESI, MALDI), mass analy sequencing.	sis tests ectroscopy						
Course Learning	On successful completion of this course, students should be able to:								
Outcomes	CLO 1 demonstrate knowledge and understanding of principles of data analysis, optical spectroscopic methods, separation techniques, and modern mass spectrometry								
	CLO 2 describe the basic experimental setup and the properties of the basic components of the instruments used in the laboratory classes								
	CLO 3 apply experimental skills in experiments including sample preparation, standard solution preparation, instrument calibration, and matrix effect correction								

Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BPHM2136 (This course is for BPharm students only)					
Offer in 2021 - 2022	N Of	ffer in 2022 - 2023 : N		Examination	1	
Grade Descriptors (A+ to F)	A	ablility to apply knowledg	ge to a wide range of complex, cal use of data and results to c	vidence of strong analytical abilities, logical and familiar and unfamiliar situations Demonstrat Iraw appropriate and insightful conclusions D	e highly proficient lab skills	
	В	independent thinking, ar	nd ability to apply knowledge to	w evidence of analytical abilities and logical the familiar and some unfamiliar situations Demo or draw appropriate conclusions Demonstrate	onstrate proficient lab skills	
	С	evidence of independent and techniques and most	nt thinking, and ability to apply	ject Show evidence of some analytical abilitie knowledge to most familiar situations Demo s use of data and results to draw appropriate of s.	nstrate adequate lab skills	
	D	, ,				
	Fail  - Demonstrate little or no grasp of the knowledge and understanding of the subject Show little or no evidence of analytical abilities, logical and independent thinking, and very little or no ability to apply knowledge to solve problems Demonstrate minimally effective or ineffective lab skills and techniques and misuse of data and results and/or unable to draw appropriate conclusions Demonstrate incoherent organization and poor presentation skills.					
Communication- intensive Course	N		<b>5</b>			
Course Type	Lecture v	with laboratory compor	nent course			
Course Teaching	Activitie	es	Details		No. of Hours	
& Learning Activities	Lectures	S		24		
	Laborato	ory				
	Reading	/ Self study			100	
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Examina	ation		70	CLO 1,2,3	
	Laboratory reports			15	CLO 1,2,3	
	Test			15	CLO 1,2,3	
Required/recommended reading and online materials				umental Analysis (Thomson, latest ed n: Fundamentals of Analytical Chemis	ition).	
Additional Course Information	This cou	rse is for Pharmacy sto ory classes are manda		nplete ALL experiments and laborator	y reports to pass this	

CHEM3341	Inorgar	nic chemistry	II (6 credits)			Academic Year	2021	
Offering Department	Chemistr	try				Quota	90	
Course Co-ordinator	Prof V W	Prof V W W Yam, Chemistry (wwyam@hku.hk)						
Teachers Involved	(Prof V V	Y Yuen,Chemis W W Yam,Chen	istry)					
Course Objectives	inorganio		n examples rele	vance to biologic	c Chemistry I, with a r al processes and mate			
Course Contents & Topics	their read	Chemistry of selected classes of inorganic, coordination and organometallic compounds including mechanisms of their reaction where appropriate.  Structure, bonding, magnetism and spectral properties of inorganic systems including examples in bioinorganic systems.						
Course Learning	On succe	essful completion	n of this course	, students should	be able to:			
Outcomes		demonstrate kn	owledge of che	mistry of selecte	d classes of inorganic	, coordination and	d organometallic	
	CLO 2 understand structure, bonding, magnetism and spectral properties of inorganic systems							
	CLO 3 understand mechanisms of selected chemical reactions that are essential to coordination and organometallic compounds							
	CLO 4 gain appropriate knowledge of coordination compounds in biological systems							
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in (	CHEM2341						
Offer in 2021 - 2022	Y 1s	st sem Offer ir	2022 - 2023 : Y	•		Examination	Dec	
Grade Descriptors (A+ to F)	A	advanced four coordination as systems includi the more advar of data and ex foundation prin especially in the	dation knowledge of organometallic cong examples in bioir ced foundation knowledgerimental results to be and knowledgerimental conduction of the conduction	of inorganic chemist ompounds; mechanis norganic systems. Show Medge of inorganic control of draw appropriate a ge of inorganic cher	essential facts, concepts, p ry, especially those relatec ms of reactions; and mag ow strong ability to apply and nemistry. Show strong ability and insightful conclusions rel nistry. Demonstrate highly annic compounds and metal	I to structure and bo netic and spectral pro- l integrate knowledge a to analyze novel prob- ating to the essential effective laboratory sk	onding of inorganic, operties of inorganic and theory relating to elems and critical use and more advanced cills and techniques,	
	В	to the more an inorganic, coor inorganic system relating to the correct use of foundation print	Ivanced foundation dination and organoms including example advanced foundata and experimentiples and knowledg	knowledge of inorgametallic compounds oles in bioinorganic solution knowledge of interesting to draw the of inorganic chemis	derstanding of essential facts and chemistry, especially the mechanisms of reactions; systems. Show evidence to a finorganic chemistry. Show appropriate conclusions relative. Demonstrate effective la bounds and metal complexe	nose related to struct and magnetic and s apply and integrate kr evidence to analyze ting to the essential boratory skills and tecl	ure and bonding of pectral properties of nowledge and theory novel problems and and more advanced aniques, especially in	

		spectroscopic methods.							
	Demonstrate general but incomplete command of knowledge and understanding of essential facts, concepts, prir theories relating to the more advanced foundation knowledge of inorganic chemistry, especially those related to stonding of inorganic, coordination and organometallic compounds; mechanisms of reactions; and magnetic a properties of inorganic systems including examples in bioinorganic systems. Show evidence of some abilities to integrate knowledge and theory relating to the more advanced foundation knowledge of inorganic chemistry. Sho analyze problems to most familiar situations and mostly correct but erroneous use of data and experimental resi appropriate conclusions relating to the essential and more advanced foundation principles and knowledge of inorganic Demonstrate moderately effective laboratory skills and techniques, especially in the synthesis and reactivity study compounds and metal complexes, and their characterization by various spectroscopic methods.								
	D	Demonstrate partial but limited command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the more advanced foundation knowledge of inorganic chemistry, especially those related to structure and bonding of inorganic, coordination and organometallic compounds; mechanisms of reactions; and magnetic and spectral properties of inorganic systems including examples in bioinorganic systems. Show evidence of limited abilities to apply and integrate knowledge and theory relating to the more advanced foundation knowledge of inorganic chemistry. Show limited ability to analyze problems to most familiar situations and mostly correct but erroneous use of data and experimental results to draw appropriate conclusions relating to the essential and more advanced foundation principles and knowledge of inorganic chemistry. Demonstrate partially effective laboratory skills and techniques, especially in the synthesis and reactivity study of inorganic compounds and metal complexes, and their characterization by various spectroscopic methods.							
	Fail	theories relating to the m bonding of inorganic, co properties of inorganic so integrate knowledge and ability to analyze problem conclusions relating to Demonstrate minimally et	ore advanced foundation knowle or ordination and organometallic of stems including examples in bio theory relating to the more adva so to most familiar situations and the essential and more advan ffective laboratory skills and tecl	edge and understanding of essential facts, adge of inorganic chemistry, especially thos compounds; mechanisms of reactions; an inorganic systems. Show little or no evidenc anced foundation knowledge of inorganic challed derroneous use of data and experimental re ced foundation principles and knowledge hniques, especially in the synthesis and re- on by various spectroscopic methods.	e related to structure and d magnetic and spectral de of abilities to apply and nemistry. Show little or no assults to draw appropriate of inorganic chemistry.				
Communication- intensive Course	N								
Course Type	Lecture v	vith laboratory compone	ent course						
Course Teaching	Activities		Details	No. of Hours					
& Learning Activities	Lectures			24					
	Laboratory				24				
	Tutorials				6				
	Reading / Self study				100				
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping				
	Assignments			18	CLO 1,2,3,4				
	Examination			50	CLO 1,2,3,4				
	Laboratory reports			12	CLO 1,2,3,4				
	Test	•		20	CLO 1,2,3,4				
Required/recommended reading and online materials	1 1-1-1								
Additional Course Information	Laboratory classes are mandatory. Students must complete ALL experiments and laboratory reports to pass this course.								

CHEM3342	Bioinorg	ganic cl	nemistry	(6 cred	its)					Academic Yea	ır	2021
Offering Department	Chemistry	y					Quota		50			
Course Co-ordinator	Prof H Z Sun, Chemistry (hsun@hku.hk)											
Teachers Involved	d (Dr H Y Au Yeung, Chemistry)											
	(Prof H Z Sun,Chemistry)											
Course Objectives	This course is a continuation from Basic Inorganic Chemistry and Basic Organic Chemistry, giving further and more details of inorganic chemistry in biological system, with examples relevance to biological processes and medical science, suited to the needs of those intending to extend their studies in (bio)chemistry and biomedical science.											
Course Contents & Topics	Bioinorganic Chemistry of selected topics of interest. Examples include the inorganic chemistry (and biochemistry) behind the requirement of biological cells for metals such as zinc, iron and copper; and metals in medicine such as mechanisms by which organisms obtain required metal ions from their environment, and use of metal-containing compounds in treating diseases such as cancer.											
Course Learning Outcomes	On successful completion of this course, students should be able to:											
	CLO 1 understand the principles and concepts of inorganic/organic chemistry in biological system											
	CLO 2 understand structure, bonding, and spectral properties of selected metals in proteins and nucleic acids											
	CLO 3 understand chemical mechanisms of selected metal homeostasis (i.e. uptake, transport and storage)											
	CLO 4 understand the role of metal complexes medicine											
(and Co-requisites and Impermissible combinations)												
Offer in 2021 - 2022	Y 2nd	d sem C	offer in 202	22 - 2023	: Y					Examination		May
Grade Descriptors (A+ to F)	Demonstrate thorough knowledge and understanding of essential facts, concepts, principles, and theories relating to the basic foundation knowledge of bioinorganic chemistry, especially those related to hard-soft acid-base theory; chelation; structure and bonding of metals in biological systems; thermodynamic and kinetic aspects of metal ions in biological processes and their relevance to metal homeostasis; metal-based drugs. Show strong ability to apply and integrate knowledge and theory relating to the basic foundation knowledge of bioinorganic chemistry. Show strong ability to analyze novel problems and critical use of data and experimental results to draw appropriate and insightful conclusions relating to the basic principles and knowledge of bioinorganic chemistry. Demonstrate highly effective basic techniques, especially in the characterization of inorganic active site and overall metallo-biomolecules.											
	B Demonstrate substantial command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the basic foundation knowledge of bioinorganic chemistry, especially those related to hard-soft acid-base theory; chelation; structure and bonding of metals in biological systems; thermodynamic and kinetic aspects of metal ions in biological processes and their relevance to metal homeostasis; metal-based drugs. Show evidence to apply and integrate knowledge and theory relating to the basic foundation knowledge of bioinorganic chemistry. Show evidence to analyze novel problems and correct use of data and experimental results to draw appropriate conclusions relating to the basic principles and knowledge of bioinorganic chemistry. Demonstrate effective basic techniques, especially in the characterization of inorganic active site and overall metallobiomolecules.											
	С									of essential facts, co pecially those related		

	D	biological processes and the integrate knowledge and th problems to most familiar si conclusions relating to the techniques, especially in the Demonstrate partial but limi relating to the basic found chelation; structure and bor processes and their relevan knowledge and theory rela problems to most familiar si conclusions relating to the techniques, especially in the	and bonding of metals in biological systems eir relevance to metal homeostasis; metal-base eory relating to the basic foundation knowle tuations and mostly correct but erroneous us basic principles and knowledge of bioinorga e characterization of inorganic active site and ted command of knowledge and understandi ation knowledge of bioinorganic chemistry, diding of metals in biological systems; thermo ce to metal homeostasis; metal-based drugs, ting to the basic foundation knowledge of bioinorganic active site and basic principles and knowledge of bioinorganic active site and characterization of inorganic active site and characterization of inorganic active site and characterization of inorganic active site and careful properties.	sed drugs. Show evidence of so dge of bioinorganic chemistry, se of data and experimental re- nic chemistry. Demonstrate m overall metallo-biomolecules. ng of essential facts, concepts especially those related to har dynamic and kinetic aspects o Show evidence of limited abilit ioinorganic chemistry. Show I se of data and experimental re- ganic chemistry. Demonstrate overall metallo-biomolecules.	ome abilities to apply and Show ability to analyze sults to draw appropriate oderately effective basic principles, and theories rd-soft acid-base theory; if metal ions in biological ies to apply and integrate imited ability to analyze sults to draw appropriate partially effective basic
	Fail	theories relating to the bas theory; chelation; structure biological processes and the and integrate knowledge an to analyze problems to m conclusions relating to the	idence of command of knowledge and under ic foundation knowledge of bioinorganic che and bonding of metals in biological systems eir relevance to metal homeostasis; metal-bas d theory relating to the basic foundation know ost familiar situations and erroneous use of basic principles and knowledge of bioinorgic characterization of inorganic active site and	mistry, especially those relate s; thermodynamic and kinetic sed drugs. Show little or no evic yledge of bioinorganic chemistr of data and experimental resu- anic chemistry. Demonstrate re	d to hard-soft acid-base aspects of metal ions in dence of abilities to apply y. Show little or no ability alts to draw appropriate
Communication- intensive Course	N				
Course Type	Lecture-ba	ased course			
Course Teaching	Activities	<b>;</b>	Details		No. of Hours
& Learning Activities	Lectures				36
	Tutorials		including literature survey & preser	itation	12
	Reading /	Self study			100
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignme	ents	(continuous assessment of assignments and presentation)	40	CLO 1,2,3,4
	Examinat	ion		60	CLO 1,2,3,4
Required/recommended reading and online materials	Bertini, I.; Reactivity Metals an	Gray, H. B.; Stiefel, University Science Bood Life, Moore C., RSC P nic Chemistry: Inorganio		logical Inorganic Chemi	istry: Structure and

CHEM3441	Organic	chemistry II (6 cred	dits)		Academic Year	2021	
Offering Department	Chemistry	,	•		Quota	300	
Course Co-ordinator	Dr Z X Hu	ang (1st sem); Prof X Y	Li (2nd sem), Chemistry (I	huangzx@hku.hk; x	riaoyuli @hku.hk)		
Teachers Involved	(Dr Z X Hu (Prof X D	uang,Chemistry) Li,Chemistry) Li,Chemistry)	· · · · · · · · · · · · · · · · · · ·	<u> </u>			
Course Objectives	chemistry	As a continuation from CHEM2441 Organic Chemistry I, this course aims to provide a solid foundation of organic chemistry together with CHEM2441. It focuses primarily on the basic principles to understand the structure and reactivity of organic molecules, with examples illustrating the role of organic chemistry in daily life and industry.					
Course Contents & Topics	amines; a	Chemistry of common organic functional groups: ketones and aldehydes; carboxylic acids and their derivatives; amines; aromatic compounds. Principles of organic synthesis. Detailed considerations of reaction mechanisms. Spectroscopic tools (UV-Vis, IR, NMR, and MS) for characterization and identification of organic compounds.					
Course Learning	On succes	ssful completion of this	course, students should be	able to:			
Outcomes	CLO 1 dr	aw correct structural re	oresentations of organic mo	olecules			
	CLO 2 un	nderstand the basic prin	ciples of structure and read	ctivity of organic mo	lecules		
	CLO 3 de	etermine structures of o	ganic compounds based o	n spectroscopic dat	ta		
	CLO 4 write reasonable mechanisms for transformations of common functional groups (alcohols, ethers, carbonyl compounds, aldehydes, ketones, carboxylic acids, acyl halides, anhydrides, esters, amides, nitriles, and amines)						
	CLO 5 appreciate the importance of organic chemistry in daily life						
	CLO 6 devise synthetic pathways to organic compounds using functional group chemistry						
Pre-requisites (and Co-requisites and Impermissible combinations)	students v	: CHEM3441 has been who admitted in 2014-	n changed to lecture-base 15 or before, they must e meet the Chemistry Major	enroll also CHEM3			
Offer in 2021 - 2022	Y 1st	sem 2nd sem Offer	in 2022 - 2023 : Y		Examination	Dec May	
Grade Descriptors (A+ to F)	Α	learning outcomes. Show s	stery at an advanced level of extrong analytical and critical abilitide range of complex, familiar and	es and logical thinking,			
	В	Demonstrate substantial co	ommand of a broad range of kno vidence of analytical and critical a	wledge and skills requir			
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations.						
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems.						
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems.						
		of analytical and critical abilities, logical and conerent thinking. Show very little or no ability to apply knowledge to solve problems.					
	N						
Communication- ntensive Course Course Type		ased course					

& Learning Activities	Lectures			36
	Tutorials			12
	Reading / Self study			100
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments		10	CLO 1,2,3,4,5,6
	Examination	1 x 3 hr written examination	70	CLO 1,2,3,4,5,6
	Test		20	CLO 1,2,3,4,5,6
Required/recommended reading and online materials	"Organic Chemistry", by Paula Chemistry. Chapters 14-20.	Y. Bruice, 2016, 8th Edition,	Pearson, with e-text	and Mastering

CHEM3442	Organic	chemistry of b	iomolecules (6 credits)		Academic Year	2021		
Offering Department	Chemistry	/			Quota	50		
Course Co-ordinator	Dr P H To	P H Toy, Chemistry (phtoy@hku.hk)						
Teachers Involved		Dr P H Toy,Chemistry) Dr. Y X Li,Chemistry)						
Course Objectives	,	ne major objective of this course is to give the students an understanding and appreciation of the role of organic nemistry in biology and biochemistry.						
Course Contents & Topics		ne chemistry of organic molecule groups such as carbohydrates, amino acids, peptides, coenzymes, nucleoud lipids will discussed. Enzyme catalysis, cofactors and inhibitors will also be presented.  In successful completion of this course, students should be able to:						
Course Learning	On succe	ssful completion of	this course, students should be	e able to:				
Outcomes	CLO 1	have a basic unde	rstanding of biologically importa	ant organic molecules				
	CLO 2	have a basic unde	rstanding of enzyme catalysis					
	CLO 3	appreciate how org	ganic chemistry plays an import	tant role in biology and	d biochemistry			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in C	HEM2442 or CHE	M3441					
Offer in 2021 - 2022	Y 1st	sem Offer in 202	22 - 2023 : Y		Examination	Dec		
Grade Descriptors (A+ to F)	Α	for attaining all the original thought, and	gh mastery at an advanced level of ext course learning outcomes. Show strong d ability to apply knowledge to a wide thal and presentational skills.	g analytical and critical abil	ities and logical thin	king, with evidence of		
	В							
	С	Demonstrate general but incomplete command of biomolecule organic chemistry knowledge, and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar problems. Apply moderately effective organizational and presentational skills.						
	D	Demonstrate partial but limited command of biomolecule organic chemistry knowledge, and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.						
	Fail  Demonstrate little or no evidence of command of biomolecule organic chemistry knowledge, and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.							
Communication- intensive Course	N	, , , ,	·		,			
Course Type	Lecture-b	ased course						
Course Teaching	Activitie	S	Details			No. of Hours		
& Learning Activities	Lectures					36		
_	Tutorials					12		
	Reading	/ Self study				100		
Assessment Methods and Weighting	Methods	•	Details	_	ing in final grade (%)	Assessment Methods to CLO Mapping		
	Examina	tion			50	CLO 1,2,3		
	Presenta				10	CLO 1,2,3		
	Test	·	2-mid term tests		40	CLO 1,2,3		
Required/recommended reading and online materials		Y.; Organic Chemi	stry (Pearson, 2017, 8th edition	n), Chapters 20-26.		, ,-		

CHEM3443	Organic chemistry laboratory (6 credits)	Academic Year	2021				
Offering Department	Chemistry	Quota	80				
Course Co-ordinator	Dr A M Y Yuen, Chemistry (maiyan@hku.hk)						
Teachers Involved	(Dr A M Y Yuen, Chemistry)						
	(Dr Y F Wang,Chemistry)						
Course Objectives	To provide students with intensive hands-on training of experimental chemistry and the opportunity to develop analytical and critical thinking skills through chemistry experiments. The course focuses on the practical aspects of a variety multistep syntheses. Chromatographic, instrumental, and spectroscopic techni holistic training of experimental organic chemistry.	scientific investigation of organic reaction	ations in organic ons, including and				
Course Contents & Topics	purification, and characterization of organic compounds; gas and liquid of	The course will include the following laboratory skills and practices: laboratory safety practice; preparation, purification, and characterization of organic compounds; gas and liquid chromatography; ultraviolet-visible spectrophotometry; infrared spectroscopy; NMR spectroscopy and melting point determination					
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 demonstrate a good practice of laboratory safety and exercise proper procedures for safe handling and usage of chemicals						

		,,	nalyze the results of chemical experiment				
		CLO 3 apply modern instrumentation techniques to characterize organic compounds and draw the results					
	CLO 4 co	mmunicate the resul	ts of their work to others				
	CLO 5 demonstrate problem-solving skills, critical thinking and analytical reasoning						
Pre-requisites (and Co-requisites and Impermissible combinations)	NOT for si (for studer Pass in C	Pass in CHEM2441; and pass in CHEM3441, or already enrolled in this course;  NOT for students who have passed CHEM3441A in semester 1, 2015-16, or CHEM3441 in or before 2014-2015  for students admitted in 2014-15 or before)  Pass in CHEM2441 or CHEM2442 or CHEM2443; and Pass in CHEM3441 or CHEM3442, or already enrolled in any of these two courses (for students admitted in 2015-16 or thereafter)					
Offer in 2021 - 2022		,	fer in 2022 - 2023 : Y	Examination	Dec May		
Grade Descriptors (A+ to F)	A	course learning outcom wide range of complet techniques. Critically appresentational skills.	knowledge and thorough command of concepts ar es. Show strong analytical and critical abilities and x, familiar and unfamiliar situations. Competently ppraise data to draw appropriate and insightful con	logical thinking, with ability to conduct experiment with e nclusions. Apply highly effect	o apply knowledge to a efficient lab skills and tive organizational and		
	В	learning outcomes. Sho critical abilities and logic	al command of a broad range of knowledge and ski ow substantial grasp and mastery of the subject k cal thinking, and ability to apply knowledge to familia d critical analysis of experimental data. Apply effecti	knowledge. Demonstrate evide ar and some unfamiliar situation	ence of analytical and ons. Show effective lab		
	С	outcomes. Show general abilities and logical think	out incomplete command of knowledge and skills al but incomplete grasp of the subject knowledge. I king, and ability to apply knowledge to most familian ted some ability to analyze experimental data critic	Demonstrate evidence of some r situations. Show moderately	e analytical and critical effective lab skills and		
	D	·					
			rective lab skills and teeriniques. Apply inflited of bar	rely effective organizational an	nd presentational skills.		
	Fail	Demonstrate little or no evidence of little or no and coherent thinking.	evidence of command of knowledge and skills requi grasp of the knowledge and understanding of the si Show very little or no ability to apply knowledge to techniques. Organization and presentational skills a	ired for attaining the course lea ubject. Lack of analytical and solve problems. Demonstrate	arning outcomes. Show critical abilities, logical minimally effective or		
	Fail N	Demonstrate little or no evidence of little or no and coherent thinking.	evidence of command of knowledge and skills requi grasp of the knowledge and understanding of the si Show very little or no ability to apply knowledge to	ired for attaining the course lea ubject. Lack of analytical and solve problems. Demonstrate	arning outcomes. Show critical abilities, logical minimally effective or		
intensive Course	N	Demonstrate little or no evidence of little or no and coherent thinking.	evidence of command of knowledge and skills requi grasp of the knowledge and understanding of the si Show very little or no ability to apply knowledge to techniques. Organization and presentational skills a	ired for attaining the course lea ubject. Lack of analytical and solve problems. Demonstrate	arning outcomes. Show critical abilities, logical minimally effective or		
intensive Course Course Type	N	Demonstrate little or no evidence of little or no and coherent thinking. ineffective lab skills and ith laboratory compon	evidence of command of knowledge and skills requi grasp of the knowledge and understanding of the si Show very little or no ability to apply knowledge to techniques. Organization and presentational skills a	ired for attaining the course lea ubject. Lack of analytical and solve problems. Demonstrate	arning outcomes. Show critical abilities, logical minimally effective or		
intensive Course Course Type Course Teaching	N Lecture wi	Demonstrate little or no evidence of little or no and coherent thinking. Ineffective lab skills and little laboratory compoints.	evidence of command of knowledge and skills requi grasp of the knowledge and understanding of the si Show very little or no ability to apply knowledge to techniques. Organization and presentational skills a nent course	ired for attaining the course lea ubject. Lack of analytical and solve problems. Demonstrate	arning outcomes. Show critical abilities, logical e minimally effective or ctive.		
intensive Course Course Type Course Teaching	N Lecture wi	Demonstrate little or no evidence of little or no and coherent thinking. Ineffective lab skills and little laboratory compoints.	evidence of command of knowledge and skills requi grasp of the knowledge and understanding of the si Show very little or no ability to apply knowledge to techniques. Organization and presentational skills a nent course  Details	ired for attaining the course lea ubject. Lack of analytical and solve problems. Demonstrate	arning outcomes. Show critical abilities, logical e minimally effective or critive.  No. of Hours		
intensive Course Course Type Course Teaching	N Lecture wi Activities Laborator Tutorials	Demonstrate little or no evidence of little or no and coherent thinking. Ineffective lab skills and little laboratory compoints.	evidence of command of knowledge and skills requi grasp of the knowledge and understanding of the si Show very little or no ability to apply knowledge to techniques. Organization and presentational skills a nent course  Details	ired for attaining the course lea ubject. Lack of analytical and solve problems. Demonstrate	arning outcomes. Show critical abilities, logical e minimally effective or critive.  No. of Hours 48		
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture wi Activities Laborator Tutorials	Demonstrate little or no evidence of little or no and coherent thinking. Ineffective lab skills and little laboratory composition in the laboratory composition is a second control of the laboratory composition.	evidence of command of knowledge and skills requi grasp of the knowledge and understanding of the si Show very little or no ability to apply knowledge to techniques. Organization and presentational skills a ment course  Details	ired for attaining the course lea ubject. Lack of analytical and solve problems. Demonstrate	arning outcomes. Show critical abilities, logical e minimally effective or ective.  No. of Hours 48 12		
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture wi Activities Laborator Tutorials Reading /	Demonstrate little or no evidence of little or no and coherent thinking. Ineffective lab skills and little laboratory composition of the laboratory composit	evidence of command of knowledge and skills requi grasp of the knowledge and understanding of the si Show very little or no ability to apply knowledge to techniques. Organization and presentational skills a nent course  Details  12 x 4-hr lab sessions	ired for attaining the course lea ubject. Lack of analytical and solve problems. Demonstrate re minimally effective or ineffe	narning outcomes. Show critical abilities, logical e minimally effective or ective.  No. of Hours 48 12 100 Assessment Methods to CLO		
Communication- intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting	N Lecture wi Activities Laborator Tutorials Reading / Methods	Demonstrate little or no evidence of little or no evidence or little or	evidence of command of knowledge and skills requigraps of the knowledge and understanding of the sign show very little or no ability to apply knowledge to techniques. Organization and presentational skills a ment course    Details   12 x 4-hr lab sessions	ired for attaining the course lea ubject. Lack of analytical and solve problems. Demonstrate re minimally effective or ineffe Weighting in final course grade (%)	narning outcomes. Show critical abilities, logical e minimally effective or extive.  No. of Hours 48 12 100 Assessment Methods to CLO Mapping		
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture wi Activities Laborator Tutorials Reading / Methods  Examinati Laborator John W.	Demonstrate little or no evidence of little or no and coherent thinking, ineffective lab skills and little laboratory comports.  Y Self study  y reports	evidence of command of knowledge and skills requigrasp of the knowledge and understanding of the show very little or no ability to apply knowledge to techniques. Organization and presentational skills a nent course  Details  12 x 4-hr lab sessions  Details  (20% practical exam and 30% 2-hr written exam)  (Include Lab Quiz 15%, Lab Report and Notebook 25% and	ired for attaining the course lea ubject. Lack of analytical and solve problems. Demonstrate are minimally effective or ineffe Weighting in final course grade (%)	Assessment Methods to CLO Mapping CLO 1,2,3,4,5		

CHEM3445	Integrated	ooratory (6 credits)		Academic Year	2021
Offering Department	Chemistry			Quota	20
Course Co-ordinator	Dr A M Y Yue	Chemistry (maiyan@hku.hk)			
Teachers Involved	(Dr A M Y Yu (Dr J He,Che				
Course Objectives	organometalli vacuum and separation of extraction tec	ns to provide students with experience chemistry. This advanced synthesis of cert atmosphere techniques to prepare xtures and isolation of products by use iques. Experiments on characterization of part of the course. The use of the chemical provides and provides are the course.	ourse covering a variety e organic and organom of column and thin-layer and identification by che	of synthetic me etallic compound chromatography mical and spectr	ethods, including ds; methods fo , sublimation an oscopic method
Course Contents & Topics		include the following laboratory skills and ng, experimental set up, purification, and techniques.			
Course Learning Outcomes	CLO 1 Demo usage CLO 2 Demo CLO 3 Apply the re CLO 4 Analy	ompletion of this course, students should trate a good practice of laboratory safe formicals trate proficiency in synthetic chemical la odern instrumentation techniques to chalts the influence of chemical structure on the trate problem-solving skills, critical thinki	ety and exercise proper p boratory techniques aracterize organic compo ne physical and chemical	ounds and draw o	conclusions fron
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in CHE	443 or already enrolled in this course			
Offer in 2021 - 2022	Y Summ	Offer in 2022 - 2023 : Y		Examination	No Exam
Grade Descriptors	A De	nstrate extensive knowledge and thorough comn	nand of concepts and principle	s which are required	for attaining all th

(A+ to F)		wide range of complex, techniques. Critically appropresentational skills.	Show strong analytical and critical abilities an familiar and unfamiliar situations. Competent aise data to draw appropriate and insightful of	tly conduct experiment with conclusions. Apply highly effect	efficient lab skills and ctive organizational and			
	В	•						
	С	outcomes. Show general babilities and logical thinking	incomplete command of knowledge and skill but incomplete grasp of the subject knowledge, g, and ability to apply knowledge to most famil some ability to analyze experimental data cr	Demonstrate evidence of sor ar situations. Show moderatel	ne analytical and critical y effective lab skills and			
	D	some of factual information apply them. Demonstrate Demonstrate partially effect	ited command of knowledge and skills required n of the subject. Show a partial comprehensio evidence of some coherent and logical thin tive lab skills and techniques. Apply limited or b	n of basic concepts and princi king, but with limited analytic arely effective organizational a	ples and weak ability to cal and critical abilities. and presentational skills.			
	Fail	evidence of little or no gra and coherent thinking. Sho	idence of command of knowledge and skills req sp of the knowledge and understanding of the ow very little or no ability to apply knowledge i chniques. Organization and presentational skills	subject. Lack of analytical and solve problems. Demonstra	d critical abilities, logical te minimally effective or			
Communication- intensive Course	N							
Course Type	Lecture wi	th laboratory compone	nt course					
Course Teaching	Activities		Details		No. of Hours			
& Learning Activities	Laborator	y			48			
	Tutorials				12			
	Reading / Self study				100			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Laborator	y reports	(Practical Examination 25%; Lab report 10%; Lab performance 10%)	45	CLO 1,2,3,4,5			
	Presentat	ion	,	20	CLO 3,4,5			
	Test		Test/ Quiz	35	CLO 1,2,3,4,5			
Required/recommended reading and online materials		Lehman: Operational latest edition)	Organic Chemistry - A Problem-So	lving Approach to the	Laboratory Course			
Additional Course Information	Laboratory course.	classes are mandato	ry. Students must complete ALL expe	eriments and laboratory	reports to pass this			

	credits	al chemistry: Introduction to quantum chemistry (6	Academic Year	2021			
Offering Department	Chemistr	у	Quota	100			
Course Co-ordinator	Dr C Y Y	am, Chemistry <i>(yamcy</i> @ <i>yangtze.hku.hk)</i>					
Teachers Involved	(Dr C Y )	/am,Chemistry)					
Course Objectives	foundation	rse presents fundamental principles and topics on quantum chei on for students intending to further their studies in chemistry.		•			
Course Contents & Topics	mechanic particle in structure theory, a	Elementary quantum mechanics: Historical development, Postulates of quantum mechanics, Principles of quantum mechanics, Theory of angular momentum, Heisenberg uncertainty principle. Applications to simple systems: particle in a box, harmonic oscillator, rigid rotator; Atomic structure: Hydrogen and many electron atoms. Molecular structure and chemical bonds. Approximation methods: variational method, Hartree-Fock method, valence bond theory, and perturbation theory.					
Course Learning	On succe	essful completion of this course, students should be able to:					
Outcomes	CLO 1 u	inderstand and use the terminology and nomenclature in quantum course					
	n	lemonstrate knowledge and understanding of basic concepts in nolecular structure	•				
	CLO 3 understand elementary numerical procedures and the basic relationships of quantum mechanics and molecular systems						
		•					
	CLO 4 h	ands-on experience of the application of Hartree-Fock method to mo	lecules				
(and Co-requisites and Impermissible	CLO 4 h	•	lecules				
Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2021 - 2022	CLO 4 h	ands-on experience of the application of Hartree-Fock method to mo	lecules Examination	Dec			
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022	CLO 4 h	ands-on experience of the application of Hartree-Fock method to mo CHEM2541  t sem Offer in 2022 - 2023 : Y  Demonstrate thorough mastery at an advanced level of extensive knowledge a learning outcomes. Show strong analytical and critical abilities and logical thinking, to apply knowledge to a wide range of complex, familiar and unfamiliar situations. A	<b>Examination</b> nd skills required for att, with thorough grasp of the	aining all the course he subject, and ability			
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	CLO 4 h Pass in C	ands-on experience of the application of Hartree-Fock method to mo CHEM2541  t sem Offer in 2022 - 2023 : Y  Demonstrate thorough mastery at an advanced level of extensive knowledge a learning outcomes. Show strong analytical and critical abilities and logical thinking,	<b>Examination</b> nd skills required for att , with thorough grasp of the skills of the s	aining all the course he subject, and ability skills and techniques at most of the course grasp of the subject			
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	CLO 4 h Pass in C	ands-on experience of the application of Hartree-Fock method to mo CHEM2541  It sem Offer in 2022 - 2023 : Y  Demonstrate thorough mastery at an advanced level of extensive knowledge a learning outcomes. Show strong analytical and critical abilities and logical thinking, to apply knowledge to a wide range of complex, familiar and unfamiliar situations. A Critical use of data and results to draw appropriate and insightful conclusions.  Demonstrate substantial command of a broad range of knowledge and skills reqlearning outcomes. Show evidence of analytical and critical abilities and logical thinking to apply knowledge to familiar and some unfamiliar situations. Apply effective	Examination  nd skills required for att , with thorough grasp of the opply highly effective laburied for attaining at least thinking, and substantial elab skills and technique and for attaining most of king, and general but income.	aining all the course the subject, and ability skills and techniques at most of the course grasp of the subject s. Correct use of data the course learning complete grasp of the			
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	CLO 4 h Pass in 0 Y 1s A B	ands-on experience of the application of Hartree-Fock method to mo CHEM2541  It sem Offer in 2022 - 2023 : Y  Demonstrate thorough mastery at an advanced level of extensive knowledge a learning outcomes. Show strong analytical and critical abilities and logical thinking, to apply knowledge to a wide range of complex, familiar and unfamiliar situations. A Critical use of data and results to draw appropriate and insightful conclusions. Demonstrate substantial command of a broad range of knowledge and skills requestive apply knowledge to familiar and some unfamiliar situations. Apply effective of results to draw appropriate conclusions.  Demonstrate general but incomplete command of knowledge and skills require outcomes. Show evidence of some analytical and critical abilities and logical thin subject, ability to apply knowledge to most familiar situations. Apply moderately effective of the command of the comman	Examination  Ind skills required for att, with thorough grasp of the poly highly effective laburied for attaining at leasthinking, and substantial le lab skills and technique lead for attaining most of king, and general but indicective lab skills and technique in the cours aining some of the cours and critical abilities. Should be comply the cours and critical abilities. Should be comply the cours and critical abilities.	aining all the course he subject, and ability skills and techniques at most of the course grasp of the subject s. Correct use of data the course learning complete grasp of the niques. Mostly correct e learning outcomes ow partial but limitec olve problems. Apply			

Communication- intensive Course	N						
Course Type	Lecture with laboratory component course						
Course Teaching	Activities	Details		No. of Hours			
& Learning Activities	Lectures						
	Laboratory			24			
	Tutorials			6			
	Reading / Self study			100			
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Examination		70	CLO 1,2,3			
	Laboratory reports	Experiment & Lab report	20	CLO 1,2,3,4			
	Test	Test/Quiz	10	CLO 1,2,3			
Required/recommended reading and online materials	D. A. McQuarrie: Quantum Ch I. N. Levin: Quantum Chemistr		·				
Additional Course Information	Laboratory classes are manda course.	atory. Students must complete ALL	experiments and laboratory	reports to pass this			

CHEM3542	Physical chemistry: statistical thermodynamics and kinetics theory (6 credits)  Academic Y		2021				
Offering Department	Chemistry	1		Quota	50		
Course Co-ordinator	Dr. J Yang, Chemistry (juny@hku.hk)						
Teachers Involved		(Dr J Yang,Chemistry)					
Course Objectives	The course presents fundamental principles and topics on statistical thermodynamics and kinetic theory in order to provide a solid foundation for students intending to further their studies in physical chemistry and related fields.						
Course Contents & Topics	- Statistica - Statistica - Ensemb - Systems - Molecula - Ideal gas - Calculati	al entropy les and partition functior c of independent molecu ar degrees of freedom: to s mixture: chemical equi ion of free energies in ga equilibrium and kinetics	bution for thermodynamics  ns: microcanonical and canonical  les: ideal gas  ranslation, rotation, vibration, and election  aseous reaction  theory	ctronic			
			nsition state theory and applications				
Course Learning Outcomes	CLO 1 ur in CLO 2 de	nderstand and use the to the course emonstrate knowledge a	course, students should be able to: erminology and nomenclature in statis and understanding of basic concepts in tween macroscopic observables and	n statistical thermodynan	nics		
Pre-requisites (and Co-requisites and Impermissible combinations)		HEM2541	,	,	,		
Offer in 2021 - 2022	Y 2nd	sem Offer in 2022 - 2	2023 : Y	Examination	May		
Grade Descriptors (A+ to F)	A Thorough mastery at an advanced level of extensive knowledge of statistical thermodynamics and reaction dynamics. Demonstrate evidence of strong analytical / critical abilities and logical thinking. Can apply the knowledge to practical questions in Physical Chemistry.						
	B Substantial command of knowledge of statistical thermodynamics and reaction dynamics. Demonstrate evidence of analytical / critical abilities and logical thinking. Understand the scope of Physical Chemistry questions that can be applied with the knowledge.  C General but incomplete command of knowledge of statistical thermodynamics and reaction dynamics. Demonstrate evidence of analytical thinking. Can apply the knowledge to familiar situations.  D Partial but limited command of knowledge of knowledge of statistical thermodynamics and reaction dynamics. Demonstrate limited evidence of analytical thinking. Understand the question to be solved with knowledge.						
	Fail	Little or no evidence of com	mand of knowledge of statistical thermodynam	ics and reaction dynamics.			
Communication-	N						
intensive Course	14	!4L 1_L 4					
Course Type Course Teaching	Activities	ith laboratory componer	Details		No. of Hours		
& Learning Activities		•	Details		24		
- Louining Activities	Lectures Laborator	rv			24		
	Tutorials	у			4		
		/ Self study			100		
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods		
	Accienments			50	to CLO Mappin CLO 1,2,3		
	Assignments						
reading and	Examinat P. Atkins: K.A. Dill & nanoscice B. Widom	rion Physical Chemistry (10th S. S. Bromberg: Molecuence (2nd edition) Statistical Mechanics:	lar driving forces: statistical thermod a concise introduction to chemists		CLO 1,2,3		
Required/recommended reading and online materials	Examinat P. Atkins: K.A. Dill & nanoscice B. Widom	rion Physical Chemistry (10th S. S. Bromberg: Molecuence (2nd edition) Statistical Mechanics:	lar driving forces: statistical thermod a concise introduction to chemists				

before taking this course.

CHEM3999	Directed	studies in chemist	ry (6 credits)	Academic Yea	r 2021			
Offering Department	Chemistry		<u>-</u> ·	Quota				
Course Co-ordinator	Prof D L P	hillips, Chemistry (phillip	os @hku.hk)					
Teachers Involved	(Various te	Various teachers in the Department,Chemistry)						
Course Objectives		his course is designed for third year students who would like to take an early experience on research. It offers udents an opportunity to carry out small scale chemical projects by themselves.						
Course Contents & Topics	Students i	idents an opportunity to carry out small scale chemical projects by themselves.  udents interested in taking this course should contact their prospective supervisors in May to determine the intents and the nature of their project in the coming academic year. Prior approval from both the prospective pervisor and the course coordinator is required.						
Course Learning Outcomes	CLO 1 un	orked on in the course	with the small scale cher					
			nd understanding of basic concepts					
			ps of the their particular chemical pr		•			
Pre-requisites (and Co-requisites and Impermissible combinations)	CHEM4XX or CHEM3 This capst This cours	(X) in the Chemistry Ma 1146. one course is for Chemi e is designed for third yo	advanced level disciplinary core/e ajor including a pass in CHEM2341 stry Major/ Chemistry Major (Intensi ear students who would like to take ed to take this capstone course is the	or CHEM2441 or CHEM2 ve) students only. an early experience on res	442 or CHEM2541			
Offer in 2021 - 2022		sem 2nd sem Offer	•	Examination	No Exam			
Grade Descriptors (A+ to F)	A B C	originality. Illuminating utiliz sources. Critical employmer of a wide range of appropriskills. [Work of A+ should de Show a substantial comprinformation from sources. D Correct utilization of data ar and methods. Perform effect Show a general but incomprelevant information from so but some incorrect utilization theories, principles, data and Show a partial but limited coherent and logical thinkin but mostly via summary ins conclusions. Demonstrate li organizational and presental		information acquired from a wide te and illuminating conclusions. In Employ very effective organizatic at that is required in wider areas responsibility and critical thinking omparisons between different secondose general integration of the ce of some analytical and critical training or some analytical and critical responsibility. The ce of some analytical and critical responsibility of the conclusions. Demonstrate some anizational and presentational skillevant information, of the subjectives. Show utilization and referer a ability to employ data and result and methods. Perform limited	range of high quality bemonstrate integration and and presentational and presentational elevant to the topic.] with use of relevant condary interpretations. ecries, principles, data all thinking with use of teations. Mainly correct partial integration of lls. ect. Presence of some ace of several sources, its to form appropriate or marginally effective			
	Fail  Show little or no comprehension of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Limited employment of secondary sources and no critical comparison of them. Incorrectly utilize data and results and/or unable to form appropriate conclusions. Demonstrate little or no integration of theories, principles, data and methods. Organization and presentational skills are of very limited use or ineffective.							
Communication- intensive Course	N							
Course Type	Project-ba	sed course						
Course Teaching	Activities		Details		No. of Hours			
& Learning Activities	Reading /	Self study	discussion & meetings to be arran the supervisor	ged by the student and	120			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Dissertation	on	including a written report and an oral presentation	100	CLO 1,2,3			
Required/recommended reading and online materials	Recomme	nded reading material w	vill be assigned depending on the pro	oject.				
Additional Course	Exception	al academic strength of	the students is required for taking th	is course.				

CHEM4142	Symm	netry, group theory and applications (6 credits)	Academic Year	2021			
Offering Department	Chemis		Quota	60			
Course Co-ordinator	Dr E C	M Tse, Chemistry (ecmtse @hku.hk)					
Teachers Involved		M Tse,Chemistry) H Ng,Chemistry)					
Course Objectives	course spectro	oduce the concepts of symmetry and group theory and to apply the also provides an introductory treatment of bonding theories, scopy. This course is essential for students who wish to take advances of spectroscopy.	inorganic electronic	and vibrational			
Course Contents & Topics	charact molecu	etry elements and symmetry operations; symmetry point groups; reducer tables; direct products; symmetry-adapted linear combinations; lar orbital theory for organic, inorganic and organometallic systems; and spectroscopy.	projection operators	; hybrid orbitals;			
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 understand the basic principles and concepts of symmetry and group theory and to apply them in solving chemical problems						
	CLO 2 demonstrate knowledge and understanding in the use of character tables and projection operator techniques						
	CLO 3 demonstrate knowledge and understanding of bonding theories involving hybrid orbitals and molecular orbitals for organic, inorganic and organometallic systems						
	CLO 4 demonstrate knowledge and understanding in the application of symmetry and group theory in electronic						

	a	nd vibrational spectrosc	ору				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in C	CHEM3341					
Offer in 2021 - 2022	Y 1s	t sem Offer in 2022 - 2	023 : Y	Examination	Dec		
Grade Descriptors (A+ to F)	A	and group theory and the symmetry operations; sym symmetry-adapted linear molecular orbitals for orgal Show strong ability to appl group theory and their app	ir applications in solving chemi innetry point groups; reducible i combinations; projection operat nic, inorganic and orgametallic s y and integrate knowledge and t lications in bonding, and electron f data and experimental results to	sential facts, concepts, principles, and theo cal problems, especially those related to and irreducible representations; character ors; treatment of bonding theories includ ystems; and applications in electronic and heory relating to the basic principles and coic and vibrational spectroscopy. Show strong of draw appropriate and insightful conclusions	symmetry elements and tables; direct products; ling hybrid orbitals and vibrational spectroscopy. Oncepts of symmetry and g ability to analyze novel		
	В	to symmetry and group ti elements and symmetry po- products; symmetry-adapte and molecular orbitals fo spectroscopy. Show evide symmetry and group theor analyze novel problems a	heory and their applications in perations; symmetry point group; ed linear combinations; projection or organic, inorganic and orga- ince to apply and integrate known y and their applications in bond	standing of essential facts, concepts, princip solving chemical problems, especially tho s; reducible and irreducible representations in operators; treatment of bonding theories metallic systems; and applications in ele- wedge and theory relating to the basic pri- ing, and electronic and vibrational spectros- perimental results to draw appropriate con-	se related to symmetry ;; character tables; direct including hybrid orbitals ectronic and vibrational nciples and concepts of acopy. Show evidence to		
	С	theories relating to symme symmetry elements and stables; direct products; sy hybrid orbitals and molec vibrational spectroscopy. S principles and concepts of spectroscopy. Show ability	try and group theory and their a symmetry operations; symmetry mmetry-adapted linear combinat ular orbitals for organic, inorga show evidence of some abilities of symmetry and group theory to analyze problems to most fe	Ige and understanding of essential facts, opplications in solving chemical problems, expoint groups; reducible and irreducible reions; projection operators; treatment of bonic and orgametallic systems; and applic to apply and integrate knowledge and the and their applications in bonding, and el milliar situations and mostly correct but erry to the principles and applications of symming.	specially those related to presentations; character inding theories including ations in electronic and orry relating to the basic ectronic and vibrational oneous use of data and		
	D	experimental results to draw appropriate conclusions relating to the principles and applications of symmetry and group theory.  Demonstrate partial but limited command of knowledge and understanding of essential facts, concepts, principles, and theories relating to symmetry and group theory and their applications in solving chemical problems, especially those related to symmetry elements and symmetry operations; symmetry point groups; reducible and irreducible representations; character tables; direct products; symmetry-adapted linear combinations; projection operators; treatment of bonding theories including hybrid orbitals and molecular orbitals for organic, inorganic and orgametallic systems; and applications in electronic and vibrational spectroscopy. Show evidence of limited abilities to apply and integrate knowledge and theory relating to the basic principles and concepts of symmetry and group theory and their applications in bonding, and electronic and vibrational spectroscopy. Show limited ability to analyze problems to most familiar situations and mostly correct but erroneous use of data and experimental					
	Fail	Demonstrate little or no en theories relating to symmen symmetry elements and stables; direct products; sy hybrid orbitals and molect vibrational spectroscopy. S principles and concepts of spectroscopy. Show little	vidence of command of knowled try and group theory and their a symmetry operations; symmetry mmetry-adapted linear combinat ular orbitals for organic, inorga how little or no evidence of abilit of symmetry and group theory or no ability to analyze proble	oles and applications of symmetry and group Ige and understanding of essential facts, of applications in solving chemical problems, even point groups; reducible and irreducible re- ions; projection operators; treatment of bo- nic and orgametallic systems; and applically es to apply and integrate knowledge and the and their applications in bonding, and elems to most familiar situations and error to the principles and applications of symminals.	concepts, principles, and specially those related to presentations; character anding theories including ations in electronic and ecry relating to the basic ectronic and vibrational ectronic and vibrational ecous use of data and		
Communication-	N				, , , ,		
intensive Course							
Course Type		pased course					
Course Teaching	Activitie		Details		No. of Hours		
& Learning Activities	Lectures		an diagraphs :-		36		
	Tutorials		or discussion		12		
A		/ Self study			100		
Assessment Methods and Weighting	Methods	3	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignm	ents		25	CLO 1,2,3,4		
	Examina			50	CLO 1,2,3,4		
	Test		Test / Project	25	CLO 1,2,3,4		
Required/recommended reading and online materials		on: Chemical Applicatior	ns of Group Theory (Wiley,		,,,,,,,		
Additional Course	This cour	ee is also offered to PD	r students, and the course	code for RPg students is CHEM61	16		
	THIS COUL	se is also offered to RP(	y stauents, and the course	COUC IOI IXI 9 SIGUEITIS IS CITEIVIOT	10.		
Information							

CHEM4143	Interfacial science and technology (6 credits)	Academic Year	2021
Offering Department	Chemistry	Quota	50
Course Co-ordinator	Prof G K Y Chan, Chemistry (hrsccky@hku.hk)		
Teachers Involved	(Prof G K Y Chan,Chemistry) (Visiting Professor,Chemistry)		
Course Objectives	To understand the science and technology of interfacial phenomena and proceed added products and modern technologies.	esses often appea	red in high value
Course Contents & Topics	Physics and Chemistry of Interfaces: coatings and surfactants, colloids and inte films, nanomaterials, porous materials.	rfaces, wetting, m	icroemulsion, thin
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 understand interfacial phenomena and their origin from molecular details CLO 2 solve problems in interfacial science and technology by applying I thermodynamics, and kinetics CLO 3 be familiarized with technologies that require application of interfacial nanotechnology, detergency, composite polymers, and porosimetry	knowledge of ger	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in CHEM3143 or CHEM3541 or CHEM3542		

Offer in 2021 - 2022	N Of	fer in 2022 - 2023 : Y		Examination				
Grade Descriptors (A+ to F)	A	Demonstrate thorough knowledge of interfacial science and technology, and mastery of skills required for attaining all of the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to solve problems in a wide range of complex, familiar and unfamiliar situations. Critical use of data and sourcing of references. Apply highly effective organizational and presentational skills.						
	В							
	С	attaining most of the course ability to apply knowledge	e learning outcomes. Show evid	acial science and technology and comma lence of some analytical and critical abilities ar situations. Mostly correct but some erro resentational skills.	and logical thinking, and			
	D	some of the course learning critical abilities. Show limited	ng outcomes. Show evidence of	cience and technology and command of sk f some coherent and logical thinking, but wo o solve problems. Limited ability to use data titional skills.	ith limited analytical and			
	Fail	attaining the course learning	g outcomes. Lack of analytical adge to solve problems. Misuse	acial science and technology, and comma and critical abilities, logical and coherent thi of data and references. Organization and	nking. Show very little o			
Communication- intensive Course	N	· ·						
Course Type	Lecture-b	ased course						
Course Teaching	Activitie	s	Details	No. of Hours				
& Learning Activities	Lectures			36				
	Tutorials		or discussion	12				
	Reading	/ Self study		100				
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignm	ents		15	CLO 1,2,3			
	Examina	tion		50	CLO 1,2,3			
	Test			35	CLO 1,2,3			
Required/recommended	Barnes a	nd Gentle: Interfacial Sci	ience					
reading and online materials	Dairies a	ia Gerillo. Interfacial Go	Reflec					

CHEM4144	Advanc	ced mat	erials (6 cr	edits)						Academic Yea	r  2	2021
Offering Department	Chemistr	stry	•	•						Quota	3	30
Course Co-ordinator	Dr E C N	Dr E C M Tse, Chemistry (ecmtse @hku.hk)										
Teachers Involved	(Dr E C N	M Tse,Ch	emistry)									
	Dr K Ok	(Dr K Okuro, Chemistry)										
Course Objectives	on mate	This course is a continuation from Introdution to Materials Chemistry. It provides a more compreheisive overview on materials chemistry and application of materials in advanced technology. The most recent development in materials chemistry will also be discussed.										
Course Contents & Topics	control o	Advanced polymerization methods: copolymerization and applications of copolymers, coordination polymerization, control of stereochemistry in polymers; ionic and radical living polymerization. Materials for specialty applications: high strength materials; high temperature polymers, polyelectrolytes, conducting polymers, optical information storage, sensors, photonics, electronics, nanotechnology. Advanced materials characterization techniques.										
Course Learning	On succe	cessful cor	npletion of th	is course	, studer	nts shou	ld be al	ble to:				
Outcomes	p	polymeriz	ations				. ,		•	nation polymeriza		,
			camples of so properties affe						erature/h	nigh strength app	lica	itions, and hov
	CLO 3 d	demonstra	ate knowledg	e in adva	inced m	aterials	charact	terizatior	n techniqu	ies		
	CLO 4 u	understan	d the working	g principle	es of ma	aterials	for infor	mation s	torage ar	nd opto-electronic	ap	oplications
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in (	CHEM314	13									
Offer in 2021 - 2022	Y 2n	nd sem	Offer in 2022	- 2023 :	Υ					Examination	1	Лау
Grade Descriptors (A+ to F)	A	approad ability to ability to	ch in polymer sy apply and integ	nthesis, pro grate knowle problems a	operties, a edge and nd critical	pplication theory re use of da	, and cha ating to that ata and ex	aracterizati ne synthes	ion of mate is and appl	principles, and theorials for advanced terications of advanced draw appropriate and	chno mat	ology. Show stron erials. Show stron
	В	B Demonstrate substantial command of knowledge and understanding of essential facts, concepts, principles, and theories relating to frontier approach in polymer synthesis, properties, application, and characterization of materials for advanced technology. Show evidence to apply and integrate knowledge and theory relating to the synthesis and applications of advanced materials. Show evidence to analyze novel problems and correct use of data and experimental results to draw appropriate conclusions relating to advanced materials synthesis and their properties.										
	С							erials for advance the synthesis and rrect but erroneou				
	D											
	Fail	Demons	strate little or no							f essential facts, cor d characterization of		

	applications of adva	nced materials. Show little or no ability	ly and integrate knowledge and theory relat to analyze problems to most familiar situation ons relating to advanced materials synthesis	ons and erroneous use of	
Communication- intensive Course	N				
Course Type	Lecture-based course				
Course Teaching	Activities	Details		No. of Hours	
& Learning Activities	Lectures				
	Tutorials	or discussion	12		
	Reading / Self study		100		
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignments		30	CLO 1,2,3,4	
	Examination		50	CLO 1,2,3,4	
	Test		20	CLO 1,2,3,4	
Required/recommended reading and online materials	Specialist references will be	given throughout the course.			

CHEM4145	Medicin	nal chemistry (6 credits)	Academic Year	r  2021				
Offering Department	Chemistr		Quota	40				
Course Co-ordinator	Dr Y Li, C	Chemistry (yingli0e@hku.hk)						
Teachers Involved	(Dr P H T	Toy,Chemistry)						
	(Dr Y Li,C	Chemistry) CLi,Chemistry)						
Course Objectives			nd uses as an introd	fuction to research				
course Objectives	in areas	This course covers the chemical principles of drug design and drug action and uses as an introduction to researc in areas of bioorganic chemistry, bioinorganic chemistry, medicinal chemistry, pharmaceutical chemistry, and biotechnology.						
Course Contents & Topics	computer - Drug-re - Proteins - Metals i - DNA-Dr	Drug discovery, design, and development: lead discovery, pharmacophore, structure-activity relationships (Scomputer-aided drug design, combinatorial chemistry and high-throughput drug screening Drug-receptor interactions Proteins (and enzymes) and nucleic acids as drug targets Metals in medicine DNA-Drug interactions Drug metabolism and prodrugs and drug delivery						
Course Learning		essful completion of this course, students should be able to:						
Outcomes	CLO 1	demonstrate knowledge of drug discovery, design and developme	ant					
Sucomes	CLO 1		JIIL					
		understand drug-biomolecule interactions where appropriate	,					
<b>.</b>	CLO 3	gain appropriate knowledge of drug metabolism and drug delivery		1 1 " :				
Pre-requisites (and Co-requisites and Impermissible combinations)	this cours	CHEM3441 or CHEM3442; and Not for students who have passed se.	in BPHM3133, or a	already enrolled				
Offer in 2021 - 2022	Y 2n	d sem Offer in 2022 - 2023 : Y	Examination	May				
Grade Descriptors (A+ to F)	A	Demonstrate thorough knowledge and understanding of essential facts, concept foundation knowledge of medicinal chemistry, especially those related to drug dis drug lead optimization; structure activity relationship; pharmacokinetics; drug deli ability to apply and integrate knowledge and theory relating to the basic founds	scovery, design and deve ivery and its relevance to	elopment; drug targets toxicity. Show stron				
		strong ability to analyze novel problems and critical use of data and experime conclusions relating to the basic principles and knowledge of medicinal chemistry for medicinal chemistry, especially in drug discovery and metabolism.	ntal results to draw app . Demonstrate highly effe	ropriate and insightfective basic technique				
	В	strong ability to analyze novel problems and critical use of data and experime conclusions relating to the basic principles and knowledge of medicinal chemistry	ntal results to draw app. Demonstrate highly effects, concepts, principled to drug discovery; destitics; drug delivery and it of foundation knowledge conental results to draw appendix of the suntal results to draw	ropriate and insightfi- ective basic techniques, s, and theories relatir sign and developmer s relevance to toxicit of medicinal chemistro- propriate conclusion				
	С	strong ability to analyze novel problems and critical use of data and experime conclusions relating to the basic principles and knowledge of medicinal chemistry for medicinal chemistry, especially in drug discovery and metabolism.  Demonstrate substantial command of knowledge and understanding of essential to the basic foundation knowledge of medicinal chemistry; especially those relate drug targets; drug lead optimization; structure activity relationship; pharmacokine Show evidence to apply and integrate knowledge and theory relating to the basic Show evidence to analyze novel problems and correct use of data and experin relating to the basic principles and knowledge of medicinal chemistry. Demons chemistry, especially in drug discovery and metabolism.  Demonstrate general but incomplete command of knowledge and understandin theories relating to the basic foundation knowledge of medicinal chemistry; especial development; drug targets; drug lead optimization; structure activity relations relevance to toxicity. Show evidence of some abilities to apply and integrate foundation knowledge of medicinal chemistry. Show ability to analyze problems to erroneous use of data and experimental results to draw appropriate conclusions or medicinal chemistry. Demonstrate moderately effective basic techniques, basic te	ntal results to draw app. Demonstrate highly effects, concepts, principles at to drug discovery; destics; drug delivery and it foundation knowledge onental results to draw astrate effective basic tects of the destination o	ropriate and insightf- ctive basic technique s, and theories relatir- sign and developmer s relevance to toxicit of medicinal chemistr- propriate conclusion- thniques for medicinal necepts, principles, and discovery; design and drug delivery and it relating to the basi and mostly correct b ples and knowledge				
		strong ability to analyze novel problems and critical use of data and experime conclusions relating to the basic principles and knowledge of medicinal chemistry, especially in drug discovery and metabolism.  Demonstrate substantial command of knowledge and understanding of essential to the basic foundation knowledge of medicinal chemistry; especially those related drug targets; drug lead optimization; structure activity relationship; pharmacoking Show evidence to apply and integrate knowledge and theory relating to the basic Show evidence to analyze novel problems and correct use of data and experin relating to the basic principles and knowledge of medicinal chemistry. Demons chemistry, especially in drug discovery and metabolism.  Demonstrate general but incomplete command of knowledge and understandin theories relating to the basic foundation knowledge of medicinal chemistry; especi development; drug targets; drug lead optimization; structure activity relations relevance to toxicity. Show evidence of some abilities to apply and integrate foundation knowledge of medicinal chemistry: especial development and the principles of medicinal chemistry. Show ability to analyze problems to erroneous use of data and experimental results to draw appropriate conclusions of the principles of the pri	ntal results to draw app. Demonstrate highly effects, concepts, principles do drug discovery; destricts; drug delivery and it to foundation knowledge onental results to draw apstrate effective basic tectory of the second of th	ropriate and insightf active basic technique s, and theories relatir sign and developmer s relevance to toxicit of medicinal chemistr propriate conclusion chniques for medicin- incepts, principles, an discovery; design ar drug delivery and it relating to the basis and mostly correct b iples and knowledge chemistry, especially principles, and theorie discovery; design and drug delivery and it relating to the basis situations and most the basis principles are				
	С	strong ability to analyze novel problems and critical use of data and experime conclusions relating to the basic principles and knowledge of medicinal chemistry, especially in drug discovery and metabolism.  Demonstrate substantial command of knowledge and understanding of essential to the basic foundation knowledge of medicinal chemistry; especially those relating targets; drug lead optimization; structure activity relationship; pharmacoking Show evidence to apply and integrate knowledge and theory relating to the basic Show evidence to analyze novel problems and correct use of data and experin relating to the basic principles and knowledge of medicinal chemistry. Demons chemistry, especially in drug discovery and metabolism.  Demonstrate general but incomplete command of knowledge and understandin theories relating to the basic foundation knowledge of medicinal chemistry; especi development; drug targets; drug lead optimization; structure activity relations relevance to toxicity. Show evidence of some abilities to apply and integrate foundation knowledge of medicinal chemistry. Show ability to analyze problems to erroneous use of data and experimental results to draw appropriate conclusions in medicinal chemistry. Demonstrate moderately effective basic techniques, basic tedrug discovery and metabolism.  Demonstrate partial but limited command of knowledge and understanding of es relating to the basic foundation knowledge of medicinal chemistry; structure activity relations relevance to toxicity. Show evidence of limited abilities to apply and integrate foundation knowledge of medicinal chemistry; surcture activity relations relevance to toxicity. Show evidence of limited abilities to draw appropriate correct but erroneous use of data and experimental results to draw appropriate correct but erroneous use of data and experimental results to draw appropriate correct but erroneous use of data and experimental results to draw appropriate correct but erroneous use of data and experimental results to draw appropriat	ntal results to draw app. Demonstrate highly effects, concepts, principles and to drug discovery; destics; drug delivery and its foundation knowledge of the foundation knowledge of the foundation knowledge of the foundation knowledge of the foundation knowledge of the foundation knowledge of the foundation knowledge and theory of most familiar situations of the foundation of the foundati	ropriate and insightficitive basic technique s, and theories relatirsign and developmer s relevance to toxicit of medicinal chemistropropriate conclusion thiniques for medicinal chemistropropriate conclusion thiniques for medicinal chemistropropriate conclusion thiniques for medicinal chemistry design and discovery; design and mostly correct b ples and knowledge chemistry, especially principles, and theorie discovery; design and delivery and it relating to the basi situations and most le basic principles and the principles and the principles and discovery; design and discovery; design and discovery; design and discovery; design and discovery; design and discovery; design and discovery; design and discovery; design and discovery; design ard				
	C	strong ability to analyze novel problems and critical use of data and experime conclusions relating to the basic principles and knowledge of medicinal chemistry, especially in drug discovery and metabolism.  Demonstrate substantial command of knowledge and understanding of essential to the basic foundation knowledge of medicinal chemistry; especially those relate drug targets; drug lead optimization; structure activity relationship; pharmacokines Show evidence to apply and integrate knowledge and theory relating to the basic Show evidence to analyze novel problems and correct use of data and experin relating to the basic principles and knowledge of medicinal chemistry. Demons chemistry, especially in drug discovery and metabolism.  Demonstrate general but incomplete command of knowledge and understandin theories relating to the basic foundation knowledge of medicinal chemistry; especial everlopment; drug targets; drug lead optimization; structure activity relations relevance to toxicity. Show evidence of some abilities to apply and integrate foundation knowledge of medicinal chemistry. Show ability to analyze problems to erroneous use of data and experimental results to draw appropriate conclusions in medicinal chemistry. Demonstrate moderately effective basic techniques, basic tedrug discovery and metabolism.  Demonstrate partial but limited command of knowledge and understanding of esteriating to the basic foundation knowledge of medicinal chemistry; especially development; drug targets; drug lead optimization; structure activity relations relevance to toxicity. Show evidence of limited abilities to apply and integrate foundation knowledge of medicinal chemistry. Demonstrate partially effective basic techniquiscovery and metabolism.  Demonstrate partial but limited command of knowledge and understandin theories relating to the basic foundation knowledge of medicinal chemistry is expecially development; drug targets; drug lead optimization; structure activity relations relevance to toxicity. Show little or no	ntal results to draw app. Demonstrate highly effects, concepts, principles and to drug discovery; destics; drug delivery and its foundation knowledge of the foundation knowledge of the foundation knowledge of the foundation knowledge of the foundation knowledge of the foundation knowledge of the foundation knowledge and theory of most familiar situations of the foundation of the foundati	ropriate and insightfuctive basic technique s, and theories relating and developmen s relevance to toxicity of medicinal chemistry propriate conclusion thiniques for medicinal chemistry propriate conclusion thiniques for medicinal discovery, design and discovery and its relating to the basi and mostly correct by ples and knowledge chemistry, especially it orinciples, and theoried discovery; design and delivery and its relating to the basi situations and mostly especially in drumpers of the company of the compan				
ntensive Course	C D Fail	strong ability to analyze novel problems and critical use of data and experime conclusions relating to the basic principles and knowledge of medicinal chemistry, especially in drug discovery and metabolism.  Demonstrate substantial command of knowledge and understanding of essential to the basic foundation knowledge of medicinal chemistry; especially those related drug targets; drug lead optimization; structure activity relationship; pharmacoking Show evidence to apply and integrate knowledge and theory relating to the basic Show evidence to analyze novel problems and correct use of data and experin relating to the basic principles and knowledge of medicinal chemistry. Demons chemistry, especially in drug discovery and metabolism.  Demonstrate general but incomplete command of knowledge and understandin theories relating to the basic foundation knowledge of medicinal chemistry; especi development; drug targets; drug lead optimization; structure activity relations relevance to toxicity. Show evidence of some abilities to apply and integrate foundation knowledge of medicinal chemistry. Show ability to analyze problems to erroneous use of data and experimental results to draw appropriate conclusions in medicinal chemistry. Demonstrate moderately effective basic techniques, basic tedrug discovery and metabolism.  Demonstrate partial but limited command of knowledge and understanding of es relating to the basic foundation knowledge of medicinal chemistry; especially development; drug targets; drug lead optimization; structure activity relations relevance to toxicity. Show evidence of limited abilities to apply and integrate foundation knowledge of medicinal chemistry. Show limited ability to analyze procurect but erroneous use of data and experimental results to draw appropriate correct but erroneous use of data and experimental results to apply and integrate foundation knowledge of medicinal chemistry. Show limited abilities to apply and integrate foundation knowledge of medicinal chemistry. Show little or no abili	ntal results to draw app. Demonstrate highly effects, concepts, principles and to drug discovery; destics; drug delivery and its foundation knowledge of the foundation knowledge of the foundation knowledge of the foundation knowledge of the foundation knowledge of the foundation knowledge of the foundation knowledge and theory of most familiar situations of the foundation of the foundati	ropriate and insightfuctive basic techniques, and theories relatinging and development is relevance to toxicity of medicinal chemistry propriate conclusion thiniques for medicinal chemistry propriate conclusion thiniques for medicinal chemistry, design and discovery; design and mostly correct by ples and knowledge chemistry, especially orinciples, and theoried discovery; design and delivery and it relating to the basi situations and mostly especially or inciples, and theoried discovery; design and the ples and the ples and the ples and the ples and discovery; design				
Communication- ntensive Course Course Type Course Teaching	C D Fail	strong ability to analyze novel problems and critical use of data and experime conclusions relating to the basic principles and knowledge of medicinal chemistry, especially in drug discovery and metabolism.  Demonstrate substantial command of knowledge and understanding of essential to the basic foundation knowledge of medicinal chemistry; especially those related drug targets; drug lead optimization; structure activity relationship; pharmacoking. Show evidence to apply and integrate knowledge and theory relating to the basic Show evidence to analyze novel problems and correct use of data and experin relating to the basic principles and knowledge of medicinal chemistry. Demons chemistry, especially in drug discovery and metabolism.  Demonstrate general but incomplete command of knowledge and understandin theories relating to the basic foundation knowledge of medicinal chemistry; especi development; drug targets; drug lead optimization; structure activity relations relevance to toxicity. Show evidence of some abilities to apply and integrate foundation knowledge of medicinal chemistry. Show ability to analyze problems to erroneous use of data and experimental results to draw appropriate conclusions in medicinal chemistry. Demonstrate moderately effective basic techniques, basic tedrug discovery and metabolism.  Demonstrate partial but limited command of knowledge and understanding of es relating to the basic foundation knowledge of medicinal chemistry; especially development; drug targets; drug lead optimization; structure activity relations relevance to toxicity. Show evidence of limited abilities to apply and integrate foundation knowledge of medicinal chemistry. Show limited ability to analyze procorrect but erroneous use of data and experimental results to draw appropriate of knowledge of medicinal chemistry. Demonstrate partially effective basic technique discovery and metabolism.  Demonstrate little or no evidence of command of knowledge and understandin theories relating to the basic foundation knowledge	ntal results to draw app. Demonstrate highly effects, concepts, principles and to drug discovery; destics; drug delivery and its foundation knowledge of the foundation knowledge of the foundation knowledge of the foundation knowledge of the foundation knowledge of the foundation knowledge of the foundation knowledge and theory of most familiar situations of the foundation of the foundati	ropriate and insightf active basic technique s, and theories relatirsign and developmer s relevance to toxicit of medicinal chemistropropriate conclusion thiniques for medicinal chemistropropriate conclusion thiniques for medicinal chemistropropriate conclusion thiniques for medicinal chemistry design and discovery; design and mostly correct b ples and knowledge chemistry, especially brinciples, and theorie discovery; design and delivery and it relating to the basis ituations and most le basic principles are stry, especially and it of the computer of t				

	Tutorials	or discussion		12
	Reading / Self study			100
Assessment Methods and Weighting	Methods	Details Weighting in final course grade (%)		Assessment Methods to CLO Mapping
	Assignments		10	CLO 1,2,3
	Examination		60	CLO 1,2,3
	Presentation	(two presentations)	20	CLO 1,2,3
	Test	midterm	10	CLO 1,2,3
Required/recommended	An Introduction to Medicinal Chem	istry (3/e), G.L. Patrick, Oxford Univ	ersity Press, 2005	
reading and	Medicinal Chemistry- An Introducti	on, G. Thomas, John Wiley, 2000		
online materials	D. Wang, S.J. Lippard (2004) Nat.	Rev. Drug Dis., Cellular processing	of platinum anticancer dr	ugs, 4, 307-320
Additional Course Information	This course is also offered to RPg	students, and the course code for R	Pg students is CHEM611	13.

CHEM4147	Supram	olecular chemist	ry (6 credits)	Academic Ye	ear 2021				
Offering Department	Chemistry			Quota	40				
Course Co-ordinator	Dr H Y Au	-Yeung, Chemistry (	(hoyuay@hku.hk)	<u>'</u>					
Teachers Involved		u-Yeung,Chemistry)	,						
	(Dr K Oku	ro,Chemistry) /ang,Chemistry)							
Course Objectives			ncerns the chemistry beyond	that of molecules. This course	aims at introducing				
	students t	Supramolecular chemistry concerns the chemistry beyond that of molecules. This course aims at introducing students to concepts and techniques in supramolecular chemistry, demonstrating how molecular assembly an supramolecular structures leads to functions and properties, and their relevance to material and biological sciences.							
Course Contents				on-covalent interactions and com					
& Topics	building b as macro	building blocks; methods in supramolecular chemistry. Selected topics in modern supramolecular chemistry, suc as macrocycles and cages, molecular capsule and container molecules, synthetic receptors, interlocked structure supramolecular polymers and supramolecular chemistry of biomolecules and biomaterials, will also be discussed.							
Course Learning	On succes	ssful completion of th	nis course, students should be a	able to:					
Outcomes	CLO 1 Ui	nderstand important	principles and concepts in supr	ramolecular chemistry					
	CC SL	oncepts in the des opramolecular system	ign and explanation of the	ature of non-covalent interactions structures, properties and fun	ctions of different				
			o explain the properties of the s		na canaot relevant				
Pre-requisites (and Co-requisites and Impermissible combinations)		HEM3341 and CHE		rapramoiocata ojuteme					
Offer in 2021 - 2022	Y 2nd	sem Offer in 2022	2 - 2023 : Y	Examination	May				
Grade Descriptors	Α	Demonstrate thorough	knowledge and understanding of esse	ential facts, concepts and principles in su	upramolecular chemistry,				
(A+ to F)	especially those relating to non-covalent interactions, molecular recognition and self-assembly. Show strong ability to apply and integrate knowledge in supramolecular chemistry in explaining the formation and properties of, and in designing different supramolecular systems. Show strong ability to analyse and interpret experimental data to draw appropriate conclusions relating to the advanced principles and properties of supramolecular systems.								
	B Demonstrate substantial knowledge and understanding of essential facts, concepts and principles in supramolecular chemistry, especially those relating to non-covalent interactions, molecular recognition and self-assembly. Show evidence to apply and integrate knowledge in supramolecular chemistry in explaining the formation and properties of, and in designing different supramolecular systems. Show evidence to analyse and interpret experimental data to draw appropriate conclusions relating to the advanced principles and properties of supramolecular systems.								
	С								
	Demonstrate partial but incomplete command of knowledge and understanding of essential facts, concepts and principles in supramolecular chemistry, especially those relating to non-covalent interactions, molecular recognition and self-assembly. Show evidence of limited ability to apply and integrate knowledge in supramolecular chemistry in explaining the formation and properties of, and in designing different supramolecular systems. Show limited ability to analyse and interpret experimental data to draw appropriate conclusions relating to the advanced principles and properties of supramolecular systems.								
	Fail  Demonstrate little or no evidence of command of knowledge and understanding of essential facts, concepts and principles in supramolecular chemistry, especially those relating to non-covalent interactions, molecular recognition and self-assembly. Show little or no ability to apply and integrate knowledge in supramolecular chemistry in explaining the formation and properties of, and in designing different supramolecular systems. Show little or no ability to analyse and interpret experimental data to draw appropriate conclusions relating to the advanced principles and properties of supramolecular systems.								
Communication- intensive Course	N								
Course Type	Lecture-ba	ased course							
Course Teaching	Activities	3	Details		No. of Hours				
& Learning Activities	Lectures				36				
	Tutorials				12				
		Self study			100				
Assessment Methods	Methods		Details	Weighting in final	Assessment				
and Weighting	Wiethous		Details	course grade (%)	Methods to CLO Mapping				
	Assignme	ents		15	CLO 1,2,3				
	Examinat			45	CLO 1,2,3				
	Presenta			20	CLO 1,2,3				
	Test	uon		20					
Required/recommended	d Supramol			Atwood, John Wiley & Sons, Lto ennis A. Dougherty, University Sci					
online materials				will be made throughout the course					

Offering Demanter	1 TOTILIE	rs in Modern Chem	ical Science (6 credits)	Academic Year	r 2021				
Offering Department	Chemistr		, ,	Quota	60				
Course Co-ordinator	Prof X D	Li, Chemistry (xiangli@	hku.hk)						
Teachers Involved	(Prof X D	ang,Chemistry) Li,Chemistry)							
Course Objectives	medical, technolog interplay	and engineering disci gical breakthroughs in a among molecules, ma	be the "central science" as it plays iplines. This course aims to introduchemical sciences. Throughout the caterials, and interfaces leads to unpoine, smart materials, and sustainable	uce students to the newer ourse, students will be intro recedented functionalities	est concepts and oduced to how the				
Course Contents & Topics	include of stimuli-re conversion materials	urrent topics focus on the interdisciplinary area of chemistry with biology, and material sciences. Covered topics clude chemical genetics, epigenetics and proteomics; chemical biology for drug discovery and development; imuli-responsive nanomaterials; autonomous macromolecular motion; future power landscape; renewable energy onversion and utilization. Examples in protein posttranslational modifications, active colloidal, thermoelectric aterials, molecular machines, advanced rechargeable batteries, and next-generation fuel cells and electrolysers ill be discussed.							
Course Learning	On succe	essful completion of this	course, students should be able to:						
Outcomes Pre-requisites	CLO 2 d sc CLO 3 ir ir	emonstrate understand ciences and applying th nterpret and analyse rec	nciples and topical trends in chemical ding of future directions in biomedi its knowledge in comparing and contri- cent published research data in the fice tobserved properties and phenomen data.	cal chemistry, nanomatert asting various emergent tec eld of chemistry and extract	chnologies relevant chemica				
and Co-requisites and Impermissible combinations)		0,00	200						
Offer in 2021 - 2022	Y 2n	d sem Offer in 2022 -		Examination	May				
Grade Descriptors (A+ to F)	В	A Demonstrate thorough knowledge and understanding of essential facts, concepts and principles in chemical science those relating to biomedical chemistry, nanomaterials, and energy sciences. Show strong ability to apply an knowledge in chemical sciences in explaining the formation and properties of chemical species and in designic chemical systems. Show strong ability to analyse and interpret experimental data to draw appropriate conclusions readvanced principles and properties of chemical systems.  B Demonstrate substantial knowledge and understanding of essential facts, concepts and principles in chemical especially those relating to biomedical chemistry, nanomaterials, and energy sciences. Show evidence to apply a knowledge in chemical sciences in explaining the formation and properties of chemical species and in designic chemical systems. Show evidence to analyse and interpret experimental data to draw appropriate conclusions readvanced principles and properties of chemical systems.  C Demonstrate general but incomplete amount of knowledge and understanding of essential facts, concepts and chemical sciences, especially those relating to biomedical chemistry, nanomaterials, and energy sciences. Show so apply and integrate knowledge in chemical sciences in explaining the formation and properties of chemical species and interpret experimental data to draw conclusions relating to the advanced principles and properties of chemical systems.							
	D	Demonstrate partial but in chemical sciences, espec	advanced principles and properties of chemican ncomplete command of knowledge and unde cially those relating to biomedical chemistry, r	al systems. rstanding of essential facts, conc anomaterials, and energy science	a to draw appropriate cepts and principles in ces. Show evidence of				
	D Fail	Demonstrate partial but in chemical sciences, espec limited ability to apply an species and in designing to draw appropriate conclude Demonstrate little or no echemical sciences, especiability to apply and integra in designing different chemical sciences capacity.	advanced principles and properties of chemic complete command of knowledge and unde ially those relating to biomedical chemistry, r d integrate knowledge in chemical sciences different chemical systems. Show evidence of sisons relating to the advanced principles and prividence of command of knowledge and unde ially those relating to biomedical chemistry, ate knowledge in chemical sciences in explaini mical systems. Show little or no ability to analy	al systems.  rstanding of essential facts, conc  anomaterials, and energy scienc  in explaining the formation and p  limited ability to analyse and inter  oroperties of chemical systems.  rstanding of essential facts, conc  nanomaterials, and energy scien  ing the formation and properties of  yse and interpret experimental da	a to draw appropriate cepts and principles in ces. Show evidence of properties of chemica pret experimental data cepts and principles in ces. Show little or not of chemical species an				
		Demonstrate partial but in chemical sciences, espec limited ability to apply an species and in designing to draw appropriate conclude Demonstrate little or no echemical sciences, especiability to apply and integra in designing different chemical sciences capacity.	advanced principles and properties of chemical complete command of knowledge and underially those relating to biomedical chemistry, red integrate knowledge in chemical sciences different chemical systems. Show evidence of usions relating to the advanced principles and pevidence of command of knowledge and underially those relating to biomedical chemistry, ate knowledge in chemical sciences in explain	al systems.  rstanding of essential facts, conc  anomaterials, and energy scienc  in explaining the formation and p  limited ability to analyse and inter  oroperties of chemical systems.  rstanding of essential facts, conc  nanomaterials, and energy scien  ing the formation and properties of  yse and interpret experimental da	a to draw appropriate cepts and principles in ces. Show evidence of properties of chemica pret experimental data cepts and principles in ces. Show little or not of chemical species an				
ntensive Course	Fail N	Demonstrate partial but in chemical sciences, espec limited ability to apply an species and in designing to draw appropriate conclude Demonstrate little or no echemical sciences, especiability to apply and integra in designing different chemical sciences capacity.	advanced principles and properties of chemic complete command of knowledge and unde ially those relating to biomedical chemistry, r d integrate knowledge in chemical sciences different chemical systems. Show evidence of sisons relating to the advanced principles and prividence of command of knowledge and unde ially those relating to biomedical chemistry, ate knowledge in chemical sciences in explaini mical systems. Show little or no ability to analy	al systems.  rstanding of essential facts, conc  anomaterials, and energy scienc  in explaining the formation and p  limited ability to analyse and inter  oroperties of chemical systems.  rstanding of essential facts, conc  nanomaterials, and energy scien  ing the formation and properties of  yse and interpret experimental da	a to draw appropriate cepts and principles in ces. Show evidence of properties of chemica pret experimental data cepts and principles in ces. Show little or not of chemical species an				
ntensive Course Course Type	Fail N	Demonstrate partial but in chemical sciences, especial imitted ability to apply an species and in designing to draw appropriate concluments. Demonstrate little or no echemical sciences, especiability to apply and integra in designing different cheronclusions relating to the conclusions relating to the constant of the	advanced principles and properties of chemic complete command of knowledge and unde ially those relating to biomedical chemistry, r d integrate knowledge in chemical sciences different chemical systems. Show evidence of sisons relating to the advanced principles and prividence of command of knowledge and unde ially those relating to biomedical chemistry, ate knowledge in chemical sciences in explaini mical systems. Show little or no ability to analy	al systems.  rstanding of essential facts, conc  anomaterials, and energy scienc  in explaining the formation and p  limited ability to analyse and inter  oroperties of chemical systems.  rstanding of essential facts, conc  nanomaterials, and energy scien  ing the formation and properties of  yse and interpret experimental da	a to draw appropriate cepts and principles in ces. Show evidence of properties of chemica pret experimental data cepts and principles in ces. Show little or not of chemical species an				
ntensive Course Course Type Course Teaching	Fail N Lecture-b	Demonstrate partial but in chemical sciences, especial builty to apply an species and in designing to draw appropriate concluded to the chemical sciences, especiability to apply and integra in designing different chemical sciences about the conclusions relating to the conclusions relating to the coased course	advanced principles and properties of chemical complete command of knowledge and unde icially those relating to biomedical chemistry, r d integrate knowledge in chemical sciences different chemical systems. Show evidence of usions relating to the advanced principles and periodence of command of knowledge and unde cially those relating to biomedical chemistry, ate knowledge in chemical sciences in explaini mical systems. Show little or no ability to analytical advanced principles and properties of chemical sciences.	al systems.  rstanding of essential facts, conc  anomaterials, and energy scienc  in explaining the formation and p  limited ability to analyse and inter  oroperties of chemical systems.  rstanding of essential facts, conc  nanomaterials, and energy scien  ing the formation and properties of  yse and interpret experimental da	a to draw appropriate septs and principles in ses. Show evidence oproperties of chemical pret experimental data treets and principles in ces. Show little or not chemical species and to draw appropriate				
ntensive Course Course Type Course Teaching	Fail  N  Lecture-b  Activitie  Lectures  Tutorials	Demonstrate partial but in chemical sciences, especial daility to apply an species and in designing to draw appropriate concluments and the chemical sciences, especiability to apply and integra in designing different cherconclusions relating to the conclusions relating to the chemical sciences.	advanced principles and properties of chemical complete command of knowledge and unde icially those relating to biomedical chemistry, r d integrate knowledge in chemical sciences different chemical systems. Show evidence of usions relating to the advanced principles and periodence of command of knowledge and unde cially those relating to biomedical chemistry, ate knowledge in chemical sciences in explaini mical systems. Show little or no ability to analytical advanced principles and properties of chemical sciences.	al systems.  rstanding of essential facts, conc  anomaterials, and energy scienc  in explaining the formation and p  limited ability to analyse and inter  oroperties of chemical systems.  rstanding of essential facts, conc  nanomaterials, and energy scien  ing the formation and properties of  yse and interpret experimental da	n to draw appropriate pepts and principles in pes. Show evidence of properties of chemica pret experimental data pepts and principles in pepts and pri				
ntensive Course Course Type Course Teaching	Fail  N  Lecture-b  Activitie  Lectures  Tutorials	Demonstrate partial but in chemical sciences, especial builty to apply an species and in designing to draw appropriate conclude Demonstrate little or no chemical sciences, especiability to apply and integra in designing different cheroconclusions relating to the conclusions relating to the coased course	advanced principles and properties of chemical complete command of knowledge and unde icially those relating to biomedical chemistry, r d integrate knowledge in chemical sciences different chemical systems. Show evidence of usions relating to the advanced principles and periodence of command of knowledge and unde cially those relating to biomedical chemistry, ate knowledge in chemical sciences in explaini mical systems. Show little or no ability to analytical advanced principles and properties of chemical sciences.	al systems.  rstanding of essential facts, conc  anomaterials, and energy scienc  in explaining the formation and p  limited ability to analyse and inter  oroperties of chemical systems.  rstanding of essential facts, conc  nanomaterials, and energy scien  ing the formation and properties of  yse and interpret experimental da	n to draw appropriate septs and principles in ses. Show evidence correperties of chemicarpret experimental dat septs and principles in septs and principles in septs and principles in septs. Show little or not of chemical species and tat to draw appropriate.  No. of Hours  36				
ntensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail  N  Lecture-b  Activitie  Lectures  Tutorials	Demonstrate partial but in chemical sciences, especial builty to apply an species and in designing to draw appropriate conclude Demonstrate little or no chemical sciences, especiability to apply and integra in designing different cheroconclusions relating to the conclusions relatin	advanced principles and properties of chemical complete command of knowledge and unde icially those relating to biomedical chemistry, r d integrate knowledge in chemical sciences different chemical systems. Show evidence of usions relating to the advanced principles and periodence of command of knowledge and unde cially those relating to biomedical chemistry, ate knowledge in chemical sciences in explaini mical systems. Show little or no ability to analytical advanced principles and properties of chemical sciences.	al systems.  rstanding of essential facts, conc anomaterials, and energy scienc in explaining the formation and p limited ability to analyse and inter oroperties of chemical systems.  rstanding of essential facts, conc anomaterials, and energy scien go the formation and properties of yse and interpret experimental da al systems.  Weighting in final course grade (%)	n to draw appropriate septs and principles in ses. Show evidence o properties of chemica pret experimental dat septs and principles in ces. Show little or no f chemical species an sta to draw appropriate  No. of Hours  36  12  100  Assessment Methods				
ntensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail  N Lecture-b Activitie Lectures Tutorials Reading	Demonstrate partial but in chemical sciences, especial builty to apply an species and in designing to draw appropriate concluded to the chemical sciences, especiability to apply and integratin designing different chemical sciences, especiability to apply and integratin designing different chemical sciences.	advanced principles and properties of chemical complete command of knowledge and unde iailly those relating to biomedical chemistry, r d integrate knowledge in chemical sciences different chemical systems. Show evidence of usions relating to the advanced principles and payledence of command of knowledge and under iailly those relating to biomedical chemistry, ate knowledge in chemical sciences in explaining advanced principles and properties of chemical systems. Show little or no ability to analyte advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical systems. The complete is advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences and properties of chemical sciences in explaining advanced principles and properties of chemical sciences and properties of chemical sciences and properti	al systems.  rstanding of essential facts, conc anomaterials, and energy scienc in explaining the formation and p limited ability to analyse and inter oroperties of chemical systems.  rstanding of essential facts, conc anomaterials, and energy scien go the formation and properties of yse and interpret experimental da al systems.  Weighting in final course grade (%)	n to draw appropriate pepts and principles in pess. Show evidence of properties of chemica pret experimental dat pepts and principles in pepts and pri				
ntensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail  N  Lecture-b  Activitie  Lectures  Tutorials  Reading  Methods	Demonstrate partial but in chemical sciences, especial builty to apply an species and in designing to draw appropriate conclude to the chemical sciences, especiability to apply and integrating the designing different conclusions relating to the conclusions relating to the chemical sciences.	advanced principles and properties of chemical complete command of knowledge and unde iailly those relating to biomedical chemistry, rid integrate knowledge in chemical sciences different chemical systems. Show evidence of issions relating to the advanced principles and pavidence of command of knowledge and unde iailly those relating to biomedical chemistry, ate knowledge in chemical sciences in explainimical systems. Show little or no ability to analyte advanced principles and properties of chemical patents.  Details  Details	al systems. rstanding of essential facts, conc anomaterials, and energy scienc in explaining the formation and p limited ability to analyse and inter oroperties of chemical systems. rstanding of essential facts, conc anomaterials, and energy scien go the formation and properties of yse and interpret experimental da al systems.  Weighting in final course grade (%)	n to draw appropriate septs and principles in ses. Show evidence of properties of chemical properties of chemical properties of chemical properties of chemical septs and principles in ces. Show little or no f chemical species an state to draw appropriate  No. of Hours  36  12  100  Assessment Methods to CLO Mapping CLO 1,2,3				
ntensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail  N Lecture-b Activitie Lectures Tutorials Reading Methods  Assignm Examina	Demonstrate partial but in chemical sciences, especial but in chemical sciences, especial mitted ability to apply an species and in designing to draw appropriate conclusions the conclusions that the chemical sciences, especiability to apply and integrating designing different conclusions relating to the concl	advanced principles and properties of chemical complete command of knowledge and unde iailly those relating to biomedical chemistry, r d integrate knowledge in chemical sciences different chemical systems. Show evidence of usions relating to the advanced principles and payledence of command of knowledge and under iailly those relating to biomedical chemistry, ate knowledge in chemical sciences in explaining advanced principles and properties of chemical systems. Show little or no ability to analyte advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical systems. The complete is advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences and properties of chemical sciences in explaining advanced principles and properties of chemical sciences and properties of chemical sciences and properti	al systems. rstanding of essential facts, conc anomaterials, and energy scienc in explaining the formation and p limited ability to analyse and inter oroperties of chemical systems. rstanding of essential facts, conc nanomaterials, and energy scien gy the formation and properties of yse and interpret experimental da al systems.  Weighting in final course grade (%)  25  40	n to draw appropriate septs and principles in sees. Show evidence corpoperties of chemica pretexperimental dat septs and principles in ces. Show little or not for chemical species an state to draw appropriate  No. of Hours  36  12  100  Assessment Methods to CLO Mapping CLO 1,2,3  CLO 1,2,3				
Communication- intensive Course Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	Fail  N Lecture-b Activitie Lectures Tutorials Reading Methods  Assignm Examina Presenta	Demonstrate partial but in chemical sciences, especial imited ability to apply an species and in designing to draw appropriate conclusions are ability to apply and integration of the conclusions relating to the conclusions rel	advanced principles and properties of chemic normplete command of knowledge and unde itally those relating to biomedical chemistry, rd integrate knowledge in chemical sciences different chemical systems. Show evidence of issions relating to the advanced principles and periodence of command of knowledge and underitally those relating to biomedical chemistry, ate knowledge in chemical sciences in explain mical systems. Show little or no ability to analyzed advanced principles and properties of chemical advanced principles and properties of chemical periode in the properties of chemical sciences.  Details  Details  (20% Tests/Assignments; 5% participation)	al systems. rstanding of essential facts, concanomaterials, and energy science in explaining the formation and plimited ability to analyse and interproperties of chemical systems. rstanding of essential facts, concanomaterials, and energy scien go the formation and properties of lyse and interpret experimental dail systems.  Weighting in final course grade (%)  25  40  35	n to draw appropriate septs and principles in sees. Show evidence corroperties of chemica pret experimental dat septs and principles in septs and prin				
ntensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail  N Lecture-b Activitie Lectures Tutorials Reading Methods  Assignm Examina Presenta	Demonstrate partial but in chemical sciences, especial imited ability to apply an species and in designing to draw appropriate conclusions are ability to apply and integration of the conclusions relating to the conclusions rel	advanced principles and properties of chemical complete command of knowledge and unde iailly those relating to biomedical chemistry, r d integrate knowledge in chemical sciences different chemical systems. Show evidence of usions relating to the advanced principles and payledence of command of knowledge and under iailly those relating to biomedical chemistry, ate knowledge in chemical sciences in explaining advanced principles and properties of chemical systems. Show little or no ability to analyte advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical systems. The complete is advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences in explaining advanced principles and properties of chemical sciences and properties of chemical sciences in explaining advanced principles and properties of chemical sciences and properties of chemical sciences and properti	al systems. rstanding of essential facts, concanomaterials, and energy science in explaining the formation and plimited ability to analyse and interproperties of chemical systems. rstanding of essential facts, concanomaterials, and energy scien go the formation and properties of lyse and interpret experimental dail systems.  Weighting in final course grade (%)  25  40  35	n to draw appropriate septs and principles in sees. Show evidence of properties of chemica pret experimental dat septs and principles in septs and principles in sees. Show little or no form of chemical species an state to draw appropriate  No. of Hours 36 12 100  Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2,3 CLO 1,2,3 CLO 1,2,3				
ntensive Course Course Type Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended	Fail  N Lecture-b Activitie Lectures Tutorials Reading Methods  Assignm Examina Presenta	Demonstrate partial but in chemical sciences, especial imited ability to apply an species and in designing to draw appropriate conclusions the designing of the designing of the designing of the designing different cherical sciences, especialisty to apply and integratin designing different cherical sciences are designed to the conclusions relating to the design of	advanced principles and properties of chemic normplete command of knowledge and unde itally those relating to biomedical chemistry, rd integrate knowledge in chemical sciences different chemical systems. Show evidence of issions relating to the advanced principles and periodence of command of knowledge and underitally those relating to biomedical chemistry, ate knowledge in chemical sciences in explain mical systems. Show little or no ability to analyzed advanced principles and properties of chemical advanced principles and properties of chemical periode in the properties of chemical sciences.  Details  Details  (20% Tests/Assignments; 5% participation)	al systems. rstanding of essential facts, conc anomaterials, and energy scienc in explaining the formation and p limited ability to analyse and inter oroperties of chemical systems. rstanding of essential facts, conc anomaterials, and energy scien go the formation and properties of yse and interpret experimental da al systems.  Weighting in final course grade (%)  25  40  35  made throughout the course	n to draw appropriate septs and principles is ses. Show evidence corpoperties of chemical present and principles is ses. Show evidence corpoperties of chemical present and principles is ces. Show little or not follow the properties and principles is ces. Show little or not follow the properties and principles is ces. Show little or not follow the properties and principles is a factor of the properties and principles is cessionally appropriate to draw appropriate				

CHEM4241	Modern chemical instrumentation and applications (6 credits)	Academic Year	2021
Offering Department	Chemistry	Quota	50
Course Co-ordinator	Dr I K Chu, Chemistry (ivankchu@hku.hk)		
Teachers Involved	(Dr I K Chu,Chemistry) (Dr K Okuro,Chemistry)		
Course Objectives	The aim of the course is to provide an understanding of modern instrumed principles and practical aspects of instrument design. The course will be of phigher research degree or a career in technical sales/service.	,	
Course Contents & Topics	Biological Mass spectrometry: Liquid Chromatography-Tandem Mass Metabolomics.  Laser Spectroscopy: Principle of laser; three-level and four-level lasers; laser frequency conversion); laser-induced fluorescence; laser atomic spectromet	er instrumentation	(Q-switching and

			ntegration and photon counting.						
			alysis: Dynamic light scattering; z	eta-potential measurement; la	aser trapping (optica				
	tweezers								
	Laser Microscopy: Confocal laser scanning microscopy; super-resolution microscopy; fluorescence correlation spectroscopy.								
Course Learning		• •	s course students should be able	to:					
Outcomes	On successful completion of this course, students should be able to:								
	CLO 1 explain the principles of the modern mass spectrometric methods for proteins and metabolites identification and quantification  CLO 2 explain how proteins are identified and sequenced experimentally and how data is generated in								
		roteomics experiments		experimentally and now date	a is generated in				
		•	hing techniques and software tool	s to analyze high-throughout	proteomics data				
			d for target quantitative analysis o	, , ,					
	CLO 5 e		of the laser spectroscopy, ato		and atomic x-ray				
		escribe the basic expe the laboratory classes	rimental set up and the properties s	of the basic components of the	ne instruments used				
Pre-requisites (and Co-requisites and Impermissible	Pass in C	:HEM3241							
combinations) Offer in 2021 - 2022	Y 1st	sem Offer in 2022 -	2022 · V	Examination	Dec				
Grade Descriptors			2023 . If nowledge and understanding of essential f						
(A+ to F)	A	chemical instrumentation to analyze problems relat	s and applications. Show strong ability to ted to fundamental principles and practical	apply and integrate knowledge and aspects of instrument design.	theory, and strong ability				
	В	Demonstrate substantial command of knowledge and understanding of essential facts, concepts, principles and theories relating to the modern chemical instrumentations and applications. Show evidence to apply and integrate knowledge and theory, and ability to analyze problems related to fundamental principles and practical aspects of instrument design.							
	С	Demonstrate general but incomplete command of knowledge and understanding of essential facts, concepts, principles and							
		theories relating to the modern chemical instrumentations and applications. Show evidence of some abilities to apply and integrate knowledge and theory, and to analyze problems to most familiar situations to fundamental principles and practical aspects of instrument design.							
	Demonstrate partial but limited command of knowledge and understanding of essential facts, concepts, principles and theories relating to the modern chemical instrumentations and applications. Show evidence of limited abilities to apply and integrate knowledge and theory, and limited ability to analyze problems to most familiar situations related to fundamental principles and practical aspects of instrument design.								
	Fail  Demonstrate little or no evidence of command of knowledge and understanding of essential facts, concepts, principles and theories relating to the modern chemical instrumentations and applications. Show little or no evidence of abilities to apply and integrate knowledge and theory, and little or no ability to analyze problems to most familiar situations related to fundamenta principles and practical aspects of instrument design.								
Communication- ntensive Course	N								
Course Type	Lecture w	ith laboratory compon	ent course						
Course Teaching	Activitie	S	Details		No. of Hours				
Learning Activities	Lectures				24				
	Laborato	ry			16				
	Tutorials				12				
	Reading	/ Self study			100				
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping				
	Assignm	ents		10	CLO 1,2,3,4,5,6				
	Examina			60	CLO 1,2,3,4,5,6				
		ry reports	(lab performance, reports)	20	CLO 6				
	Test	•	, , , , ,	10	CLO 1,2,3,4,5,6				
Required/recommended eading and online materials	D.A. Skoo	og, F.K. Holler, S.R. Cı	contemporary mass spectrometry rouch: Principles of Instrumental A will be made throughout the cour	Ánalysis (Thomson, látest edit	ion)				
Additional Course nformation	Laborator course.	y classes are mandat	ory. Students must complete ALI	L experiments and laboratory					

CHEM4242	Analytical chemistry (6 credits)	Academic Year	2021				
Offering Department	Chemistry	Quota	50				
Course Co-ordinator	Dr K K H Ng, Chemistry (kkhn3@hku.hk)						
Teachers Involved	(Dr K K H Ng,Chemistry)						
Course Objectives	This course focuses on the basic principle, practice and methodology in chemical and biochemical analysis. The course emphasizes on the integration of analytical concepts and technologies to solve practical analytical and bioanalytical problems. This course will be particularly useful for students who plan to pursue their career related to analytical and bioanalytical chemistry.						
Course Contents & Topics	Analytical measurement concepts: Statistical treatment & evaluation of chemical measurement data; Figures of merits of analytical methods; Validation of analytical methods; Quality assurance in chemical analysis and testing laboratories						
	Theoretical background and practical techniques of sample preparation, separation and detection and enrichment techniques for biomedical, pharmaceutical and forensic chemical analysis separation technologies for complex mixture analysis (e.g. multidimensional LC); Derivatization chromatographic analysis and spectroscopic detection; Analytes characterization and detection technologies for complex mixture analysis (e.g. multidimensional LC); Derivatization chromatographic analysis and spectroscopic detection; Analytes characterization and detection technologies.						
	Problem-based design of analytical strategy for chemical & biochemical analysis: Expert sharing of practical knowledge and experience related to selected fields of research; Case study and review of analytical chemistry literature/ scenario.						
Course Learning	On successful completion of this course, students should be able to:						

Outcomes	CLO 1 apply statistical methods to assess analytical measurement data quality and interpret their significance, validate analytical methods and results						
	CLO 2 demonstrate understanding on the working principle of different analytical techniques and recognize their advantages and limitations						
	CLO 3 int	tegrate different analy	tical techniques to solve analytical	and bioanalytical problems			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in C	ass in CHEM3241 or CHEM3242					
Offer in 2021 - 2022	Y 2nd	I sem Offer in 2022	- 2023 : Y	Examination	May		
Grade Descriptors (A+ to F)	A	learning outcomes. Show	nastery at an advanced level of extensive strong analytical and critical abilities, logi- issues and problems related to chemical a ork.	cal thinking and capability to apply l	nowledge learnt to solve		
	В	learning outcomes. Show	al command of a broad range of knowledg vevidence of analytical and critical abilities mplex issues and problems related to chellork.	s, logical thinking, and capability to a	apply knowledge learnt to		
	С	evidence of analytical and	command of knowledge and skills required d critical abilities, logical thinking, and abilit ted to chemical analysis. Apply effective or	y to apply knowledge learnt to solve	a wide range of complex		
	D	Demonstrate a partial but limited command of knowledge and skills required for attaining some of the course learning outcome in Food and Water Analysis. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities Show limited ability to apply knowledge to solve problems related to chemical analysis. Apply limited or barely effective organization and presentation skill as shown in class work.					
	Fail  Demonstrate little or no evidence for the command of knowledge and skills required for attaining the course learning outcomes.  Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems related to chemical analysis. Organization and presentation skills are minimally effective or ineffective as shown in class work.						
Communication- intensive Course	N						
Course Type	Lecture w	ith laboratory compon	ent course				
Course Teaching	Activities	3	Details		No. of Hours		
& Learning Activities	Lectures			24			
	Laborator	γ	6 x 4-hour of laboratory practic	24			
	Tutorials	•	•		6		
	Reading /	Self study			100		
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Examinat	ion		60	CLO 1,2,3		
	Laboratory reports		Experiment & Lab report	15	CLO 1,2		
	Presentat	• •		10	CLO 1,2,3		
	Test			15	CLO 1,2,3		
Required/recommended reading and online materials	edition) A. Manz, I	A. Skoog, D.M. West, F.J. Holler, S.R. Crouch: Fundamentals of Analytical Chemistry (Cengage Learning, latest					
Additional Course			ory. Students must complete ALL				
Information	course.	,	,	,	, p		
		uise.					

CHEM4341	Advance	d inorganic chemistry (6 cre	edits)	Academic Year	2021				
Offering Department	Chemistry		•	Quota	50				
Course Co-ordinator	Prof C M	Prof C M Che, Chemistry (cmche@hku.hk)							
Teachers Involved	(Prof H Z	Che,Chemistry) Sun,Chemistry) W Yam,Chemistry)							
Course Objectives	topics in I	This course is a continuation from Intermediate Inorganic Chemistry, giving further and more detailed treatment to topics in Inorganic Chemistry and new areas of interest. Problem based learning on selected advance topics will be introduced in the later part of the course. This course also aims to prepare students for graduate work.							
Course Contents & Topics	bonds, ind	Selected advanced topics of current interest. Examples include metal-metal bonds and metal-ligand multiple bonds, inorganic and supramolecular photochemistry, lanthanide chemistry, bio-inorganic and medicinal chemistry, and activation of small molecules by metal complexes.							
Course Learning	On successful completion of this course, students should be able to:								
Outcomes	CLO 1 understand the principles and concepts of inorganic and supramolecular photochemistry								
	CLO 2 understand the electronic structure and bondings of novel metal-metal and metal-ligand multiple bonded metal complexes								
	CLO 3 understand and realize the activation of small molecules by transition metal complexes and realize the importance of such activation in chemical catalysis of global interest, green chemistry and energy saving reactions								
	CLO 4 understand the role of metal complexes in bio-inorganic and medicinal chemistry								
Pre-requisites (and Co-requisites and Impermissible combinations)		Pass in CHEM3341							
Offer in 2021 - 2022	Y 1st	sem Offer in 2022 - 2023 : Y		Examination	Dec				
Grade Descriptors (A+ to F)	Α	in inorganic chemistry. Show strong abiliproblems in inorganic chemistry. Apply hig	derstanding of essential facts, concepts, pri ity to apply and integrate knowledge and t ghly effective organizational and presentation	heory, and strong ab nal skills.	lity to analyze novel				
	В	to the more advanced knowledge in inorga	wledge and understanding of essential fact anic chemistry. Show evidence to apply and emistry. Apply effective organizational and p	integrate knowledge a					
	С	theories relating to the more advanced kn	nmand of knowledge and understanding o owledge in inorganic chemistry. Show evide roblems to most familiar situations in inorg	nce of some abilities t	o apply and integrate				

		organizational and pres	sentational skills.						
	D	relating to the more a	dvanced knowledge in inorganic	and understanding of essential facts, concepts chemistry. Show evidence of limited abilities	s to apply and integrate				
			owledge and theory, and limited ability to analyze problems to most familiar situations in inorganic chemistry. Demo rtially effective organizational and presentational skills.						
	Fail	theories relating to the integrate knowledge ar	more advanced knowledge in in	wledge and understanding of essential facts, organic chemistry. Show little or no evidence to analyze problems to most familiar situation entational skills.	of abilities to apply and				
Communication- intensive Course	N								
Course Type	Lecture-b	ased course							
Course Teaching	Activities		Details	Details					
& Learning Activities	Lectures				36				
	Tutorials		including literature sur	12					
	Reading / Self study				100				
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping				
	Assignm	ents		20	CLO 1,2,3,4				
	Examination			60	CLO 1,2,3,4				
	Test		(Quiz/ test)	20	CLO 1,2,3,4				
Required/recommended reading and online materials		F.A. Cotton, G. Wilkinson, Hurillo and Bochmann: Advance Inorganic Chemistry (Wiley, 1999, 6th ed.) References to specialist texts and other published materials will be made throughout the course.							
Additional Course Information	take this	udents are strongly recommended to take CHEM4142 Symmetry, group theory and applications if they wish to e this course.) is course is also offered to RPg students, and the course code for RPg students is CHEM6115.							

CHEM4342	Organo	metallic chemistry (6 credits)		Academic Year	2021		
Offering Department	Chemistry	<u> </u>		Quota	40		
Course Co-ordinator	Dr. J Z Lii	u, Chemistry (juliu@hku.hk)					
Teachers Involved	(Dr J He,0	Chemistry)					
	(Dr. JZL	iu,Chemistry)					
Course Objectives	II. The co	urther, more detailed, treatment to or ourse also aims to introduce and fam for graduate work in inorganic and o	niliarize students with advanced l		•		
Course Contents & Topics	Lectures: Main group and transition metal organometallics. Transition metal cluster chemistry. Bon and reactivities of organometallics. Application of organometallics in organic synthesis and catalysis Laboratory: To introduce and familiarize students with advanced laboratory techniques which include						
	and mani methods.	pulation of air- and moisture- sensi	tive compounds, and their chara	acterization by vario	ous spectroscop		
Course Learning		ssful completion of this course, stud-					
Outcomes		nderstand the advanced principles a		•			
	tra	emonstrate knowledge and underst ansition metal organometallics, espe etal alkylidynes					
	po	CLO 3 demonstrate knowledge and understanding in the application of organometallics in organic synthesis, polymerization and catalysis					
		emonstrate ability in advanced labor oisture- sensitive compounds, and t					
Pre-requisites and Co-requisites and Impermissible combinations)	Pass in C	HEM3341					
Offer in 2021 - 2022	Y 1st	sem Offer in 2022 - 2023 : Y		Examination	Dec		
Grade Descriptors (A+ to F)	A	Demonstrate thorough knowledge and undetailed and advanced treatment of orgar main group and transition metal organome synthesis and catalysis. Show strong abilit concepts of organometallic chemistry. Shoresults to draw appropriate and insightful chemistry. Demonstrate highly effective ac of air- and moisture- sensitive compounds	nometallic chemistry, especially those re etallics; transition metal cluster chemistry by to apply and integrate knowledge and ow strong ability to analyze novel proble I conclusions relating to the advanced   dvanced laboratory skills and techniques	elated to structure, bondi ; and application of orga- theory relating to the ad- ems and critical use of d principles and application, especially in the synthe	ing and reactivities of nometallics in organi vanced principles an lata and experimenta ons of organometalli		
	В	Demonstrate substantial command of know to the more detailed and advanced treatr reactivities of main group and transition organometallics in organic synthesis and advanced principles and concepts of orgadata and experimental results to draw organometallic chemistry. Demonstrate e manipulation of air- and moisture- sensitives	wledge and understanding of essential fa ment of organometallic chemistry, espor on metal organometallics; transition m catalysis. Show evidence to apply and ir anometallic chemistry. Show evidence to appropriate conclusions relating to the ffective advanced laboratory skills and	icts, concepts, principles cially those related to st letal cluster chemistry; ntegrate knowledge and o analyze novel problem e advanced principles techniques, especially	tructure, bonding ar and application of theory relating to the and correct use and applications of in the synthesis ar		
	С	Demonstrate general but incomplete com theories relating to the more detailed and bonding and reactivities of main group and organometallics in organic synthesis and co- relating to the advanced principles and co- situations and mostly correct but erroneou advanced principles and applications of or and techniques, especially in the synt characterization by various spectroscopic r	advanced treatment of organometallic of I transition metal organometallics; transit atatalysis. Show evidence of some abilities incepts of organometallic chemistry. Sho is use of data and experimental results to ganometallic chemistry. Demonstrate mathesis and manipulation of air- and	nemistry, especially thos ion metal cluster chemis is to apply and integrate le w ability to analyze prob o draw appropriate conc oderately effective adva	te related to structure stry; and application knowledge and theo olems to most famili- clusions relating to the anced laboratory ski		
	D	Demonstrate partial but limited command relating to the more detailed and advance and reactivities of main group and trans organometallics in organic synthesis and theory relating to the advanced principles most familiar situations and mostly correct	of knowledge and understanding of esset d treatment of organometallic chemistry, sition metal organometallics; transition catalysis. Show evidence of limited ab and concepts of organometallic chemistr	especially those related metal cluster chemistry illities to apply and inte- ry. Show limited ability to	I to structure, bonding; and application of grate knowledge are analyze problems		

	laboratory ski characterizati	lls and techniques, especially in the on by various spectroscopic methors.		tive compounds and their	
	theories relati bonding and o organometalli theory relating to most famili advanced pri and techniqu	ng to the more detailed and adva eactivities of main group and tran cs in organic synthesis and catally g to the advanced principles and of ar situations and erroneous use nciples and applications of organ	d of knowledge and understanding of essential facts, onced treatment of organometallic chemistry, especially t sition metal organometallics; transition metal cluster che ysis. Show little or no evidence of abilities to apply and concepts of organometallic chemistry. Show little or no a of data and experimental results to draw appropriate or onetallic chemistry. Demonstrate minimally effective as and manipulation of air- and moisture- sensitive ods.	hose related to structure, mistry; and application of integrate knowledge and bility to analyze problems onclusions relating to the dvanced laboratory skills	
Communication- intensive Course	N				
Course Type	Lecture with laboratory	component course			
Course Teaching	Activities	Details	Details		
& Learning Activities	Lectures			24	
	Laboratory			30	
	Tutorials			5	
	Reading / Self study			100	
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignments		15	CLO 1,2,3,4	
	Examination		60	CLO 1,2,3,4	
	Laboratory reports		15	CLO 1,2,3,4	
	Test		10	CLO 1,2,3,4	
Required/recommended reading and online materials	C. Elschenbroich and	A. Salzer: Organometallics	the Transition Metals (Wiley, 2005, 4th ed.) - A Concise Introduction (VCH, 1992, 2nd revenaterials will be made throughout the course		
Additional Course Information	Laboratory classes are course.	boratory classes are mandatory. Students must complete ALL experiments and laboratory reports to pass this			

CHEM4441	Advan	ced organic ch	emistry (6 credits)	Academic Yea	ar 2021			
Offering Department	Chemist		<u> </u>	Quota	40			
Course Co-ordinator	Dr J He,	Chemistry (jianhe	@hku.hk)					
Teachers Involved	(Dr J He	,Chemistry)						
		Huang,Chemistry)						
Course Objectives		To provide students with knowledge in organic chemistry reaction mechanisms and organic compound structure determination.						
Course Contents		he course covers chemical bonding, advanced stereochemistry, conformational analysis, techniques for						
& Topics		vestigating reaction mechanisms, reactive intermediates, rearrangement reactions, and pericyclic reactions.						
Course Learning			of this course, students should be					
Outcomes			•	ctivity relationship of organic molec				
		, ,	ct the selectivities (chemoselective	vity, regioselectivity and stereosel	ectivity) in organi			
		reactions						
			ral approaches to study organic me					
	(	(radicals, carbene	s and nitrenes), and polar rearrang	•	ctive intermediates			
			le mechanistic pathways for some	,, ,				
	CLO 6	apply the knowled	ge of reaction mechanisms in desi	gn of synthetic routes for organic co	ompounds			
Pre-requisites (and Co-requisites and Impermissible	Pass in (	Pass in CHEM3441						
combinations)								
Offer in 2021 - 2022	Y 1s		.022 - 2023 : Y	Examination	Dec			
Grade Descriptors (A+ to F)	В	learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and abilities apply knowledge to a wide range of complex, familiar and unfamiliar situations.						
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations.						
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems.						
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems.							
Communication- Intensive Course	N	- · · · · · ·		· · · · ·				
Course Type	Lecture-	based course						
Course Teaching	Activitie	es	Details		No. of Hours			
& Learning Activities	Lectures	S			36			
	Tutorials	S			12			
	Reading / Self study				100			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin			
and Weighting	Evamination							
and Weighting	Examina	ation		70	CLO 1,2,3,4,5,6			
and weighting	Examina Test	ation		70 30	CLO 1,2,3,4,5,6 CLO 1,2,3,4,5,6			

online materials	"Organic Chemistry", by Paula Y. Bruice, 2016, 8th Edition, Pearson, with e-text and Mastering Chemistry.  I. Fleming, "Pericyclic Reactions", Oxford University Press, 1999.
Additional Course Information	This course is also offered to RPg students, and the course code for RPg students is CHEM6114.

CHEM4443	Integra	ted organic synthe	sis (6 credits)	Academic Yea	r  2021				
Offering Department	Chemistr	гу		Quota	50				
Course Co-ordinator	Prof P CI	hiu, Chemistry <i>(pchiu</i> @	hku.hk)						
Teachers Involved	(Dr Z X F	Huang,Chemistry)							
Course Objectives	products advanced preparati	To introduce aspects of modern organic reactions with relevance to and in the context of the synthesis of natural products, drugs and medicinal chemistry to provide an integrated approach to the subject, and to provide training in advanced organic laboratory skills, and further hands-on experience in synthesis and characterization, as preparation for graduate studies or research in organic chemistry.							
Course Contents & Topics	present r molecule these mo their me retrosynt	Building on the organic chemistry covered in the foundational courses CHEM1003 and CHEM2402, this course will present modern synthetic methods and synthetic planning. The course is organized into units based on target drug molecules. In each unit, the chemical biology of these compounds are briefly presented and the syntheses of these molecules are introduced, accompanied by in-depth discussions of the reactions involved with emphasis on their mechanisms, selectivity, stereochemistry, scope and limitations. Concept of synthetic design including retrosynthetic analysis, stereoselectivity and enantioselective control elements will be emphasized. A laboratory section provides training in the practical skills of synthesis.							
Course Learning Outcomes	CLO 1 u	On successful completion of this course, students should be able to: CLO 1 understand the rationale, selectivities, and mechanisms of various reactions and reagents in organisms.							
		chemistry while to solve mechanisti	c and synthetic chemistry prob	hlems					
				plems ed level of technical difficulty, using	additional skills in				
			d execution, spectroscopic ana		additional SkillS III				
			al and literature search, to lear						
Pre-requisites		CHEM3441: or	aa morataro scaron, to rean	comica y macponachuy					
(and Co-requisites and Impermissible combinations)		,	component) and CHEM3443						
Offer in 2021 - 2022	Y 2n	nd sem Offer in 2022 -		Examination	May				
Grade Descriptors (A+ to F)	A Demonstrate a thorough mastery at an advanced level of knowledge and understanding of concepts, principles, reactions and mechanisms related to synthetic organic chemistry. Show a strong ability to integrate knowledge and theory, and a strong ability to analyze novel synthetic organic chemistry situations and problems. Show a critical use of knowledge and data to apply to the solution of novel and complex synthetic problems. Demonstrate highly effective organization and application of lab skills and techniques in synthetic experiments.								
	В	Demonstrate a substantial command of knowledge and understanding of concepts, principles, reactions and mechanisms related to synthetic organic chemistry. Show evidence of ability to integrate knowledge and theory, and evidence of ability to analyze synthetic organic chemistry situations and problems. Show a correct use of knowledge and data to apply to the solution of some novel and most familiar synthetic problems. Demonstrate effective organization and application of lab skills and techniques in synthetic experiments.							
	C Demonstrate a general but incomplete command of knowledge and understanding of concepts, principles, reactions and mechanisms related to synthetic organic chemistry. Show evidence of some ability to integrate knowledge and theory, and evidence of some ability to analyze synthetic organic chemistry situations and problems. Show a correct use of knowledge to apply to the solution of most familiar problems. Demonstrate moderately effective organization and application of lab skills and techniques in synthetic experiments.								
	Demonstrate a partial but limited command of knowledge and understanding of concepts, principles, reactions and mechanisms related to synthetic organic chemistry. Show evidence of a limited ability to integrate knowledge and theory, and a limited ability to analyze familiar situations and problems. Show some correct but erroneous use of knowledge to apply to the solution of most familiar problems. Demonstrate partially effective organization and application of lab skills and techniques in synthetic experiments.								
	Fail	mechanisms related to s synthetic organic chemist	ynthetic organic chemistry. Show littl try, and little or no ability to analyze m the solution of familiar problems. De	dge and understanding of concepts, pringle or no evidence of ability to integrate knost familiar situations and problems. Showernonstrate minimally effective organization	owledge and theory in mostly erroneous use				
Communication- intensive Course	N								
Course Type	Lecture v	with laboratory compone	ent course						
Course Teaching	Activitie		Details	No. of Hours					
& Learning Activities	Lectures				24				
	Laborato				25				
	Reading	/ Self study			100				
Assessment Methods and Weighting	Methods	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping				
	Assignm	nents	(Problem sets)	10	CLO 1,2,4				
	Examination			50	CLO 1,2,3,4				
	Laborato	ory reports	(Practicals & lab test)	25	CLO 1,2,3,4				
	Test			15	CLO 1,2,4				
Required/recommended reading and online materials			nesis, C. Willis, M. Wills, Oxfor J. Saunders, Oxford Science						
Additional Course Information	course.	•		ALL experiments and laboratory r					
	This course is also offered to RPg students, and the course code for RPg students is CHEM6111.								

CHEM4444	Chemical biology (6 credits)	Academic Year	2021			
Offering Department	Chemistry	Quota	50			
Course Co-ordinator	Prof X C Li, Chemistry (xuechenl@hku.hk)					
Teachers Involved	(Prof X C Li,Chemistry)					
Course Objectives	To understand how to use chemical approaches to emulate biological system	ns to study natura	al molecules and			

		generate new functional molecules. Useful as an introduction to research in areas of chemical biology, medicinal chemistry and biotechnology.					
Course Contents & Topics	Chemica	Chemical biology of nucleic acids, protein chemistry, protein posttranslational modifications, carbohydrate hemistry, chemical glycobiology and tools and techniques in chemical biology.					
Course Learning		n successful completion of this course, students should be able to:					
Outcomes		inderstand chemical biolo	· · · · · · · · · · · · · · · · · · ·				
	CLO 2 g	O 2 give examples of how to use chemical methods to produce natural biomolecules and new biomolecules with altered functions					
		O 3 compare chemical biology and traditional biology approaches in drug discovery					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	ss in BIOC3601 or CHEM3441					
Offer in 2021 - 2022	Y 2n	d sem Offer in 2022 - 2	2023 : Y	Examination	n May		
Grade Descriptors (A+ to F)	A	learning outcomes. Show sto apply knowledge to a w	trong analytical and critical ride range of complex, fan ful use and critical analysis	of extensive knowledge and skills required for abilities and logical thinking, with evidence of co- niliar and unfamiliar situations. Apply highly ef / evaluation of information drawn from a full rar	original thought, and ability fective organizational and		
	В	learning outcomes. Show ever and some unfamiliar situation sources, showing ability to aptly.	vidence of analytical and cri ons. Apply effective organiz make meaningful compari	of knowledge and skills required for attaining a titical abilities and logical thinking, and ability to a zational and presentational skills. Critical use of sons between different secondary interpretation	apply knowledge to familiar f relevant information from ns and to quote/reference		
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Use of relevant information from sources, showing ability to make comparisons between different interpretations and to quote/reference aptly.						
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills. Use and reference of several sources, but mainly through summary rather than analysis and comparison.						
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective. Limited use of secondary sources and no critical comparison of them.						
Communication- intensive Course	N						
Course Type	Lecture-l	pased course					
Course Teaching	Activitie	es	Details		No. of Hours		
& Learning Activities	Lectures	3			36		
-	Tutorials	1	tutorials/discussion		12		
		/ Self study	,		100		
Assessment Methods and Weighting	Method	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignm	nents		5	CLO 1,2,3		
	Examina			50	CLO 1,2,3		
	Presentation			25	CLO 1,2,3		
	Test			20	CLO 1,2,3		
Required/recommended reading and	Foundati	ons of Chemical Biology	by C.M. Dobson, J.A.	Gerrard and A.J. Pratt.			
online materials							
Course Website	Nil						
Additional Course	Nil						
Information							

CHEM4541	Physical chemistry III: statistical thermodynamics and kinetics theory (6 credits)	Academic Year	2021					
Offering Department	Chemistry	Quota	40					
Course Co-ordinator	, Chemistry ()	, Chemistry ()						
Teachers Involved								
Course Objectives	The course presents fundamental principles and topics on statistical thermodyl provide a solid foundation for students intending to further their studies in physical provides and topics of statistical thermodyl provides a solid foundation for students intending to further their studies in physical provides a solid foundation for students intending to further their studies in physical provides and topics on statistical thermodyl provides a solid foundation for students intending to further their studies in physical provides and topics on statistical thermodyl provides as the students and topics of the students and topics of the students are students.							
Course Contents & Topics	Principles of Statistical Thermodynamics  - Thermodynamic laws  - Ensembles and partition functions: microcanonical, canonical and grand-cano  - Systems of independent molecules: ideal gas  - Molecular degrees of freedom: translation, rotation, vibration, and electronic  - Ideal gas mixture: chemical equilibrium, binding, and titration  - Lattice statistics: Ising model and phase transition  - Quantum statistics  Chemical equilibrium and kinetics theory  - Rate theory: collision theory, transition state theory	nical						
Course Learning	On successful completion of this course, students should be able to:							
Outcomes	CLO 1 understand and use the terminology and nomenclature in statistical thermodynamics and topics discussed in the course							
	CLO 2 demonstrate knowledge and understanding of basic concepts in statistical thermodynamics							
	CLO 3 understand correlation between macroscopic observables and microsco	opic statistical mod	el systems					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in CHEM3541							

Offer in 2021 - 2022	N Off	M Offer in 2022 - 2023 : N Examinat				
Grade Descriptors (A+ to F)	A Thorough mastery at an advanced level of extensive knowledge of statistical thermodynamics and reaction dynamics. Demonstrate evidence of strong analytical / critical abilities and logical thinking. Can apply the knowledge to practical questions in Physical Chemistry.					
	В	Substantial command of knowledge of statistical thermodynamics and reaction dynamics. Demonstrate evidence of analytical / critical abilities and logical thinking. Understand the scope of Physical Chemistry questions that can be applied with the knowledge.				
	С	General but incomplete command of knowledge of statistical thermodynamics and reaction dynamics. Demonstrate evidence of analytical thinking. Can apply the knowledge to familiar situations.				
	D	Partial but limited command of knowledge of knowledge of statistical thermodynamics and reaction dynamics. Demonstrate limited evidence of analytical thinking. Understand the question to be solved with knowledge.				
	Fail	Little or no evidence of com	nmand of knowledge of statistical thermodynam	nics and reaction dynamics.		
Communication- intensive Course	N					
Course Type	Lecture w	ith laboratory componer	nt course			
Course Teaching	Activities		Details	No. of Hours		
& Learning Activities	Lectures			24		
	Laboratory			24		
	Tutorials				6	
	Reading / Self study				100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents	continuous assessment of on class quizzes & assignments	40	CLO 1,2,3	
	Examinat	ion		60	CLO 1,2,3	
Required/recommended reading and online materials	T. L. Hill, An introduction to Statistical Thermodynamics P. Atkins, Physical Chemistry					
Additional Course Information	Laborator course.	y classes are mandator	y. Students must complete ALL exp	eriments and laboratory	reports to pass this	

	Computational chemistry (6 credits)  Academic Y			ear 2021		
Offering Department	Chemisti		<u> </u>	Quota	50	
Course Co-ordinator	Prof G H	Chen, Chemistry (gh	nc @yangtze.hku.hk)		'	
Teachers Involved	(Dr J Yaı	ng,Chemistry)				
	(Prof G F	H Chen, Chemistry)				
Course Objectives	methods		computational chemistry including fire ndergraduate and postgraduate stud mputational biology.			
Course Contents	Hartree-I	Fock molecular orbit	al method, density-functional theory,		s, Basis sets, Force	
& Topics		Fields, QM/MM method, free energy calculation, and computer-aided drug design.  On successful completion of this course, students should be able to:				
Course Learning Outcomes			•	<u> </u>		
Outcomes			concepts of density-functional theory	and a second		
		nechanics/molecular	sic numerical techniques of mole mechanics method	ecular mechanics metho	od and quantum	
		. ,	computational software to calculate clude organic molecules, inorganic ma		roperties of various	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in 0	Pass in CHEM3541 or PHYS3351				
Offer in 2021 - 2022	N O	ffer in 2022 - 2023 : Y	•	Examination		
Grade Descriptors (A+ to F)	A Mastery of advanced knowledge on following topics: density-functional theory, Kohn-Sham equation, time-dependent density functional theory, open system, molecular dynamics, force field, and quantum mechanics/molecular mechanics. Strong analytica and critical abilities and logical thinking, with strong ability to apply knowledge to practical problems in physical chemistry.					
	B Substantial command of a broad range of knowledge on following topics: density-functional theory, Kohn-Sham equation, time-					
		dependent density-functional theory, open system, molecular dynamics, force field, and quantum mechanics/molecular mechanics. Evidence of analytical and critical abilities and logical thinking, with ability to apply knowledge to practical problems in physical chemistry.				
	C Command of knowledge on following topics: density-functional theory, Kohn-Sham equation, time-dependent density-functional theory, open system, molecular dynamics, force field, and quantum mechanics/molecular mechanics. Evidence of some analytical and critical abilities and logical thinking, with ability to apply knowledge to familiar problems in physical chemistry.					
	D	Partial but limited command of knowledge on following topics: density-functional theory, Kohn-Sham equation, time-dependent density-functional theory, open system, molecular dynamics, force field, and quantum mechanics/molecular mechanics. Evidence of some coherent analytical and critical abilities and logical thinking, with limited ability to apply knowledge to practical problems in physical chemistry.				
		problems in physical ch	nemistry.	thinking, with inflited ability to app		
	Fail	Little or no evidence dependent density-fun	of command of knowledge on following topinctional theory, open system, molecular dyralytical and critical abilities and logical thinking,	cs: density-functional theory, Ko	ply knowledge to practica ohn-Sham equation, time im mechanics/molecular	
	Fail N	Little or no evidence dependent density-fun mechanics. Lack of an	of command of knowledge on following topinctional theory, open system, molecular dyralytical and critical abilities and logical thinking,	cs: density-functional theory, Ko	ply knowledge to practica phn-Sham equation, time Im mechanics/molecular	
intensive Course	N	Little or no evidence dependent density-fun mechanics. Lack of an	of command of knowledge on following topi octional theory, open system, molecular dyr alytical and critical abilities and logical thinking, nemistry.	cs: density-functional theory, Ko	ply knowledge to practica ohn-Sham equation, time im mechanics/molecular	
intensive Course Course Type Course Teaching	N	Little or no evidence dependent density-fun mechanics. Lack of an problems in physical ch with laboratory compo	of command of knowledge on following topi octional theory, open system, molecular dyr alytical and critical abilities and logical thinking, nemistry.	cs: density-functional theory, Ko	ply knowledge to practica ohn-Sham equation, time im mechanics/molecular	
intensive Course Course Type Course Teaching	N Lecture v	Little or no evidence dependent density-fur mechanics. Lack of an problems in physical characteristics with laboratory composes	of command of knowledge on following topictional theory, open system, molecular dyr alytical and critical abilities and logical thinking, nemistry.	cs: density-functional theory, Ko	ply knowledge to practical phn-Sham equation, timum mechanics/molecular ply knowledge to practical	
intensive Course Course Type Course Teaching	N Lecture v	Little or no evidence dependent density-fur mechanics. Lack of an problems in physical cr	of command of knowledge on following topictional theory, open system, molecular dyr alytical and critical abilities and logical thinking, nemistry.	cs: density-functional theory, Konamics, force field, and quantu with very little or no ability to app	ply knowledge to practical phn-Sham equation, time im mechanics/molecular ply knowledge to practical physics of thours	
intensive Course Course Type Course Teaching	N Lecture v Activitie Lectures	Little or no evidence dependent density-fur mechanics. Lack of an problems in physical cr	of command of knowledge on following topictional theory, open system, molecular dyr alytical and critical abilities and logical thinking, nemistry.  Details	cs: density-functional theory, Konamics, force field, and quantu with very little or no ability to app	ply knowledge to practical ohn-Sham equation, timum mechanics/molecular ply knowledge to practical No. of Hours 24	
intensive Course Course Type Course Teaching	N Lecture v Activitie Lectures Laborato Tutorials	Little or no evidence dependent density-fur mechanics. Lack of an problems in physical cr	of command of knowledge on following topictional theory, open system, molecular dyr alytical and critical abilities and logical thinking, nemistry.  Details	cs: density-functional theory, Konamics, force field, and quantu with very little or no ability to app	ply knowledge to practical order of the control of	
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods	N Lecture v Activitie Lectures Laborato Tutorials	Little or no evidence dependent density-fun mechanics. Lack of an problems in physical characteristics with laboratory composes.	of command of knowledge on following topictional theory, open system, molecular dyr alytical and critical abilities and logical thinking, nemistry.  Details	cs: density-functional theory, Konamics, force field, and quantu with very little or no ability to app	No. of Hours 24 24 6 100 Assessment Methods	
Communication- intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting	N Lecture v Activitie Lectures Laborato Tutorials Reading	Little or no evidence dependent density-fun mechanics. Lack of an problems in physical characteristics with laboratory composes.	of command of knowledge on following topictional theory, open system, molecular dyrallytical and critical abilities and logical thinking, nemistry.  Details  lab sessions 6x4 hours of computations of comput	cs: density-functional theory, Konamics, force field, and quantu with very little or no ability to apply the state of the	No. of Hours 24 24 6 100 Assessment	

Required/recommended reading and online materials	Attila Szabo & Neil S. Ostlund: Modern Quantum Chemistry (1st ed.) Robert G. Parr & Weitao Yang: Density-Functional Theory of Atoms and Molecules J.M. Haile: Molecular Dynamics Simulation Andrew R. Leach: Molecular Modelling - Principles and Applications
Additional Course Information	This course is equivalent to CHEM6109 Computational Chemistry. CHEM4542 is offered every other year. Laboratory classes are mandatory. Students must complete ALL experiments and laboratory reports to pass this course.

CHEM4543	Advance	ed physical chemis	try (6 credits)	Academic Year	2021		
Offering Department	Chemistry		- ,	Quota	40		
Course Co-ordinator	Prof G H (	Chen, Chemistry (ghc@	yangtze.hku.hk)	'			
Teachers Involved	`	Phillips,Chemistry) Chen,Chemistry)					
Course Objectives		•	ics in physical chemistry. It is of ed in postgraduate studies.	fered for students majoring in	physical chemist		
Course Contents & Topics	processes	ime-resolved spectroscopy methods, excited states and reactive intermediates, photophysics and photochemical rocesses, chemical reaction mechanisms, advanced quantum mechanical methods, reaction pathways and urface crossings.					
Course Learning Outcomes	CLO 1 un CLO 2 un dy	On successful completion of this course, students should be able to: CLO 1 understand the basic concepts of quantum chemistry, statistical thermodynamics and molecular dynamics CLO 2 understand Hartree-Fock method, statistical ensembles, quantum statistics, H-theorem, and reaction dynamics CLO 3 understand the elementary numerical procedures in Hartree-Fock and molecular mechanics methods					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Cl	HEM3541					
Offer in 2021 - 2022	Y 2nd	sem Offer in 2022 - 2	2023 : Y	Examination	May		
Grade Descriptors (A+ to F)	Mastery of advanced knowledge on following topics: variation method in quantum mechanics, Hartree-Fock method, perturbation theory, advanced statistical thermodynamics, reaction dynamics. Strong analytical and critical abilities and logical thinking, with strong ability to apply knowledge to practical problems in physical chemistry.						
	B Substantial command of a broad range of knowledge on following topics: variation method in quantum mechanics, Hartree-Fock method, perturbation theory, advanced statistical thermodynamics, reaction dynamics. Evidence of analytical and critical abilities and logical thinking, with ability to apply knowledge to practical problems in physical chemistry.						
	Command of knowledge on following topics: variation method in quantum mechanics, Hartree-Fock method, perturbation theory, advanced statistical thermodynamics, reaction dynamics. Evidence of some analytical and critical abilities and logical thinking, with ability to apply knowledge to familiar problems in physical chemistry.						
	Partial but limited command of knowledge on following topics: variation method in quantum mechanics, Hartree-Fock method, perturbation theory, advanced statistical thermodynamics, reaction dynamics. Evidence of some coherent analytical and critical abilities and logical thinking, with limited ability to apply knowledge to practical problems in physical chemistry.						
	Fail  Little or no evidence of command of knowledge on following topics: variation method in quantum mechanics, Hartree-Fock method, perturbation theory, advanced statistical thermodynamics, reaction dynamics. Lack of analytical and critical abilities and logical thinking, with very little or no ability to apply knowledge to practical problems in physical chemistry.						
Communication-	N						
ntensive Course							
Course Type	Lecture-ba	ased course					
Course Teaching	Activities	<b>3</b>	Details		No. of Hours		
& Learning Activities	Lectures				36		
	Tutorials		tutorials/discussion		12		
	Reading /	Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents	(continuous assessment)	20	CLO 1,2,3		
	Examinat		i '	80	CLO 1,2,3		
Required/recommended reading and online materials	Ira N. Levi R. C. Tolm	ne: Quantum Chemistry nan: The Principles of S					
Course Website	Nil	ile, r. d. demstein: Mo	lecular Reaction Dynam				
Additional Course		o is also offered to DDs	s students, and the source and f	or DDg students is CHEM6112			
Information	THIS COURS	e is also oliered to RPG	g students, and the course code for	JI NEY SIUUEIIIS IS CHEIVIOTTZ	•		

CHEM4544	Electrochemical science and technology (6 credits)	Academic Year	2021			
Offering Department	Chemistry	Quota	36			
Course Co-ordinator	Prof G K Y Chan, Chemistry (hrsccky@hku.hk)					
Teachers Involved	(Prof G K Y Chan, Chemistry) (Visiting Professor, Chemistry)					
Course Objectives	To understand the science of electrochemistry, methods to characterise electrochemical applications and technologies.	To understand the science of electrochemistry, methods to characterise electrochemical cells, and factors affecting electrochemical applications and technologies.				
Course Contents & Topics	Thermodynamics, kinetics, and transport of electrochemical processes. It controlled potential, current, and hydrodynamics. Voltammetry for analytical sources, sensors, synthesis and separation processes. Electrolytes, separator electrochemical processes.	l chemistry. Electro	ochemical power			
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 Understand the thermodynamic and kinetics of a charge transfer process at the electrode-electrolyte interface and transport of relevant species in molecular and macroscopic scales.					
	CLO 2 Apply voltammetry methods to characterize an electrochemical process.					
	CLO 3 Correlate performance of electrochemical cells to materials, design, and operation parameters.					
Pre-requisites	Pass in CHEM3241 or CHEM3541 or CHEM3542					

(and Co-requisites and Impermissible						
combinations)						
Offer in 2021 - 2022	Y 2nd	sem Offer in 2022 - 2	2023 : N		Examination	May
Grade Descriptors (A+ to F)	Α	Demonstrate thorough knowledge of electrochemical science and technology, and mastery of skills required for attaining all of the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to solve problems in a wide range of complex, familiar and unfamiliar situations. Critical use of data and sourcing of references. Apply highly effective organizational and presentational skills.				
	В	Demonstrate substantial knowledge of electrochemical science and technology and command of skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to solve problems in familiar and some unfamiliar situations. Correct use of data and sourcing of references. Apply effective organizational and presentational skills.				
	С					
	D	Demonstrate partial but limited knowledge of electrochemical science and technology and command of skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Limited ability to use data and source references. Apply limited or barely effective organizational and presentational skills.				
	Fail	attaining the course learnin	g outcomes. Lack of analyt lge to solve problems. Mis	ical and critical	ence and technology, and comm abilities, logical and coherent thi d references. Organization and	nking. Show very little or
Communication- intensive Course	N					
Course Type	Lecture wit	h laboratory componer	nt course			
Course Teaching	Activities		Details			No. of Hours
& Learning Activities	Lectures					24
	Laboratory	1	Laboratory/Project			24
	Tutorials					6
	Reading /	Self study				100
Assessment Methods and Weighting	Methods		Details		Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignme	nts			10	CLO 1,2,3
	Examination	on			50	CLO 1,2,3
	Laboratory	reports	(Laboratory or Report/Term Paper)	Project	10	CLO 1,2,3
	Test		(Test/ Quiz)		30	CLO 1,2,3
Required/recommended reading and online materials	ISBN 9780 Bard, Allen	47071045. J., Larry R. Faulkner.	,		ce and Technology, John nentals and Applications. 2	
		)471043720.				
Additional Course Information	This course	e is offered every other	year.			

CHEM4910	Chemis	stry literacy and research (6 credits)	Academic Year	2021				
Offering Department	Chemist	try	Quota					
Course Co-ordinator	Prof X D	Li, Chemistry (xiangli @hku.hk)						
Teachers Involved	(Various	(Various teachers in the Department, Chemistry)						
Course Objectives	techniqu	This course is designed for final year students who would like to gain experience on research methods and techniques by working on small projects on literature research and chemistry research.						
Course Contents & Topics	literature	The course provides training on chemistry literature research techniques. Students will work on a small project on literature research and a short laboratory-based research project. The laboratory-based projects are provided by the students' supervisors who are assigned by the department.						
Course Learning	On succ	cessful completion of this course, students should be able to:						
Outcomes	CLO 1	demonstrate knowledge of academic databases and search engil	nes of chemistry literature	9				
	CLO 2	understand the terminology and nomenclature associated with the	eir own research project					
		demonstrate knowledge and understanding of the chemical tec their own research project	hniques they used to do	the research in				
		demonstrate knowledge and understanding of the results of the the broader research area	ir own research project a	and its context in				
Pre-requisites (and Co-requisites and Impermissible combinations)	CHEM42 This cap	n at least 24 credits of advanced level disciplinary core/elec XXX) in the Chemistry Major including CHEM3241, and CHEM33 ostone course is for Chemistry Major students only. liest that a student is allowed to take this capstone course is their	341, and CHEM3441, and					
Offer in 2021 - 2022		nd sem Offer in 2022 - 2023 : Y	Examination	No Exam				
Grade Descriptors (A+ to F)	Α	Show an extensive comprehension of the research project. Demonstrate very	y able analytical and critical tho					
		some originality. Illuminating utilization and critical analysis / evaluation of in sources. Critical employment of data and results to synthesize appropriate a of a wide range of appropriate theories, principles, data and methods. Employers of the skills. IWork of A+ should demonstrate substantial additional work beyond the	nd illuminating conclusions. De ploy very effective organization	range of high quality monstrate integration al and presentational				
	В	sources. Critical employment of data and results to synthesize appropriate a	nd illuminating conclusions. De ploy very effective organization: at is required in wider areas rele le analytical and critical thinking arisons between different seco	range of high quality monstrate integration al and presentational evant to the topic.] g with use of relevant ndary interpretations.				
	В	sources. Critical employment of data and results to synthesize appropriate a of a wide range of appropriate theories, principles, data and methods. Empskills. [Work of A+ should demonstrate substantial additional work beyond the Show a substantial comprehension of the research project. Demonstrate ablinformation from sources. Demonstrate ability to compose meaningful comp Correct utilization of data and results to form appropriate conclusions. Comp	nd illuminating conclusions. De ploy very effective organization: at is required in wider areas rela le analytical and critical thinking arisons between different seco pose general integration of the ence of some analytical and cri mparisons between different in conclusions. Demonstrate some	range of high quality monstrate integration al and presentational evant to the topic.] g with use of relevant notices, principles, data tical thinking with use tical thinking with use terpretations. Mainly e partial integration of				
		sources. Critical employment of data and results to synthesize appropriate a of a wide range of appropriate theories, principles, data and methods. Emp skills. [Work of A+ should demonstrate substantial additional work beyond this. Show a substantial comprehension of the research project. Demonstrate abiinformation from sources. Demonstrate ability to compose meaningful comp Correct utilization of data and results to form appropriate conclusions. Compand methods. Perform effective organizational and presentational skills. Show a general but incomplete comprehension of the research project. Presof relevant information from sources. Demonstrate ability to compose correct but some incorrect utilization of data and results to form appropriate.	nd illuminating conclusions. De ploy very effective organization: at is required in wider areas rela- le analytical and critical thinking arisons between different seco- pose general integration of the ence of some analytical and cri- mparisons between different in conclusions. Demonstrate some ational and presentational skills nt information, of the research abilities. Show utilization and Limited ability to employ data	range of high quality monstrate integration al and presentational evant to the topic.] g with use of relevant ndary interpretations. ories, principles, data tical thinking with use iterpretations. Mainly e partial integration of project. Presence of reference of several and results to form				

	results and/or unab	imited employment of secondary sources le to form appropriate conclusions. Demo on and presentational skills are of very limite	nstrate little or no integration of theori	
Communication- intensive Course	N			
Course Type	Project-based course			
Course Teaching	Activities	Details		No. of Hours
& Learning Activities	Reading / Self study	12 hrs tutorials; 46 hrs reading/self study	12 hrs tutorials; 46 hrs of workshops and 100 hrs reading/self study	
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Oral presentation		50	CLO 1,2,3,4
	Research report		50	CLO 1,2,3,4
Required/recommended reading and online materials	Reading materials will be as	ssigned depending on the project.		
Additional Course Information	Satisfactory completion of the	nis course will be counted towards t	the Capstone requirement.	

CHEM4911		one experience for opic (6 credits)	chemistry undergraduates:	Academic Yea	r 2021	
Offering Department	Chemist			Quota		
Course Co-ordinator	Dr A P L	Tong, Chemistry <i>(aplt</i> o	ong@hku.hk)			
Teachers Involved	(Various	teachers in the Depart	ment,Chemistry)			
Course Objectives	This project-based course with the theme of Chemistry for a Better Living in a Foreseeable Future aims to provide students with a capstone experience. It aims to enable students to think what are the key issues the world is facing with that have to be solved by chemistry and related technology. Students will need to apply what they have learn in classroom and conduct literature search regarding advanced chemistry research and related technology under development to solve the problems identified in their project using various channels.					
Course Contents & Topics	on this p	No formal teaching. It is expected that students are actively engaged and should devote 120-140 hours to working on this project.  Students will work in groups of two or three, under the supervision of the course coordinator. The duration of the project will be two to three months. The time of running this project-based course is in the summer (May - August).				
Course Learning Outcomes	On succ	On successful completion of this course, students should be able to:  CLO 1 observe and evaluate the various issues we are facing with and determine ways in which chemistry				
		used to solve the proble	· ·	•	,	
			actice, and to understand limitations of t	heir current knowledge		
			ollaborate with people with different bac	-		
			effectively in both written and oral form			
		•	critical thinking and creativity			
			appreciation for chemistry as to its relev	ance to our daily life		
Pre-requisites and Co-requisites and Impermissible combinations)	Students are expected to have satisfactorily completed all introductory chemistry disciplinary core courses and a least 24 credits of advanced level disciplinary core/elective chemistry courses in the Chemistry Major.  Students who are interested in taking the course should contact the course coordinator for application in April May. Late application may not be considered.  This capstone course is for Chemistry Major students only.  The earliest that a student is allowed to take this capstone course is their year 3 study.					
Offer in 2021 - 2022		ummer Offer in 2022	•	Examination	No Exam	
Grade Descriptors (A+ to F)	В	Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking, with evidence of original thought. Insightful use and critical analysis / evaluation of information drawn from a full range of high quality sources and to quote/reference aptly. Critical use of data and results to draw appropriate and insightful conclusions. Show integration of the full range of appropriate theories, principles, evidence and techniques. Apply highly effective organizational and presentational skills. [Work of A+ should show considerable additional work beyond that is required in wider areas relevant to the topic.]  Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Critical use of relevant information from sources, showing ability to make meaningful comparisons between different secondary interpretations and to quote/reference aptly. Correct use of data of results to draw appropriate conclusions. Show general integration of				
	С	Use of relevant information from sources, showing ability to make comparisons between different interpretations and to quote/reference aptly. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Show some partial integration of theories, principles, evidence and techniques. Apply moderately effective organizational and presentational skills.				
	D	logical thinking, but with limited analytical and critical abilities. Demonstrate use and reference of several sources, but mainly through summary rather than analysis and comparison. Limited ability to use data and results to draw appropriate conclusions. Show limited integration of theories, principles, evidence and techniques. Apply limited or barely effective organizational and presentational skills.				
	Fail  Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Limited use of secondary sources and no critical comparison of them. Misuse of data and results and/or unable to draw appropriate conclusions. Show little or no or inapt integration of theories, principles, evidence and techniques. Organization and presentational skills are minimally effective or ineffective.					
Communication- ntensive Course	N					
Course Type	Project-l	based course				
ourse Teaching	Activiti		Details		No. of Hours	
Learning Activities	Meeting	with supervisor	Tutorials		10	
		g / Self study			60	
	Assessi		Group work or project		80	
Assessment Methods and Weighting	Method		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin	
	Oral pre	esentation	40% Presentation; 10% Participation; 10% Peer evaluation	60	CLO 1,2,3,4,5,	

	Research report		40	CLO 1,2,4,5,6		
	No specific list of textbooks and references. Students are encouraged to obtain information via various channels					
	(main library, e-journals, internet, and discussions with classmates and teachers, etc.).					
online materials						
Additional Course	Enrolment of this course is not conducted via the online course selection system and should be made through the					
Information	relevant Department/School office	after approval has been obtained from	om the course coordinator			

CHEM4966	Chemistry	internship (6 cre	dits)	Academic Ye	ar 2021	
Offering Department	Chemistry			Quota		
Course Co-ordinator	Dr H Y Au-Y	eung, Chemistry (hoy	vuay@hku.hk)			
Teachers Involved		Yeung,Chemistry)				
Course Objectives	This course aims to offer students the opportunities to gain work experience in the industry related to their major of study. The workplace learning experience would be of great benefits to the students to apply their knowledge gained in the study to the real work environments. Students have to take on at least 160 hours of internship work either within the University or outside the University arranged by the School/Departments.					
Course Contents & Topics	various tasks - Outside the be supervise Department/	- Within the University: The student will be supervised by a staff member (Supervisor), working on a project or various tasks as instructed by the Supervisor Outside the University: The student will work in an external agency related to the major of study. The student will be supervised under a staff member of the external agency (the External Supervisor) and a staff member of the Department/School of the student (the Internal Supervisor). The work to be performed by the student will normally be instructed by the External Supervisor, with prior agreement of the Internal Supervisor.				
Course Learning	On successf	ful completion of this of	course, students should be able to:	<u> </u>		
Outcomes	CLO 1 apply knowledge in their major study in solving practical problems in the work place					
	CLO 2 ga	in first hand work exp	erience in the industry related to the	eir major study		
Pre-requisites (and Co-requisites and Impermissible combinations)	CHEM4XXX This capstor	Pass in at least 24 credits of advanced level disciplinary core/elective chemistry courses (CHEM3XXX or CHEM4XXX) in the Chemistry Major.  This capstone course is for Chemistry Major/ Chemistry Major (Intensive) students only.  The earliest that a student is allowed to take this capstone course is their year 3 study.				
Offer in 2021 - 2022	Y 1st se	m 2nd sem Sumn	ner Offer in 2022 - 2023 : Y	Examination	No Exam	
Grade Descriptors Distinction/Pass/Fail	Distincti on Pass	performance in handling effective collaboration arequirements set out in the and excellent evaluation. Able to apply knowledge or assigned by supervisclients in the job. Success	to solve problems in the workplace. Successor(s). Establishes effective collaboration aisfully fulfills the requirements set out in the tion by supervisor(s), etc. Students demonstrates	by job or assigned by supervise agues, and clients in the job. urs, with excellent performance i sfully handles and carries out the nd communication with supervi Course Description regarding w	ur(s). Establishes highly Successfully fulfills the n written and oral report work required in the job sor(s), colleagues, and orking hours, written and	
	Fail  Very limited or no ability to solve problems in the workplace. Fails to handle or carry out the work required in the job or assigned by supervisor(s). Fails to establish effective collaboration or communication with supervisor(s), other colleagues, or clients in the job. Fails to satisfy the requirements set out in the Course Description regarding working hours, written and oral report, or evaluation by supervisor(s), etc.					
Communication- intensive Course	N	, , . , , , , , , , , , , , , , , , , ,				
Course Type	Internship					
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Internship w	vork	it is expected that students are to (or the equivalent of 4 weeks full-ti		160	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Written report		written report, employer's feedback and oral presentation	100	CLO 1,2	
Additional Course Information	be recorded interested to Enrolment o	on the student's tra enrol in this course s f this course is not co	urse can be counted towards the Ca anscript. This course will be assess should contact the Department to ob- anducted via the online course selec- a after approval has been obtained fi	sed on "Pass/Fail" basis. tain the approval. ction system and should b	Students who are e made through the	

CHEM4999	Chemistry project (12 credits)	Academic Year	2021				
Offering Department	Chemistry	Quota					
Course Co-ordinator	Dr J Y Tang, Chemistry (jinyao@hku.hk)						
Teachers Involved	(Various teachers in the Department, Chemistry)	(Various teachers in the Department, Chemistry)					
Course Objectives	' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' '	To provide experience of research techniques by working on a short project under the direct supervision of a member of staff. This course would prepare students for graduate school work in chemistry.					
Course Contents & Topics	A short research project provided by a member of staff (e.g. the students	A short research project provided by a member of staff (e.g. the students supervisor).					
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 understand the terminology and nomenclature associated with their own research chemistry project						
	CLO 2 demonstrate knowledge and understanding of the chemical techniques they used to do the research in their own chemical project						
	CLO 3 demonstrate critical thinking skill in their own research project and understanding the motivation and target of the research						
	CLO 4 demonstrate knowledge and understanding of the results of their own chemistry project and its context in the broader research area						
	CLO 5 demonstrate ability to integrate the knowledge acquired from previous courses and develop fundamental knowledge of designing research plan						
Pre-requisites (and Co-requisites and Impermissible	Pass in at least 24 credits of advanced level disciplinary core/elec CHEM4XXX) in the Chemistry Major including CHEM3241, and CHEM33 This capstone course is for Chemistry Major/ Chemistry Major (Intensive)	41, and CHEM3441, and					

Offer in 2021 - 2022	Y Ye	ear long Offer in 202	22 - 2023 : Y	Examination	No Exam	
Grade Descriptors (A+ to F)	A	some originality. Illumir sources. Critical emplo of a wide range of app	nprehension of the research project. Demonstrate nating utilization and critical analysis / evaluation or yment of data and results to synthesize appropria roopriate theories, principles, data and methods. Ild demonstrate substantial additional work beyon	of information acquired from a wate and illuminating conclusions. Employ very effective organizate	vide range of high quality Demonstrate integration tional and presentational	
	В	B Show a substantial comprehension of the research project. Demonstrate able analytical and critical thinking with use of relevant information from sources. Demonstrate ability to compose meaningful comparisons between different secondary interpretations. Correct utilization of data and results to form appropriate conclusions. Compose general integration of theories, principles, data and methods. Perform effective organizational and presentational skills.				
	С					
	D					
	Fail  Show little or no comprehension of the research project. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Limited employment of secondary sources and no critical comparison of them. Incorrectly utilize data and results and/or unable to form appropriate conclusions. Demonstrate little or no integration of theories, principles, data and methods. Organization and presentational skills are of very limited use or ineffective.					
Communication- intensive Course	N					
Course Type	Project-b	ased course				
Course Teaching	Activitie	s	Details		No. of Hours	
& Learning Activities	Reading	/ Self study	8 hours per week for 24 weeks of meetings	or longer discussions &	192	
Assessment Methods and Weighting	Methods	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Disserta	tion	including a written report and an oral presentation	100	CLO 1,2,3,4,5	
Required/recommended reading and online materials	Specialis	Specialist texts dependant on the selected topic.				
Additional Course Information	Third year	hird year students with exceptional academic achievement may also apply for this course				

CSCI9001	Practica	I Chinese for scie	nce students (6 credits)	Academic Ye	ar 2021	
Offering Department	Chinese			Quota		
Course Co-ordinator	Mr K W W	long, Chinese (kwwon	ngb @hku.hk)			
Teachers Involved	(Dr K T La (Dr S F La	(Dr C M Chan,Chinese) (Dr K T Lam,Chinese) (Dr S F Lee,Chinese) (Mr K W Wong,Chinese)				
Course Objectives	This cours students announce	This course aims to enhance the students' competence using Chinese for professional communication. It helps the students to master the techniques of writing different types of documents such as memos, emails, letters, announcements, notice, brochures, leaflets, and reports. In addition, topics addressing resentation and discussion techniques, the style and rhetoric of reader-based writings are included to heighten the students' linguistic				
Course Contents & Topics	- Gramma good-new	ar & vocabulary of mod s and goodwill mess documents: emails;	dern Chinese - The Chinese writing : lages, bad-news messages, and p presentations - Styles and rheto	persuasive messages - Te	chniques of writing	
Course Learning			s course, students should be able to	:		
Outcomes			npetency in modern Chinese and wr			
	CLO 2 er	mploy rhetorical device	es and stylistics, as well as practical	writing skills specific to thei	r discipline	
	CLO 4 ap	pply their disciplinary k	ommunication, initiate discussions a mowledge and their Chinese writing d creatively in different social or prof	skills and professional pres		
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL	,				
Offer in 2021 - 2022	Y 1st	sem 2nd sem Offe	er in 2022 - 2023 : Y	Examination	Dec May	
Grade Descriptors	A		uperb ability to achieve the intended learning		-	
	B C D Fail	evaluate, and synthesize The student acquired ad describe and apply the la synthesize the language to The student only has bas	ability to achieve the intended learning outcome the language techniques for effective commulequate ability to achieve the intended learnanguage techniques for effective communicationly. It is familiarity with the subject.	unication in most situations.  ing outcomes of the course at lo	w levels of learning (i.e	
Communication-		The student has very limit	ted familiarity with the subject.			
ntensive Course	N					
Course Type	Lecture-ba	ased course				
Course Teaching	Activities	S	Details		No. of Hours	
& Learning Activities	Lectures				12	
	Tutorials		Small group tutorials		12	
	Group wo	ork	Workshops		24	
	Discussion	on			24	
	Reading /	/ Self study	Reading/self study (20 hours) an	nd preparation (12 hours)	32	
	Assessm	ent			16	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignments		coursework	50		
	Examinat	tion		50		
Required/recommended reading and online materials	港:香港之場章 包含 多种 多种 多种 多种 多种 多种 多种 多种 多种 多种 多种 多种 多种	大學出版社。香港城市 1996年。《中文應用寫 。汪麗炎・1998年。《 篇》。香港:香港城市	。上海:上海大學出版社。李家樹、 大學語文學部·2001年。《中文傳意 作教程》。香港:三聯書店。李錦 [漢語寫作》。上海:上海大學出版社 大學出版社。經文略、蘭德主編·20 [表。《新編公文寫作學》。成都:四月	意:基礎篇》。香港:香港坊 昌・2000年。《現代商業傳記 土。香港城市大學語文學部・ 001年。《企業文案撰寫模式	成市大學出版社。周 意大全》。香港:商 2001年。《中文傳 成大全》。廣州:廣	

EASC1020	Introdu	ction to climate scie	ence (6 credits)	Academic Ye	ar 2021		
Offering Department	Earth Sci	iences		Quota			
Course Co-ordinator	Prof Z H	Liu, Earth Sciences (zhl.	iu @hku.hk)				
Teachers Involved	١,	(Dr S H Li,Earth Sciences) (Prof Z H Liu,Earth Sciences)					
Course Objectives	This course provides an introduction to the study of global climate systems and climate change. We study the controls of temporal and spatial variations in earth's climate and its histories of past climates preserved in the geological record. We look at modern research methods that are used in paleoclimatic and paleoenvironmental reconstructions.						
Course Contents & Topics	Global climatic systems, climate classification, natural variability of climate, physical causes for changes throug geologic time, external and internal forcing mechanisms, solar orbital variations, major climatic events of the pas and their effects on how our planet has developed, glacial and interglacial oscillations, predicting future global change.						
Course Learning	On succe	essful completion of this	course, students should be a	able to:			
Outcomes	CLO 1 identify major aspects of climatology and approaches to climatological study						
	CLO 2	explain the factors and	physical processes controll	ing climate system			
	CLO 3	understand the driving	forces of Earth's climate cha	ange			
	CLO 4	recognize the history of	f Earth's climate change				
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL						
Offer in 2021 - 2022		d sem Offer in 2022 - 2		Examination	May		
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Demonstrate critical use of data and results to draw appropriate and insightful conclusions. Show insightful use and critical analysis / evaluation of information drawn from a full range of high quality sources and to quote/reference aptly.						
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Demonstrate correct use of data and results to draw appropriate conclusions. Show critical use of relevant information from sources and ability to make meaningful comparisons between different secondary interpretations and to quote/reference aptly.						
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Demonstrate mostly correct but some erroneous use of data and results to draw appropriate conclusions. Show use of relevant information from sources and ability to make comparisons between different interpretations and to quote/reference aptly.					
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Demonstrate limited ability to use data and results to draw appropriate conclusions. Show use and reference of several sources, but mainly through summary rather than analysis and comparison.					
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Demonstrate misuse of data and results and/or unable to draw appropriate conclusions. Show limited use of secondary sources and no critical comparison of them.						
Communication- intensive Course	N	·	·				
Course Type	Lecture-b	pased course					
Course Teaching	Activitie	es	Details		No. of Hours		
& Learning Activities	Lectures	<b>,</b>			36		
	Tutorials				12		
	Project work				36		
	Reading / Self study				50		
Assessment Methods and Weighting	Methods	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignm	ents		50	CLO 2,3		
	Examina			50	CLO 1,2,3,4		
Required/recommended reading and online materials	Ruddima	n, W. F.: Earth's Climate	Past and Future (W. F. Freega: Climatology (Jones and	eman, 2008, 2nd edition)			

EASC1401	Blue Planet (6 credits)	Academic Year	2021		
Offering Department	Earth Sciences	Quota			
Course Co-ordinator	Dr P Bach, Earth Sciences ()				
Teachers Involved	(Dr P Bach,Earth Sciences)				
Course Objectives	The aim is to provide those students who are taking a first course in Earth System Sciences with a fundamental knowledge of how our diverse and living planet Earth works with weaving together an understanding of the dynamic and interactive processes in the Earth's lithosphere, hydrosphere, biosphere and atmosphere. In addition, students should become familiar with the way the study of Earth Sciences blends observation, information, hypothesis, communication and decision making for a better understanding of the future of our planet.				
Course Contents & Topics	<ul> <li>- Hydrosphere (Surface- and Groundwater, Oceans and Water Cycle)</li> <li>- Atmosphere (Composition, Weather, Climate, Green House Effect, Oxygen Cy</li> <li>- Biosphere (Life, Ecosystems, Evolution and Extinction, Geochemical Cycles,</li> </ul>	This introductory course will introduce and discuss the following topics:  - Introduction to Earth Systems and Habitable Planet Earth,  - Lithosphere (Earth Materials, Plate Tectonics, Volcanism, Earthquakes, Surface Processes and Rock Cycle)  - Hydrosphere (Surface- and Groundwater, Oceans and Water Cycle)  - Atmosphere (Composition, Weather, Climate, Green House Effect, Oxygen Cycle)  - Biosphere (Life, Ecosystems, Evolution and Extinction, Geochemical Cycles,  - Concepts and Evolution of Dynamic Earth Systems, Human Interactions with Planet Earth (Earth Resources,			
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 understand the terminology and nomenclature appropriate to the introductory study of Earth Sciences  CLO 2 demonstrate knowledge and understanding of the underlying concepts associated with the study of the Earth Systems and their dynamic interactive processes				

	CLO 3	understand the exte	nt and nature of global change and	d environmental concerns aroun	d us
	CLO 4 demonstrate the ability to make and record observations on Earth Systems processes in natural field environments				
	CLO 5 develop skills to synthesize observation and knowledge in a report in essay form				
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL				
Offer in 2021 - 2022	Y 1s	st sem Offer in 20	22 - 2023 : Y	Examination	Dec
Grade Descriptors (A+ to F)	Demonstrate thorough mastery of extensive knowledge / competencies/skills at an Earth Science introductory level required for attaining most or all of the course learning outcomes. Shows clear understanding of introductory terminology and concepts and strong abilities to apply and relate them in a range of complex interactive processes between Earth Systems. Demonstrates highly effective observational skills in field as well as organizational skills to present important observations made and uses them to draw appropriate and insightful conclusions with an impressive level of depth and original thoughts.				
	В				
	C Demonstrate general but incomplete command of knowledge / competencies/skills at an Earth Science introductory level required for attaining most of the course learning outcomes. Shows evidence for some understanding of introductory terminology and concepts and some abilities to apply and relate them in some interactive processes between Earth Systems. Demonstrates moderately effective observational skills in field as well as organizational skills to present observations made mostly correct but with some erroneous use and results to draw appropriate conclusions.				
	D				
	Fail	Demonstrate little or for attaining the co concepts and little o observational skills i	no evidence of command of knowledge / of urse learning outcomes. Shows little or r no abilities to apply and relate them in ir field. Applies incoherent organizational at lunable to draw appropriate conclusions.	competencies/skills at an Earth Science no evidence of understanding of intro nteractive processes between Earth Sys	ductory terminology and tems. Demonstrates poo
Communication- intensive Course	N		''		
Course Type	Lecture	with laboratory com	ponent course		
Course Teaching	Activitie	es	Details		No. of Hours
& Learning Activities	Lectures				24
	Laborat	,			24 16
	Field wo		Compulsory 2-day field car	Compulsory 2-day field camp	
		g / Self study			100
Assessment Methods and Weighting	Method	ls	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Examina	ation	Essay Questions	40	CLO 1,2,3
	Laborat	ory reports		20	CLO 1,2,3,4
	Project	report	Field project report	30	CLO 1,2,3,4,5
	Test		Online MC Quizzes	10	CLO 1,2,3
Required/recommended reading and online materials			. : The Blue Planet (2011) Earth Science Today (1999)		

EASC1402	Principles	of geology (6 credits)	Academic Year	2021	
Offering Department		Earth Sciences Quota			
Course Co-ordinator	Dr M C Chei	ig, Earth Sciences (hmcc@hku.hk)			
Teachers Involved	(Dr M C Che	arth Sciences) ng,Earth Sciences) arth Sciences)			
Course Objectives	This course	an introduction to fundamental principles and concepts	s in geology.		
Course Contents & Topics	- Rocks and - Plate tector - Earthquake - Igneous pro Geomorph Sedimenta - Folds, Faul - Metamorph - Principles of - Biostratigra	cs: a unifying theory and Earth's interior cesses and igneous rocks ogy and surficial processes rocks and Metamorphism			
Course Learning Outcomes	CLO 1 rec CLO 2 de CLO 3 ex CLO 4 de	completion of this course, students should be able to: e the rock cycle and the rock material in the earth's crustribe the overall structure of the earth and the key externain the major geological phenomena in the context of parties the methods in geological dating e the major events in earth's history	ist rnal and internal processes		
Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2021 - 2022	NIL Y 1st se	Offer in 2022 - 2023 : Y	Examination	Dec	
		1 Oliel III 2022 - 2023 . T	Examination	Dec	
Grade Descriptors	A	monstrate thorough mastery at an advanced level of extensive kr	nowledge and skills required for atta	aining all the co	

(A+ to F)	learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.				
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.				
	С	Demonstrate general but outcomes. Show evidence	incomplete command of knowledge a of some analytical and critical abilities oderately effective organizational and p	and skills required for attaining most and logical thinking, and ability to a	
	D	Demonstrate partial but lim Show evidence of some co	nited command of knowledge and skills therent and logical thinking, but with lim ns. Apply limited or barely effective orga	required for attaining some of the coited analytical and critical abilities. Sh	
	Fail	Demonstrate little or no evi of analytical and critical a	idence of command of knowledge and abilities, logical and coherent thinking.	skills required for attaining the course Show very little or no ability to ap	
Communication- intensive Course	N		·		
Course Type	Lecture wi	ith laboratory componer	nt course		
Course Teaching	Activities		Details	No. of Hours	
& Learning Activities	Lectures		12 sessions x 2 hours		24
	Laboratory		laboratory practical on rocks and minerals, earthquakes, fossil identification		16
	Field work		1 field trip		8
	Group work		1 group project with presentation		4
	Reading / Self study				100
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Examinat	ion	2-hour written exam	40	CLO 1,2,3,4,5
	Laboratory reports		Practical/field reports	40	CLO 1,2,3,4,5
	Project re	port	Presentation and report	20	CLO 1,2,3,4,5
Required/recommended reading and online materials	Tarbuck E	.J. and Lutgens F.K.: T	he Earth: An Introduction to Phy	ysical Geology (latest edition)	

EASC1403	Geolog	ical heritage of Ho	ong Kong (6 credits)	Academic Yea	r 2021	
Offering Department	Earth Sci	iences		Quota	35	
Course Co-ordinator	Dr M C C	heung, Earth Science	s (hmcc@hku.hk)	·		
Teachers Involved	(Dr M C (	Cheung,Earth Science	es)			
Course Objectives			eology of Hong Kong, potential geol Hong Kong's infrastructure.	ogical resources for touris	m and the role o	
Course Contents & Topics	knowledg	6 Lectures on general geology of Hong Kong, geology of Hong Kong's Country Parks, and aspects of geological knowledge pertaining to large scale construction project plus at least 4 weekend field trips (equivalent to a total of 32 hours) guided by experts to localities of geological interest.				
Course Learning	On succe	essful completion of th	is course, students should be able to:			
Outcomes	CLO 1 a	cquire an appreciation	of the processes leading to the forma	ition of various landforms		
	CLO 2 d	lemonstrate understan	ding of the major morphological featur	es in Hong Kong		
	CLO 3 e	nhance the observation	on and analytical skills, and physical al	oility through participation ir	the field excursion	
			rent impacts on / importance of geolog			
Pre-requisites	NIL					
(and Co-requisites and Impermissible combinations)						
Offer in 2021 - 2022	Y 2n	d sem Offer in 2022	- 2023 : Y	Examination	May	
Grade Descriptors (A+ to F)	A Demonstrate thorough understanding at an advanced level of extensive knowledge and skills with evidence for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking. Evidence of original thoughts, excellent field observation and ability to solve problems. Highly effective organization and presentation skills.					
	B Demonstrate substantial understanding at an advanced level of extensive knowledge and skills with evidence for attaining all the					
	course learning outcomes. Show analytical and critical abilities and logical thinking. Evidence of original thoughts and abilities of field observation. Effective organization and presentation skills.					
	С	Demonstrate general but incomplete understanding required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking. Moderately effective organization and presentation skills.				
	D	Demonstrate partial but limited understanding for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to solve problems. Apply limited or barely effective organizational and presentational skills.				
	Fail  No or little knowledge about the subject. No evidence for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Very little or no ability for field observation and for solving problems. Poor organization and presentational skills.					
Communication-	N	and procentational office				
intensive Course						
Course Type	Lecture-b	pased course				
Course Teaching	Activitie	es	Details			
			6 sessions x 2 hours		No. of Hours	
	Lectures	<b>;</b>	6 sessions x 2 hours		No. of Hours	
	Lectures Field wo		6 sessions x 2 hours 4 field trips			
		rk			12	
	Field wo Group w	rk	4 field trips		12 32	
	Field wo Group w	rk ork / Self study	4 field trips		12 32 20	
& Learning Activities  Assessment Methods	Field wo Group w Reading	rk rork / Self study nent	4 field trips 1 presentation and report	Weighting in final course grade (%)	12 32 20 60	
& Learning Activities  Assessment Methods	Field wo Group w Reading Assessm	rk ork / Self study nent s	4 field trips 1 presentation and report Essay and exercises	0 0	12 32 20 60 20 Assessment Methods to CLO Mapping CLO 1,2,3,4	
& Learning Activities  Assessment Methods and Weighting	Field wo Group w Reading Assessm Methods	rk ork / Self study nent s	4 field trips 1 presentation and report  Essay and exercises  Details  attendance of compulsory	course grade (%)	12 32 20 60 20 Assessment Methods to CLO Mapping	

Presentation	Group presentation	20	CLO 1,2,3,4
Project report	Group report	5	CLO 1,2,3,4

EASC1404	Early lif	e on earth (6 cred	lits)	Academic Yea	r  2021
Offering Department	Earth Sci			Quota	50
Course Co-ordinator	TBC, Ear	th Sciences ()		'	
Teachers Involved		V			
Course Objectives	to have o	originated on Earth, a	gins of life. It provides an overview of nd how the Earth's dynamic environm of habitable environments on Earth an	ent impacted the origin of li	fe. This course wi
Course Contents & Topics	This course will cover the following topics: the composition and properties of the early Earth and Earth's first oceans; the central role of water in life; abundance of biological elements on the early Earth and elsewhere in the Solar system; possible conditions for the synthesis of life's first building blocks; the (geo)chemical roots of early life on Earth and the search for life's signatures in the solar system and beyond.				
Course Learning	On succe	essful completion of th	nis course, students should be able to:		
Outcomes	CLO 2 e	xplain and describe t	sical and chemical conditions on the e he role of water and extreme geoche at different geological environments pla	mical conditions in the synt	
	CLO 4 ic	dentify challenges ass	ociated with each step in the origins o	f life	
	CLO 5 in	nvestigate a current o	rigins of life topic		
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL				
Offer in 2021 - 2022	N Of	fer in 2022 - 2023 : N		Examination	
Grade Descriptors (A+ to F)	A Student demonstrates thorough mastery at an advanced level of extensive knowledge and skills required for attaining all course learning outcomes. Shows strong analytical and critical abilities and logical thinking, with evidence of original thought, and the ability to apply his/her knowledge to a wide range of problems that center around 'origins of life' topics, and at the same, can combine knowledge from the natural sciences to better understand potential early Life processes on Earth and elsewhere. Student shows the ability to apply highly effective organizational and presentational skills.  B Student demonstrates substantial command of a broad range of knowledge and skills required for attaining at least most of the				
	course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and apply his/her knowledge to a range of problems in the field of the "origins of life", and at the same, is capable to combine knowledge from the natural sciences to better understand potential early Life processes on Earth and elsewhere. Student shows the ability to apply effective organizational and presentational skills.  C Student demonstrates general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply his/her				
	knowledge to a range of problems in the field of the "origins of life". Student shows the ability to apply moderately effective organizational and presentational skills.  D Student demonstrates partial but limited command of knowledge and skills required for attaining some of the course learning				
	outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability understand key topics in the "origins of life" field. Student shows the ability to apply limited or barely effective organizational and presentational skills.				
	Fail  Student demonstrates little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Shows very little or no ability to apply knowledge to understand basic topics related to the origins of life. Organization and presentational skills are minimally effective or ineffective.				
Communication- intensive Course	N				
Course Type		vith laboratory compo			
Course Teaching	Activitie		Details		No. of Hours
& Learning Activities	Lectures				24
	Laboratory				24
	Reading	/ Self study			100
Assessment Methods and Weighting	Methods	3	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignm		1 midterm, group presentations, short-essay	60	
	Examina	tion	2-hour written examination	40	
Required/recommended reading and online materials	K.W. Plax	Sections from: Mason, S.F.: Chemical Evolution (Oxford University Press, 1991)  K.W. Plaxco & M. Gross: Astrobiology: A brief Introduction (J. Hopkins University Press, 2006)  Gilmour & M.A. Sephton: An Introduction to Astrobiology (Cambridge University Press, 2004)			

EASC1405	Peaceful use of nuclear technologies (6 credits)	Academic Year	2021		
Offering Department	Earth Sciences	Quota			
Course Co-ordinator	Dr S H Li, Earth Sciences (shli@hku.hk)				
Teachers Involved	(Dr S H Li,Earth Sciences)				
Course Objectives	To provide students with the science backgrounds and knowledge on application of nuclear technologies in daily life and to invoke an awareness of current applications of nuclear sciences by case studies.				
Course Contents & Topics	Man and radiation; principles of nuclear technology; case studies of nuclear techniques applied in arts, engineering, biological, physical and social sciences; radiation on earth and beyond; industrial application of nuclear techniques; nuclear techniques in medical study. Future development in nuclear technologies.				
Course Learning Outcomes	nuclear techniques; nuclear techniques in medical study. Future development in nuclear technologies.  On successful completion of this course, students should be able to:  CLO 1 recognize the science fundamentals in nuclear technologies  CLO 2 explain and describe the principles of nuclear technologies applied  CLO 3 have the awareness of current applications of nuclear sciences  CLO 4 demonstrate the knowledge and understanding of the underlying concepts associated with nuclear technologies				
Pre-requisites (and Co-requisites and Impermissible	NIL				

Offer in 2021 - 2022	N O	Offer in 2022 - 2023 : N		Examination		
Grade Descriptors (A+ to F)	A	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.				
	В	Demonstrate substantial learning outcomes. Show and some unfamiliar situa				
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.				
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.				
	Fail	Demonstrate little or no e of analytical and critical	evidence of command of knowledge and skills abilities, logical and coherent thinking. Shind presentational skills are minimally effective	required for attaining the course ow very little or no ability to ap		
Communication- intensive Course	N	, ,				
Course Type	Lecture-	-based course				
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials				12	
	Field work				6	
	Group work				6	
	Project	work			6	
	Reading	g / Self study			92	
Assessment Methods and Weighting	Method	ds	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignn	ments	Group activities and reports	30	CLO 1,2,3	
	Examination		2-hour	50	CLO 1,2,4	
	Project	reports	Individual Report	20	CLO 1,3,4	
Required/recommended reading and online materials	To be an	nnounced				

EASC1406	Introdu	ction to the earth-life	e system (6 credits)	Academic Year	2021	
Offering Department	Earth Sci	ences	<u> </u>	Quota		
Course Co-ordinator	Dr S Crov	we, Earth Sciences (saci	rowe@hku.hk)			
Teachers Involved	(Dr S Cro	we,Earth Sciences)				
Course Objectives	biological deep ged	l interpretations on the c	th an introduction to the biosph- co-evolution of the biosphere, at Earth-Life interactions with the	mosphere, hydrosphere and g	eosphere through	
Course Contents & Topics		1 /	cycle; plate tectonics, climate e; life in the Phanerozoic; the E	*	0 /	
Course Learning	On succe	essful completion of this of	course, students should be able	to:		
Outcomes	tii	me	on of the inanimate world and th	e living world on Earth through	n deep geological	
		xplain why the Earth is a				
			process as an agent of the mode			
			nd understanding of the natural	, ,		
Pre-requisites		nalyse qualitatively ques ASC1401	tions related to systematic struct	ure and evolution of the Earth-li	fe system	
and Co-requisites and Impermissible combinations)	N. Of	f i 0000 - 0000 - N		Farming the s		
Offer in 2021 - 2022	-	fer in 2022 - 2023 : N		Examination		
Grade Descriptors (A+ to F)	A Demonstrate thorough and complete grasp of the subject in order to fulfil most or all learning outcomes. Show clear understanding of the connections between the geosphere, hydrosphere and biosphere of the modern Earth and in the geologica past. Able to understand the interactions between human beings and the nature only happens as the latest processes on Earth.					
	В	B Demonstrate understanding at an advanced level of extensive knowledge and skills with evidence for attaining all the course learning outcomes. Show understanding of the connections between the geosphere, hydrosphere and biosphere of the modern Earth and in the geological past. Can demonstrate the interactions between human being and the nature only happen in the latest geological time.				
	Demonstrate general but incomplete understanding required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking. Moderately effective organization and presentation skills.					
	Demonstrate partial but limited understanding for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail		about the subject. No evidence for atta coherent thinking. Very little or no ability			
Communication- intensive Course	N					
Course Type	Lecture-b	ased course				
Course Teaching	Activitie	S	Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials				12	
	Reading	/ Self study			100	
Assessment Methods and Weighting	Methods	3	Details	Weighting in final course grade (%)	Assessment	

			to CLO Mapping
Assignments		80	CLO 1,2,3,4,5
Test	One in-class examination	20	CLO 1,2,3,4,5
C. Cockell, R. Corfield, N. Edward Press, 2008)	s and N. Harris: An Introduction to	the Earth-Life System (Ca	imbridge University

EASC1407		r Ecosystems (	6 credits)	Academic Yea	ar 2021
Offering Department	Earth Scie			Quota	
Course Co-ordinator	TBC, Earth	h Sciences ()			
Teachers Involved					
Course Objectives	-Dinosaur -How palar -Traits and In addition are specifi	eontologists recons d significance of a L i to these subject-s ically designed to e	estruct ancient ecosystems using fossil and Late Cretaceous ecosystem. pecific aims, the course style and struct encourage the development of analytica portunities to apply newly acquired know	ure - particularly incorporat I skills and critical, logical,	
Course Contents		e covers five topics		· ·	
& Topics	1. Introduction introduction southern Co. 2. Meat-ear Theropods 3. Plant-ear Erlian's he hadrosauri 4. Living whon-dinos the ecosys 5. Bringing	ction to dinosaurs: biology ranging from of the main field Gobi Desert of Chinating dinosaurs - the sating dinosaurs - saterbivores from the cian ornithischians. With dinosaurs: saurian reptiles, mastem.	rom their appearance, classification site visited virtually and discussed in th	nto the preserved ecosyste aurs:  the the trace sauropodomorph is and into the local ecosyste and into the local ecosyste and the dinosaurs of Erlia	site of Erlian in the m. s and the rarer nor tem. an and their roles in
Course Learning	On succes	sful completion of	this course, students should be able to:		
Outcomes			tly use the terminology covered.		i: i£ii:
		ecali knowledge of uations.	f dinosaur biology and demonstrate u	nderstanding of it in fami	liar and unfamiliar
	CLO 3 Res	emember how pala low understanding of ecall the traits and	eontologists reconstruct ancient ecosy of it in familiar and unfamiliar situations. significance of the Late Cretaceous ec emporaneous ecosystems.		
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL				
Offer in 2021 - 2022 Grade Descriptors	N Offe	er in 2022 - 2023 : I	N n mastery of the knowledge and skills required fo	Examination	Chow strong
(A+ to F)	B C D	analytical abilities and knowledge to a wide r Demonstrate substant learning outcomes. St thinking and original the Demonstrate general outcomes. Show evidinamiliar situations. Demonstrate partial be Show evidence of son ability to apply knowled Demonstrate little or not some situations.	d strong critical and logical thinking. Evidence ange of complex situations, both familiar and unfatial command of a broad range of knowledge an how evidence of good analytical abilities and goought. Ability to apply knowledge to familiar situa but incomplete command of knowledge and sence of some analytical abilities and some critical trial to the command of knowledge and sence of some analytical abilities and some critical thinking command of knowledge and skills require coherent and logical thinking, but only limited adge to solve problems.	of lateral thinking and original thiniliar. d skills required for attaining at lead of critical and logical thinking. Fitions and some unfamiliar situations and some unfamiliar situations are supported for attaining most all and logical thinking. Ability to a suired for attaining some of the councilytical abilities and limited critical attaining the course learning outcout.	east most of the course lare instances of lateral ns. of the course learning pply knowledge to most urse learning outcomes al thinking. Show limited omes. Lack of analytica
Communication-	N	probleme.			
intensive Course					
Course Type		th laboratory comp			
Course Teaching	Activities	ì	Details		No. of Hours
& Learning Activities	Lectures		e-lectures (video recordings) literature and specimen-based lal	20	24 24
	Laborator	у	group discussions	JS	12
		Self study	course textbook, topical scientifi	c papers and other self	90
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods
	Assignme	ents	lab assignments	60	to CLO Mapping CLO 1,2,3,4
	Examinati		2-hour examination	30	CLO 1,2,3,4
	Test	·	online weekly assessments	10	CLO 1,2,3,4
	1 000		(multiple-choice quizzes)	10	J_U 1,2,0,7
Required/recommended	Pacamma	nded reading (a ba	ooks and regular books):		

	Press: Bloomington. 1128pp. [HKU main library e-book]
	Dinosaurs: a concise natural history (3rd edition). D.E. Fastovsky, D.B. Weishampel, J. Sibbick. 2016. Cambridge University Press: Cambridge. 477pp. [good for students with non-science backgrounds; HKU main library: 567.9 F251 d58]
	The Dinosauria (2nd edition). Weishampel, D.B., Dodson, P., Osmolska, H. (eds.). 2004. University of California Press: Berkeley. 861pp. [more technical; HKU main library: 567.9 D58]
Additional Course Information	This course is a flipped-classroom version of the award-winning HKU MOOC Dinosaur Ecosystem (Faculty of Science Teaching Innovation in E-learning Award and nominee of edX Prize for Exceptional Contributions in Online Teaching and Learning). E-learning components are hosted on the easy-to-use HKU Online Learning platform (https://learning.hku.hk/catalog/), whilst tutorials and labs are in person and include fossil specimens from the Department of Earth Sciences, Stephen Hui Geological Museum and the HKU Vertebrate Palaeontology Laboratory.

EASC2401	Fluid/so	lid interaction	s in earth processes (6 credits)	Academic Ye	ar 2021	
Offering Department	Earth Scie		· · · · · · · · · · · · · · · · · · ·	Quota		
Course Co-ordinator	Dr K H Lei	mke, Earth Scien	ces (kono@hku.hk)			
Teachers Involved	(Dr K H Le	emke,Earth Scien	ces)			
Course Objectives	This cours	se provides an ov	erview of the physical and chemical principle	s that govern Earth pro	cesses	
Course Contents			number of weeks	•		
& Topics	- Earth in t	the laboratory, sc	aling time and space (1)			
	- Introduct	tion to thermodyna	amics, and the concept of equilibrium (2)			
	- States of	f matter, phase di	agrams - sublimation, condensation, crystalli	isation and melting (2)		
	- Mineral-s	solution interfaces	s (1)			
			environments: convection, conduction and r			
			d isotope fractionation on geological time sc	ales(1)		
			d basic laws of motion (1)			
		v and particle trar				
Carres I samina			and centripetal forces (1)			
Course Learning Outcomes			of this course, students should be able to:	mulical to the Fouth Coin		
Outcomes			rinciples of equilibrium thermodynamics as a	• •		
		ie priase diagram id solids	s to explain processes of fluid/solid interacti	ons, in particular syster	ns containing mens	
			y is exchanged throughout the Earth Systen	<u> </u>		
			derstanding of principles governing isotope e		aglo phaco evetome	
			id and fluid/gas interfaces.	xcriange reactions in sil	igie priase systems	
			inciples of motion and the basic forces affec	ting movement of gases	liquide and ealide	
		n Earth	molpies of motion and the basic forces affect	ang movement or gase.	s, ilquius ariu solius	
Pre-requisites	1	ASC1401 or EAS	C1402			
(and Co-requisites	1 455 111 27	1001401012/10	01402			
and Impermissible						
combinations)						
Offer in 2021 - 2022	Y 2nd	sem Offer in 2	022 - 2023 : Y	Examination	No Exam	
Grade Descriptors	Α		ugh mastery at an advanced level of extensive know			
(A+ to F)	-		Show strong analytical and critical abilities and logical			
•		presentational skills	e to a wide range of complex, familiar and unfamiliar	situations. Apply highly effective	ctive organizational and	
	В	·				
	-	learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar				
		and some unfamiliar situations. Apply effective organizational and presentational skills.  Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning				
	С					
	outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes.					
	Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail	Demonstrate little o	r no evidence of command of knowledge and skills req	uired for attaining the course		
	of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.					
Communication-	N	problems. Organiza	tion and presentational skills are minimally effective or i	nienective.		
intensive Course	1					
Course Type	Lecture wi	ith laboratory com	nonent course			
Course Teaching	Activities	•	Details		No. of Hours	
& Learning Activities	Lectures	•	12 sessions x 2 hour		24	
	Laborator	<b>V</b>	paper exercises		24	
		Self study	рарст схетовез		100	
Assessment Methods			Details	Waighting in final	Assessment	
and Weighting	Methods		Details	Weighting in final course grade (%)	Methods	
and Weighting				course grade (70)	to CLO Mapping	
	Project re	nort	3 projects	45	CLO 1,2,3,4,5	
	r roject re	ροιι	Two in-class examination (one for	40	OLO 1,2,3,4,5	
	Test		15% and another one for 40%)	55	CLO 1,2,3,4,5	
Doguirod/rocommonded	Dractical C	Chemical Thorms	dynamics for Geoscientists, (2012) Bruce Fe	adev		
		Juennai Intillo	ovogoods for deoscientists (ZUTZTDIUCE FE	CUIC V.		
Required/recommended reading and	Academic		aya	97,		

EASC2402	Field and laboratory methods (6 credits)	Academic Year	2021
Offering Department	Earth Sciences	Quota	40
Course Co-ordinator	Dr J A King, Earth Sciences (jessking@hku.hk)		
Teachers Involved	(Dr J A King, Earth Sciences) (Dr M C Cheung, Earth Sciences)		

Required/recommended	I Compreh	nensive Course No				
	Report		Reports) 50	Assessments (Maps & 0% and Laboratory (Laboratory Report)	70	CLO 2,3,4,5,
	Assignm	ients		tation exercises	30	CLO 1,2
Assessment Methods and Weighting	Methods	S	Details		Weighting in final course grade (%)	Assessment Methods to CLO Mapping
		/ Self study	12 Hours pap			100
	Laborato			5-day field camp & 2 day trips 12 hours paper exercises		12
Leaning Activities	Lectures Field wo			12 sessions x 1 hour		12 56
Course Teaching Learning Activities	Activitie		Details	v 1 hour		No. of Hours
Course Type	Field can	•				
Communication- ntensive Course	N					
Dominio di co	Fail	observations on ea	rth processes in the field a alytical and critical abiliti	required for most of the learni and show very little or no ability es, coherent and logical thin report and geological map wit	y to apply knowledge to solve king. Shows very little or no	problems. Évidence ability to synthesiz
	D	record observations coherent and logical	s on earth processes in that thinking, but with limited	subject required for most of e field and limited application analytical and critical abilities. logical map with barely effective	of knowledge to solve proble Show limited ability to synthes	ms. Evidence of son size some observatio
	С	Demonstrate general but incomplete grasp of the subject required for most of the learning outcome. Evidence of some ability t record observations on earth processes in the field and apply knowledge to most familiar situations. Evidence of some independent analytical, critical and logical thinking. Show ability to synthesize most observations made and knowledge in a fiel report and geological map with moderately effective organizational and presentational skills.				
	В	Demonstrate substantial grasp of the subject required for most of the learning outcome. Shows evidence of ability to record observations on earth processes in the field and to apply knowledge to familiar and some unfamiliar situations. Evidence of independent analytical, critical and logical thinking. Shows ability to synthesize all observations made and knowledge in a field report and geological map with effective organizational and presentational skills.				
Grade Descriptors (A+ to F)	A	record observations strong independen	s on earth processes in that analytical, critical and	the subject in order to fulfill me field and to apply knowledg logical thinking. Show strong with highly effective organiza	ge to familiar and unfamiliar s ability to synthesize all ob	situations. Evidence servations made ar
Offer in 2021 - 2022			)22 - 2023 : Y	iaha adda a in a com	Examination	No Exam
Pre-requisites and Co-requisites and Impermissible combinations)	Pass in E	EASC1401 or EAS	C1402			
	CLO 6 u		pasics of a series of la	boratory techniques for	geological and environm	nental studies
	0	bservations and d	ata	field data in determining		
	CLO 3 d	andscape units lemonstrate techni	ques for basic field o	nowing interpreted subs bservations, measureme stent geological and land	ents and identifications	,
Outcomes	CLO 1 re	ead geological ma	ps and comprehend	3-D geological structures		
Course Learning	- Laborat	ory equipment and	scription of landscape d technicues (lectures of this course, studen		ong Kong)	
	unconfor - Interpre	mities (lectures an tation and use of a	d class practice) air photographs (class	,		and launca strat
Course Contents & Topics	- Interpre	etation of geologi	ical and topographic	(lectures and class prace maps: topographic are contour lines (horizontal.)	nd geological cross se	
		nvironment of Hon				

EASC2404	Introduction to atmosphere and hydrosphere (6 credits)	Academic Year	2021
Offering Department	Earth Sciences	Quota	50
Course Co-ordinator	Dr B Zhang, Earth Sciences (binzh@hku.hk)		
Teachers Involved	(Dr B Zhang,Earth Sciences) (Dr J R Ali,Earth Sciences)		
Course Objectives	This course introduces the atmosphere and hydrosphere systems, and explain with one another.	s at a basic level	how they interact
Course Contents & Topics	Introduction and course plan, Earth within a broader context (Solar System a forces shaping the floor of the Oceans and Seas; Water Structure, Composition/Chemistry; Introduction to the Atmosphere; Heating Earth's surfa Moisture and Atmospheric Stability; Forms of condensation and precipitation; H Pressure and Winds; Intro to Atmospheric Circulation and Weather Systems; Coasts; Groundwater basics; Groundwater usage, contamination, caves landscapes; Climate system, proxy data, causes of climate change; Effects of cl	Ocean Structure ce and Atmosphe ydrological Cycle Ocean Circulation and karst; Glaci	and Seawater re; Temperature; - an overview; Air n; Waves; Tides;
Course Learning	On successful completion of this course, students should be able to:		
Outcomes	CLO 1 understand the important features which distinguish Earth from the other	er planets within o	ur Solar System,

	pa	rticularly with regards	to its outer fluid envelopes			
	CLO 2 ap	preciate that on a ge		an basins and the seas are contin	ually changing their	
	CLO 3 un			critical role the compound plays	in the Atmosphere-	
	CLO 4 un			ated with the Atmosphere and the	e Oceans/Seas and	
				ohere and Hydrosphere topics		
Pre-requisites and Co-requisites and Impermissible combinations)		ASC1401 or EASC140	,	, ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' '		
Offer in 2021 - 2022	Y 1st	sem Offer in 2022 -	2023 : Y	Examination	Dec	
Grade Descriptors (A+ to F)	В	presentational skills; insig and to quote/reference ap	htful use and critical analysis / eva otly; integration of the full range of a	al abilities and logical thinking; highly effe aluation of information drawn from a full rang appropriate theories, principles, evidence an les and logical thinking; effective organiza	ge of high quality sources d techniques.	
		secondary interpretations	and to quote/reference aptly; gene	howing ability to make meaningful compa eral integration of theories, principles, evider	nce and techniques.	
	G	General but incomplete grasp of the subject; evidence of some critical abilities and logical thinking; moderately effective organizational and presentational skills; use of relevant information from sources, showing ability to make comparisons between different interpretations and to quote/reference aptly; some partial integration of theories, principles, evidence and techniques.				
	D Limited grasp of the subject, retention of some relevant information of the subject; evidence of limited critical abilities; limited or barely effective organizational and presentational skills; use and reference of several sources, but mainly through summary rather than analysis and comparison; limited integration of theories, principles, evidence and techniques.					
	Fail  Little or no grasp of the knowledge and understanding of the subject; little or no evidence of critical abilities and logical / coherent thinking; incoherent organization and poor presentational skills; limited use of secondary sources and no critical comparison of them; little or no or inapt integration of theories, principles, evidence and techniques.					
Communication- ntensive Course	N					
Course Type	Lecture wi	th laboratory compone	ent course			
Course Teaching	Activities	1	Details		No. of Hours	
Learning Activities	Lectures				24	
	Laborator	y	including tutorials & disc	ussion	24	
	Project wo	ork			10	
	Reading /	Self study			90	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	nts		20	CLO 4,5	
	Essay			25	CLO 1,2,3,4,5	
	Examinati	on		50	CLO 1,2,3,4,5	
	Presentat	ion		5	CLO 1,2,3,4,5	
Required/recommended eading and online materials			y: An Invitation to Marine Sord J. Tarbuck: The Atmosph	ience ere: An Introduction to Meteorology	′	
Additional Course Information	(Novembe	r) due to the Universit		ons to carried out, as was the case uspended, the associated individual rill be dropped.		

EASC2406	Geochemistry (6 credits)	Academic Year 2021				
Offering Department	Earth Sciences	Quota				
Course Co-ordinator	Dr S H Li, Earth Sciences (shli@hku.hk)					
Teachers Involved	(Dr S H Li,Earth Sciences)					
Course Objectives	This course provides an understanding of the fundamentals and introduces students to the basic chemical principles, modern technique earth.					
Course Contents & Topics	<ul> <li>Physical and chemical state of the earth,</li> <li>Differentiation of and cosmic abundance of elements,</li> <li>Aqueous solutions and chemistry of natural water,</li> <li>Trace element,</li> <li>Chemistry of igneous rocks,</li> <li>Chemical controls on soil formation,</li> <li>Radioactive isotope geochemistry,</li> <li>Stable isotope geochemistry,</li> <li>Oxidation and reduction,</li> <li>Chemical weathering</li> </ul>					
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 demonstrate an understanding of basic principles of geochemistry and their applications to geological studies					
	CLO 2 describe element distribution in major rocks					
	CLO 3 apply the principles of isotopes to dating and studies of petrogenesis and climate changes					
	CLO 4 demonstrate knowledge of the chemical weathering processes					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in EASC1402					
Offer in 2021 - 2022	Y 2nd sem Offer in 2022 - 2023 : Y	Examination May				
Grade Descriptors (A+ to F)	A Demonstrate extensive knowledge and skills at an advanced level require strong analytical and critical abilities and logical thinking, and ability to ap problems. Critical use of data and results to draw appropriate and insigh and presentational skills.	oply highly effective lab skills and techniques to solve				
	B Demonstrate substantial command of a broad range of knowledge and s	kills required for attaining at least most of the course				

		and techniques to solve and presentational skills	problems. Correct use of data of .	cal abilities and logical thinking, and ability to results to draw appropriate conclusions. App	ly effective organizational	
	С	outcomes. Show evidentab skills and technique	ice of some analytical and critical	vledge and skills required for attaining mos abilities and logical thinking, and ability to a ect but some erroneous use of data and red presentational skills.	pply moderately effective	
	D	Show evidence of some partially effective lab sl	coherent and logical thinking, bu	nd skills required for attaining some of the co t with limited analytical and critical abilities, a bollems. Limited ability to use data and res all and presentational skills.	and limited ability to apply	
	Fail	of analytical and critical techniques to solve pro	abilities, logical and coherent thinl	ge and skills required for attaining the course king, and ability to apply minimally effective o lts and/or unable to draw appropriate conclu	r ineffective lab skills and	
Communication- intensive Course	N		·			
Course Type	Lecture w	ith laboratory compor	nent course			
Course Teaching	Activities		Details	Details		
& Learning Activities	Lectures		12 sessions x 2 hours	12 sessions x 2 hours		
	Laboratory		paper exercises	24		
	Tutorials				6	
	Reading	/ Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignm	ents		50	CLO 1,2,3,4	
	Examina	tion		50	CLO 1,2,3,4	
Required/recommended reading and online materials	Krauskop	f K.B. and Bird D.K. Ir	ons of Geochemistry (Prent ntroduction to Geochemistry ochemistry (Jones and Bart	y (McGraw-Hill, Inc. 1995, 3rd ed.)		

EASC2407	Mineral	ogy (6 credits)		Academic Year	2021	
Offering Department	Earth Sci	ences		Quota	30	
Course Co-ordinator	Prof M F	Zhou, Earth Sciences (mfz	hou @hku.hk)			
Teachers Involved	(Prof M F	Zhou,Earth Sciences)				
		Sun,Earth Sciences)				
Course Objectives	To provid	de essential knowledge of	mineralogy, to familiarize students with	common minerals t	that are basis for	
	study of p	petrography of igneous, see	limentary and metamorphic rocks.			
Course Contents		crystallization, mineral che	mistry			
& Topics		symmetry, Miller indices				
	,	I properties of minerals				
		composition, structure and				
	- Identification of rock forming minerals-hand specimens - Use of petrographic microscope					
	- Optical properties under plane polarized light					
	Optical properties under orthoscopic illumination     Optical properties under conoscopic illumination					
		ation of rock forming miner				
		all variations of minerals				
Course Learning			urse, students should be able to:			
Outcomes	CLO 1		systems used in classification of mineral	9		
	CLO 2		•	•		
	CLO 2 apply the physical properties to identify rock-forming minerals  CLO 3 describe the principle of optical mineralogy					
	CLO 4 identify the common rock-forming minerals in hand specimens and thin sections					
			ionning minerals in nana specimens and	tilli scottoris		
Pro-requisites	Page in F	:ΔSC1/102				
Pre-requisites	Pass in E	ASC1402				
(and Co-requisites	Pass in E	:ASC1402				
(and Co-requisites and Impermissible	Pass in E	:ASC1402				
		:ASC1402 t sem Offer in 2022 - 202	3 : Y	Examination	Dec	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022	Y 1s	t sem Offer in 2022 - 202	3:Y dge and skills at an advanced level required for att			
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022		t sem Offer in 2022 - 202 Demonstrate extensive knowls strong analytical and critical a problems. Critical use of data		aining all the course lear	rning outcomes. Show d techniques to solve	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 1s	t sem Offer in 2022 - 202  Demonstrate extensive knowle strong analytical and critical a problems. Critical use of data and presentational skills.	dge and skills at an advanced level required for att bilities and logical thinking, and ability to apply higl and results to draw appropriate and insightful con	aining all the course lear hly effective lab skills an clusions. Apply highly ef	rning outcomes. Show d techniques to solve ffective organizational	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 1s	t sem Offer in 2022 - 202  Demonstrate extensive knowlestrong analytical and critical aproblems. Critical use of data and presentational skills.  Demonstrate substantial comi	edge and skills at an advanced level required for att bilities and logical thinking, and ability to apply higl	aining all the course lear hly effective lab skills an- iclusions. Apply highly ef juired for attaining at lea	rining outcomes. Show d techniques to solve ffective organizational st most of the course	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 1s	Demonstrate extensive knowlestrong analytical and critical a problems. Critical use of data and presentational skills.  Demonstrate substantial comilearning outcomes. Show evice and techniques to solve problems.	dge and skills at an advanced level required for att bilities and logical thinking, and ability to apply higl and results to draw appropriate and insightful con nand of a broad range of knowledge and skills req	aining all the course lear hly effective lab skills an iclusions. Apply highly ef juired for attaining at lear hinking, and ability to ap	ming outcomes. Show d techniques to solve ffective organizational st most of the course ply effective lab skills	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 1s	Demonstrate extensive knowlestrong analytical and critical as problems. Critical use of data and presentational skills.  Demonstrate substantial comilearning outcomes. Show evice and techniques to solve problem depresentational skills.	dge and skills at an advanced level required for att bilities and logical thinking, and ability to apply high and results to draw appropriate and insightful con nand of a broad range of knowledge and skills req ence of analytical and critical abilities and logical t ems. Correct use of data of results to draw appropri	aining all the course lear hly effective lab skills an- clusions. Apply highly ef juired for attaining at lea- hinking, and ability to ap ate conclusions. Apply e	ning outcomes. Show d techniques to solve ffective organizational st most of the course ply effective lab skills ffective organizational	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 1s	bemonstrate extensive knowlestrong analytical and critical a problems. Critical use of data and presentational skills.  Demonstrate substantial complearning outcomes. Show evice and techniques to solve problem and presentational skills.  Demonstrate general but inc	dige and skills at an advanced level required for att bilities and logical thinking, and ability to apply high and results to draw appropriate and insightful connand of a broad range of knowledge and skills requence of analytical and critical abilities and logical tems. Correct use of data of results to draw approprior proper complete command of knowledge and skills required.	aining all the course lear hly effective lab skills an clusions. Apply highly ef juired for attaining at lea- hinking, and ability to ap ate conclusions. Apply e ed for attaining most of	ning outcomes. Show d techniques to solve ffective organizational st most of the course ply effective lab skills ffective organizational	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 1s	Demonstrate extensive knowlestrong analytical and critical a problems. Critical use of data and presentational skills.  Demonstrate substantial comilearning outcomes. Show evide and techniques to solve problems and techniques to solve problems of the properties of the properties of the problems of the properties of t	dge and skills at an advanced level required for att bilities and logical thinking, and ability to apply high and results to draw appropriate and insightful connand of a broad range of knowledge and skills requence of analytical and critical abilities and logical tems. Correct use of data of results to draw appropriate command of knowledge and skills required to the command of knowledge and skills required the command of knowledge and skills required the command of knowledge and skills required the command of knowledge and skills required the command of knowledge and skills required the command of knowledge and skills required the command of knowledge and skills required the command of knowledge and skills required the command of knowledge and skills required to the command of knowledge	aining all the course lear hly effective lab skills an- clusions. Apply highly ef juired for attaining at lea- hinking, and ability to ap ate conclusions. Apply e ed for attaining most of liking, and ability to apply	ning outcomes. Show d techniques to solve ffective organizational st most of the course ply effective lab skills ffective organizational the course learning moderately effective	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 1s A B	bem Offer in 2022 - 202  Demonstrate extensive knowlestrong analytical and critical a problems. Critical use of data and presentational skills.  Demonstrate substantial complearing outcomes. Show evice and techniques to solve probleand presentational skills.  Demonstrate general but incoutcomes. Show evidence of lab skills and techniques to sconclusions. Apply moderately	dge and skills at an advanced level required for att bilities and logical thinking, and ability to apply high and results to draw appropriate and insightful connand of a broad range of knowledge and skills requence of analytical and critical abilities and logical tems. Correct use of data of results to draw appropriate command of knowledge and skills requiresome analytical and critical abilities and logical thire by the problems. Mostly correct but some erroneous effective organizational and presentational skills.	aining all the course lear hily effective lab skills an clusions. Apply highly ef uried for attaining at lear hinking, and ability to ap ate conclusions. Apply e ed for attaining most of king, and ability to apply a use of data and results	ning outcomes. Show d techniques to solve ffective organizational st most of the course ply effective lab skills ffective organizational the course learning moderately effective s to draw appropriate	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 1s	bemonstrate extensive knowless analytical and critical a problems. Critical use of data and presentational skills.  Demonstrate substantial commensing outcomes. Show evice and techniques to solve problem and presentational skills.  Demonstrate general but incoutcomes. Show evidence of lab skills and techniques to sconclusions. Apply moderately Demonstrate partial but limite	dige and skills at an advanced level required for att bilities and logical thinking, and ability to apply high and results to draw appropriate and insightful connand of a broad range of knowledge and skills requence of analytical and critical abilities and logical tems. Correct use of data of results to draw appropriate command of knowledge and skills requiresome analytical and critical abilities and logical thir object problems. Mostly correct but some erroneous effective organizational and presentational skills.	aining all the course lear hly effective lab skills an clusions. Apply highly ef uired for attaining at leahinking, and ability to apate conclusions. Apply eled for attaining most of liking, and ability to apply suse of data and results aining some of the cours	ning outcomes. Show d techniques to solve ffective organizational st most of the course ply effective lab skills ffective organizational the course learning moderately effective is to draw appropriate se learning outcomes.	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 1s A B	bem Offer in 2022 - 202  Demonstrate extensive knowle strong analytical and critical a problems. Critical use of data and presentational skills.  Demonstrate substantial complearing outcomes. Show evidend techniques to solve probleand presentational skills.  Demonstrate general but incoutcomes. Show evidence of lab skills and techniques to sconclusions. Apply moderately Demonstrate partial but limite Show evidence of some cohe partially effective lab skills and	adge and skills at an advanced level required for att bilities and logical thinking, and ability to apply high and results to draw appropriate and insightful contained of a broad range of knowledge and skills required of analytical and critical abilities and logical thems. Correct use of data of results to draw appropriate command of knowledge and skills required by the problems. Mostly correct but some erroneous effective organizational and presentational skills. It command of knowledge and skills required for attent and logical thinking, but with limited analytical and techniques to solve problems. Limited ability is	aining all the course lear hly effective lab skills an- clusions. Apply highly ef juired for attaining at lea- hinking, and ability to ap- ate conclusions. Apply ei ed for attaining most of niking, and ability to apply is use of data and results aining some of the cours and critical abilities, and to use data and results	ning outcomes. Show d techniques to solve ffective organizational st most of the course ply effective lab skills ffective organizational if the course learning / moderately effective is to draw appropriate see learning outcomes. Ilimited ability to apply	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 1s A B C	t sem Offer in 2022 - 202  Demonstrate extensive knowlestrong analytical and critical a problems. Critical use of data and presentational skills.  Demonstrate substantial comlearning outcomes. Show evid and techniques to solve proble and presentational skills.  Demonstrate general but incoutcomes. Show evidence of lab skills and techniques to sconclusions. Apply moderately.  Demonstrate partial but limite Show evidence of some cohe partially effective lab skills a conclusions. Apply limited or be conclusions. Apply limited or be strength.	dge and skills at an advanced level required for att bilities and logical thinking, and ability to apply high and results to draw appropriate and insightful connand of a broad range of knowledge and skills requence of analytical and critical abilities and logical thems. Correct use of data of results to draw appropriate command of knowledge and skills required and critical abilities and logical thire olive problems. Mostly correct but some erroneous effective organizational and presentational skills. I command of knowledge and skills required for attent and logical thinking, but with limited analytical and techniques to solve problems. Limited ability tarely effective organizational and presentational skills arely effective organizational and presentational skills.	aining all the course lear hily effective lab skills an clusions. Apply highly effuried for attaining at leashinking, and ability to aplate conclusions. Apply eled for attaining most of king, and ability to apply a use of data and results aining some of the cours and critical abilities, and to use data and results is.	ning outcomes. Show d techniques to solve ffective organizational st most of the course ply effective lab skills ffective organizational if the course learning moderately effectives to draw appropriate se learning outcomes. limited ability to apply to draw appropriate	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 1s A B	bemonstrate extensive knowless trong analytical and critical a problems. Critical use of data and presentational skills.  Demonstrate substantial comi learning outcomes. Show evice and techniques to solve problem of the control of	dge and skills at an advanced level required for att bilities and logical thinking, and ability to apply hig and results to draw appropriate and insightful con mand of a broad range of knowledge and skills requence of analytical and critical abilities and logical times. Correct use of data of results to draw appropriate command of knowledge and skills requires one analytical and critical abilities and logical thirpolye problems. Mostly correct but some erroneous effective organizational and presentational skills. It command of knowledge and skills required for attent and logical thinking, but with limited analytical and techniques to solve problems. Limited ability if arely effective organizational and presentational skill sce of command of knowledge and skills required for	aining all the course lear hly effective lab skills an iclusions. Apply highly ef juired for attaining at lear hinking, and ability to ap ate conclusions. Apply e ed for attaining most of iking, and ability to apply is use of data and results aining some of the cours and critical abilities, and to use data and results is.	ning outcomes. Show d techniques to solve fective organizational st most of the course ply effective lab skills ffective organizational the course learning moderately effectives to draw appropriate se learning outcomes. limited ability to apply to draw appropriate arning outcomes. Lack	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 1s A B C	bem Offer in 2022 - 202  Demonstrate extensive knowlestrong analytical and critical a problems. Critical use of data and presentational skills.  Demonstrate substantial commender of the commender of the control of th	dge and skills at an advanced level required for att bilities and logical thinking, and ability to apply high and results to draw appropriate and insightful connand of a broad range of knowledge and skills requence of analytical and critical abilities and logical thems. Correct use of data of results to draw appropriate command of knowledge and skills required and critical abilities and logical thire olive problems. Mostly correct but some erroneous effective organizational and presentational skills. I command of knowledge and skills required for attent and logical thinking, but with limited analytical and techniques to solve problems. Limited ability tarely effective organizational and presentational skills arely effective organizational and presentational skills.	aining all the course lear hly effective lab skills an- iclusions. Apply highly ef juired for attaining at lea- hinking, and ability to ap- ate conclusions. Apply ef ed for attaining most of hiking, and ability to apply is use of data and results audicitical abilities, and it to use data and results is.	ning outcomes. Show d techniques to solve ffective organizational st most of the course ply effective lab skills ffective organizational if the course learning of moderately effective s to draw appropriate see learning outcomes. Ilimited ability to apply to draw appropriate urning outcomes. Lack effective lab skills and	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)	Y 1s A B C D	bem Offer in 2022 - 202  Demonstrate extensive knowlestrong analytical and critical a problems. Critical use of data and presentational skills.  Demonstrate substantial commender of the commender of the control of th	and skills at an advanced level required for att bilities and logical thinking, and ability to apply high and results to draw appropriate and insightful contained of a broad range of knowledge and skills required of analytical and critical abilities and logical thems. Correct use of data of results to draw appropriate or analytical and critical abilities and logical this correct use of data of results to draw appropriate analytical and critical abilities and logical thire only problems. Mostly correct but some erroneous effective organizational and presentational skills. It command of knowledge and skills required for attent and logical thinking, but with limited analytical and techniques to solve problems. Limited ability arely effective organizational and presentational skil ice of command of knowledge and skills required for solve problems. Limited ability is arely effective organizational and presentational skil ice of command of knowledge and skills required for solve problems. Limited ability to apply this way to apply the solve of data and results and/or unable to draw appropriate or and ability to apply the solve of data and results and/or unable to draw appropriate and skills required for the solve of data and results and/or unable to draw appropriate and skills required for the solve of data and results and/or unable to draw appropriate and skills required for the solve of the	aining all the course lear hly effective lab skills an- iclusions. Apply highly ef juired for attaining at lea- hinking, and ability to ap- ate conclusions. Apply ef ed for attaining most of hiking, and ability to apply is use of data and results audicitical abilities, and it to use data and results is.	ning outcomes. Show d techniques to solve ffective organizational st most of the course ply effective lab skills ffective organizational if the course learning of moderately effective s to draw appropriate see learning outcomes. Ilimited ability to apply to draw appropriate urning outcomes. Lack effective lab skills and	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)	Y 1s A B C	t sem Offer in 2022 - 202  Demonstrate extensive knowlestrong analytical and critical a problems. Critical use of data and presentational skills.  Demonstrate substantial come learning outcomes. Show evidend techniques to solve problems to sconclusions. Apply moderately Demonstrate peneral but lincoutcomes. Show evidence of lab skills and techniques to sconclusions. Apply moderately Demonstrate partial but limite Show evidence of some cohe partially effective lab skills a conclusions. Apply limited or be Demonstrate little or no eviden of analytical and critical abilitie techniques to solve problems	and skills at an advanced level required for att bilities and logical thinking, and ability to apply high and results to draw appropriate and insightful contained of a broad range of knowledge and skills required of analytical and critical abilities and logical thems. Correct use of data of results to draw appropriate or analytical and critical abilities and logical this correct use of data of results to draw appropriate analytical and critical abilities and logical thire only problems. Mostly correct but some erroneous effective organizational and presentational skills. It command of knowledge and skills required for attent and logical thinking, but with limited analytical and techniques to solve problems. Limited ability arely effective organizational and presentational skil ice of command of knowledge and skills required for solve problems. Limited ability is arely effective organizational and presentational skil ice of command of knowledge and skills required for solve problems. Limited ability to apply this way to apply the solve of data and results and/or unable to draw appropriate or and ability to apply the solve of data and results and/or unable to draw appropriate and skills required for the solve of data and results and/or unable to draw appropriate and skills required for the solve of data and results and/or unable to draw appropriate and skills required for the solve of the	aining all the course lear hly effective lab skills an- iclusions. Apply highly ef juired for attaining at lea- hinking, and ability to ap- ate conclusions. Apply ef ed for attaining most of hiking, and ability to apply is use of data and results audicitical abilities, and it to use data and results is.	ning outcomes. Show d techniques to solve ffective organizational st most of the course ply effective lab skills ffective organizational if the course learning of moderately effective s to draw appropriate see learning outcomes. Ilimited ability to apply to draw appropriate urning outcomes. Lack effective lab skills and	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)  Communication-intensive Course	Y 1s A B C D Fail	Demonstrate extensive knowless trong analytical and critical a problems. Critical use of data and presentational skills.  Demonstrate substantial come learning outcomes. Show evice and techniques to solve problems of the problems of the problems of the problems of the problems. Show evidence of lab skills and techniques to sconclusions. Apply moderately Demonstrate partial but limite Show evidence of some cohe partially effective lab skills a conclusions. Apply limited or be Demonstrate little or no eviden of analytical and critical abilitie techniques to solve problems presentational skills are minim	dige and skills at an advanced level required for att bilities and logical thinking, and ability to apply hig and results to draw appropriate and insightful contained of a broad range of knowledge and skills requence of analytical and critical abilities and logical tems. Correct use of data of results to draw appropriate command of knowledge and skills required from the some analytical and critical abilities and logical thire of the second stills. It is a command of knowledge and skills required for attement and logical thinking, but with limited analytical and techniques to solve problems. Limited ability arely effective organizational and presentational skills cof command of knowledge and skills required for still the specific propriate and specific propriational and presentational skills cof command of knowledge and skills required for still good the specific propriational and contained the specific propriational and presentational specific propriational and contained the specific propriational and presentational and presentatio	aining all the course lear hly effective lab skills an- iclusions. Apply highly ef juired for attaining at lea- hinking, and ability to ap- ate conclusions. Apply ef ed for attaining most of hiking, and ability to apply is use of data and results audicitical abilities, and it to use data and results is.	ning outcomes. Show d techniques to solve ffective organizational st most of the course ply effective lab skills ffective organizational if the course learning of moderately effective s to draw appropriate see learning outcomes. Ilimited ability to apply to draw appropriate urning outcomes. Lack effective lab skills and	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)  Communication-intensive Course Course Type	Y 1s A B C D Fail	t sem Offer in 2022 - 202  Demonstrate extensive knowlestrong analytical and critical a problems. Critical use of data and presentational skills.  Demonstrate substantial come learning outcomes. Show evidend techniques to solve problems to sconclusions. Apply moderately Demonstrate peneral but lincoutcomes. Show evidence of lab skills and techniques to sconclusions. Apply moderately Demonstrate partial but limite Show evidence of some cohe partially effective lab skills a conclusions. Apply limited or be Demonstrate little or no eviden of analytical and critical abilitie techniques to solve problems	dige and skills at an advanced level required for att bilities and logical thinking, and ability to apply hig and results to draw appropriate and insightful contained of a broad range of knowledge and skills requence of analytical and critical abilities and logical tems. Correct use of data of results to draw appropriate command of knowledge and skills required from the some analytical and critical abilities and logical thire of the second stills. It is a command of knowledge and skills required for attement and logical thinking, but with limited analytical and techniques to solve problems. Limited ability arely effective organizational and presentational skills cof command of knowledge and skills required for still the specific propriate and specific propriational and presentational skills cof command of knowledge and skills required for still good the specific propriational and contained the specific propriational and presentational specific propriational and contained the specific propriational and presentational and presentatio	aining all the course lear hly effective lab skills an- iclusions. Apply highly ef juired for attaining at lea- hinking, and ability to ap- ate conclusions. Apply ef ed for attaining most of hiking, and ability to apply is use of data and results audicitical abilities, and it to use data and results is.	ning outcomes. Show d techniques to solve ffective organizational st most of the course ply effective lab skills ffective organizational if the course learning of moderately effective s to draw appropriate see learning outcomes. Ilimited ability to apply to draw appropriate urning outcomes. Lack effective lab skills and	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)  Communication-intensive Course Course Type Course Teaching	Y 1s A B C D Fail	Demonstrate extensive knowlestrong analytical and critical a problems. Critical use of data and presentational skills.  Demonstrate substantial commender of the commender of th	and skills at an advanced level required for attribilities and logical thinking, and ability to apply high and results to draw appropriate and insightful content of a broad range of knowledge and skills requence of analytical and critical abilities and logical terms. Correct use of data of results to draw appropriate command of knowledge and skills requires one analytical and critical abilities and logical thire of the command of knowledge and skills requires one analytical and critical abilities and logical thire of the problems. Mostly correct but some erroneous effective organizational and presentational skills. It command of knowledge and skills required for attent and logical thinking, but with limited analytical and techniques to solve problems. Limited ability that arely effective organizational and presentational skills coef command of knowledge and skills required for still coef command of knowledge and skills required for still coefficial and coherent thinking, and ability to apply. Misuse of data and results and/or unable to dra ally effective or ineffective.	aining all the course lear hly effective lab skills an- iclusions. Apply highly ef juired for attaining at lea- hinking, and ability to ap- ate conclusions. Apply ef ed for attaining most of hiking, and ability to apply is use of data and results audicitical abilities, and it to use data and results is.	ning outcomes. Show d techniques to solve ffective organizational st most of the course ply effective lab skills ffective organizational to the course learning of moderately effective to draw appropriate see learning outcomes. Lack effective lab skills and ns. Organization and	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 1s A B C D Fail N Lecture v	Demonstrate extensive knowlestrong analytical and critical a problems. Critical use of data and presentational skills.  Demonstrate substantial commercial earning outcomes. Show evide and techniques to solve problems of the problems of the problems of the problems. Show evidence of lab skills and techniques to sconclusions. Apply moderately Demonstrate partial but limite Show evidence of some cohe partially effective lab skills a conclusions. Apply limited or be Demonstrate little or no eviden of analytical and critical abilitie techniques to solve problems presentational skills are minimicial to the problems of th	dige and skills at an advanced level required for att bilities and logical thinking, and ability to apply hig and results to draw appropriate and insightful contained of a broad range of knowledge and skills requence of analytical and critical abilities and logical tems. Correct use of data of results to draw appropriate command of knowledge and skills required from the some analytical and critical abilities and logical third by the problems. Mostly correct but some erroneous effective organizational and presentational skills. If command of knowledge and skills required for att ent and logical thinking, but with limited analytical and techniques to solve problems. Limited ability arely effective organizational and presentational skills cof command of knowledge and skills required for still good to the still seed of command of knowledge and skills required for still good to the still seed of command of knowledge and skills required for still good the still seed of command of knowledge and skills required for still good the still seed of command of knowledge and skills required for still good the still seed of command of knowledge and skills required for still good the still	aining all the course lear hly effective lab skills an- iclusions. Apply highly ef juired for attaining at lea- hinking, and ability to ap- ate conclusions. Apply ef ed for attaining most of hiking, and ability to apply is use of data and results audicitical abilities, and it to use data and results is.	ning outcomes. Show d techniques to solve ffective organizational st most of the course ply effective lab skills ffective organizational if the course learning / moderately effective is to draw appropriate see learning outcomes. Limited ability to apply to draw appropriate arming outcomes. Lack effective lab skills and ns. Organization and	

	Reading / Self study			100	
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignments		50	CLO 1,2,3,4	
	Examination		50	CLO 1,2,3,4	
Required/recommended reading and online materials	C. Klein and C.S. Hurlbat: Manual of Mineralogy (Wiley, 1999, 1st ed.) V.D. Nesse: Introduction to Optical Mineralogy (Oxford University Press, 1998, 2nd ed).				

EASC2408	Planeta	ry geology (6 cre	dits)		Academic Ye	ar 2021
Offering Department	Earth Scie		•		Quota	
Course Co-ordinator	Dr M H Lee, Earth Sciences (mhlee @hku.hk)					
Teachers Involved	(Dr M H Lee,Earth Sciences)					
Course Objectives	This course provides students with an introduction to the origin, evolution, structure, composition and distribution of matter in the Solar System condensed in the form of planets, satellites, comets, asteroids and rings, with particulal emphasis on surface features, internal structures and histories from a geological point of view. The course incorporates the findings from recent space investigations, planetary imagery, remote sensing and Earth analogues to extraterrestrial features into a fascinating portrayal of the geological activities and histories in our Solar System.					
Course Contents & Topics	Formation, evolution, internal structure and surface processes of planetary bodies; the terrestrial planets Mercury Venus, the Earth-Moon system, and Mars; the giant planets Jupiter, Saturn, Uranus, and Neptune and their moons Pluto, Charon and the Kuiper Belt; asteroids, meteorites, comets and the Oort cloud; Origin of our Solar System.					
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 de	escribe the basic feat	tures of our Solar Syste	m and its constituents		
	CLO 2 ex	cplain how this know	ledge is acquired throug	h observations and expe	riments	
	CLO 3 demonstrate knowledge and understanding of the key geological, physical and chemical processes governing the structure, formation and evolution of planetary bodies					
	CLO 4 cc	ompare and contrast	our own planet Earth w	ith other planetary bodies	;	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	ASC1401 or EASC1	402 or PHYS1650			
Offer in 2021 - 2022	Y 2nd sem Offer in 2022 - 2023 : Y Examination May					
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.					
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.					
	С					
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.					
Communication- intensive Course	N					
Course Type	1	ith laboratory compo				
Course Teaching	Activities	8	Details			No. of Hours
& Learning Activities	Lectures			12 sessions x 2 hours		24
	,		12 sessions x 2 ho	12 sessions x 2 hours		24
	Reading /	Reading / Self study		100		
Assessment Methods and Weighting	Methods		Details		hting in final se grade (%)	Assessment Methods to CLO Mapping
	Assignme	ents			20	CLO 1,2,3,4
	Examinat				50	CLO 1,2,3,4
	Presentat	tion			15	CLO 1,2,3,4
	Test				15	CLO 1,2,3,4
Required/recommended reading and online materials	N. McBrid	e and I. Gilmour: An	Introduction to the Sola	r System (Cambridge Un	iversity Press, 2	004)

EASC2409	Regional field studies (6 credits)	Academic Year	2021		
Offering Department	Earth Sciences	Quota	10		
Course Co-ordinator	Dr J R Ali, Earth Sciences (jrali @hku.hk)				
Teachers Involved	(Dr A A G Webb (Japan Field Trip),Earth Sciences) (Dr J R Ali (Taiwan Field Trip),Earth Sciences)				
Course Objectives	This course is field-based and introduces geology of China, Taiwan, Japan and/or regions in the vicinity of Hong Kong through hands on studies and field excursions.  The course is compulsory for students doing the Geology (Intensive) major.				
Course Contents & Topics	The course will introduce the following topics:  Geological studies in Southern China, Japan, and/or Taiwan - Geological history of S. China, Japan, and/or Taiwan - Recognition of rock units and minerals in the field - Field recognition and description of geological structures - Stratigraphic measurements				

	- Field geology of active and passive margins, volcanic systems - Engineering geology - Management of geological hazards - Basic geological mapping techniques					
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 ha	•		gy of east Asia, in particular, Tai	wan, Japan and/or	
	CLO 2 be		c field observations, stratig	raphic measurements and identific	ations of rocks and	
			avs of experience in indepe	endent stratigraphic logging and ge	eological mapping	
	CLO 3 have acquired at least 3 days of experience in independent stratigraphic logging and geological mapping CLO 4 develop skills in integrating geological field data in determining a geological history and writing a structured field report					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in EASC1401 or EASC1402; and consent of course coordinator					
Offer in 2021 - 2022	Y Yea	er long Offer in 2022 - 1	2023 · Y	Examination	No Exam	
Grade Descriptors (A+ to F)	Y Year long Offer in 2022 - 2023 : Y  Demonstrate an advanced level of understanding of the geology of the study sites, ability to give a detailed account of the geological history of the study region, as well as strong ability to produce good-quality reports on independent field measurements.					
	B Demonstrate a satisfactory understanding of the geology of the study sites with evidence on efforts to unravel the geological history of the study region and acceptable level of competence in field measurement techniques.					
	С	Could only demonstrate an incomplete understanding of the geology of the study sites and some ability to make field observations and a basic knowledge on field measurement techniques.				
	D			y sites and limited ability to apply field meas	surement techniques.	
	Fail Show no or little knowledge of the geology of the study sites and lack of ability in making field observations and applying field measurement techniques.					
Communication- intensive Course	N					
Course Type	Field cam	ps				
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Field work		14 days		100	
		Self study	5		20	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Report			100	CLO 1,2,3,4	
Required/recommended reading and online materials	Comprehe	ensive course notes prov	rided			
Additional Course Information	Priority for being able to take this course is given to Year 3 and 4 students, especially those who have already participated in the linked field trip in the preceding academic year and completed the associated assignment(s), and those doing the Geology/Geology Intensive majors.					
	The Taiwan trip will be in early January of each year, the Kyushu trip will start in March of each year. However, in light of the current COVID-19 outbreak situation, the exact arrangement of Taiwan trip and Kyushu trip for 2020-2021 have yet to be confirmed.					
	The Jan 2020 fieldtrip to Taiwan (part of EASC2409) will be led by Dr Jason Ali. If the COVID-19 pandemic development makes it not viable to go to Taiwan in Jan, the Taiwan field trip will be postponed to May 2020 or a 6-day session for local field exposures will be an alternative of the Taiwan field trip (to run it preferably in early January but possibly in late May/early June)					
	A virtual version of Kyushu field trip (or somewhere else) will be an alternative option for the second part of EASC2409 to be carried out during the March Reading/Field trip week, subject to the COVID-19 development.					

EASC2410	Data ana	lysis and modeling in earth sciences (6 credits)	Academic Year	2021			
Offering Department	Earth Scien	nces	Quota				
Course Co-ordinator	Dr B Zhang	B Zhang, Earth Sciences (binzh@hku.hk)					
Teachers Involved	(Dr B Zhan	(Dr B Zhang, Earth Sciences)					
Course Objectives	This course uses a hands-on approach to introduce the basic principles of data analysis and mathematical modeling in earth sciences using Python through practical examples.						
Course Contents & Topics	data analy	Python programming basics; NumPy and Matplotlib; Data wrangling with Pandas; Visualisation, Maps; Statistical data analysis including distributions, hypothesis testing, regression; Time series analysis including spectrum and decomposition; Introduction to geospatial data analysis; numerical solutions to mathematical equations.					
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 Explain basic statistical concepts and their applications to earth science data processing and modeling						
	CLO 2 Demonstrate knowledge in basic numerical methods, their applications in earth sciences, and limitations						
	CLO 3 Apply appropriate methods to analyze, process and visualize earth science data, with the help of computer software						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in EA	SC1401					
Offer in 2021 - 2022	Y 1st s	sem Offer in 2022 - 2023 : Y	Examination	No Exam			
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.						
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.						
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most						

		familiar situations. Apply mode	erately effective organizational and present	tational skills.	
	D	Show evidence of some cohe	d command of knowledge and skills requi rent and logical thinking, but with limited a Apply limited or barely effective organizati	nalytical and critical abilities. Sl	
	Fail	of analytical and critical abil	nce of command of knowledge and skills r ities, logical and coherent thinking. Show resentational skills are minimally effective	w very little or no ability to a	
Communication- intensive Course	N				
Course Type	Lecture v	with laboratory component	course		
Course Teaching	Activitie	es	Details	No. of Hours	
& Learning Activities	Lectures			24	
	Laboratory			24	
	Reading	/ Self study			100
Assessment Methods and Weighting	Method	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignm	nente	Assignments (55%) and inclass quiz (5%)	60	CLO 1,2,3
	Test		Two in-class examinations (20% each)	40	CLO 1,2,3
Required/recommended reading and online materials	Python fo	or beginners: https://www.p	ython.org/about/gettingstarted/		

EASC2411	Introduc	ction to the Earth-	Life system (6 credits)	Academic Ye	ear 2021		
Offering Department	Earth Scie	ences		Quota			
Course Co-ordinator	Dr Y Li, E	arth Sciences (yiliang	(@hku.hk)				
Teachers Involved	(Dr Y Li,Earth Sciences)						
Course Objectives	This course provides students with an introduction to the biosphere, including physical, chemical, geological an biological interpretations on the co-evolution of life, atmosphere, hydrosphere and geosphere through deep geological time, the current Earth-Life interactions with the influence of human impact and the future of the Huma Earth system.						
Course Contents & Topics		A habitable planet; the carbon cycle; plate tectonics, climate and life; mountains and climate change; the emergence and persistence of life; life in the Phanerozoic; the Earth at extremes; the future of the Human-Earth					
Course Learning		n successful completion of this course, students should be able to:					
Outcomes		nderstand the coevolume	ution of the inanimate world and the	e living world on Earth thro	ugh deep geologica		
	CLO 2 ex	cplain why the Earth is	s a habitable planet				
	CLO 3 ur	nderstand the biologic	al process as an agent of the mode	rn and past Earth system			
	CLO 4 de	emonstrate knowledge	e and understanding of the natural c	arbon cycle and the impact	s of human activities		
	CLO 5 ar	nalyse qualitatively qu	estions related to systematic structu	ire and evolution of the Ear	h-life system		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E. Not for stu	ASC1401 udents who have pass	sed in EASC1406				
Offer in 2021 - 2022	Y 2nd	sem Offer in 2022	- 2023 : Y	Examination	No Exam		
Grade Descriptors (A+ to F)	В	understanding of the corpast. Able to understand Demonstrate understand learning outcomes. Show Earth and in the geologic	and complete grasp of the subject in ordenections between the geosphere, hydrosphe the interactions between human beings and ding at an advanced level of extensive know wounderstanding of the connections between ical past. Can demonstrate the interactions	ere and biosphere of the modern E the nature only happens as the la vledge and skills with evidence fo the geosphere, hydrosphere and	arth and in the geologica est processes on Earth. or attaining all the course biosphere of the modern		
	С	latest geological time.  C Demonstrate general but incomplete understanding required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking. Moderately effective organization and presentation skills.					
	D Demonstrate partial but limited understanding for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to solve problems. Apply limited or barely effective organizational and presentational skills.						
	Fail  Get no or little knowledge about the subject. No evidence for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Very little or no ability for solving problems. Poor organization and presentational skills.						
Communication- intensive Course	N						
Course Type	Lecture-b	ased course					
Course Teaching	Activities	3	Details	Details			
& Learning Activities	Lectures						
	Tutorials				12		
	Reading	/ Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents		80	CLO 1,2,3,4,5		
	Test		One in-class examination	20	CLO 1,2,3,4,5		
Required/recommended reading and online materials	C. Cockel Press, 20		ards and N. Harris: An Introduction	to the Earth-Life System (0	Cambridge University		

EASC3020	Global change: anthropogenic impacts (6 credits)	Academic Year	2021
Offering Department	Earth Sciences	Quota	
Course Co-ordinator	Prof Z H Liu, Earth Sciences (zhliu@hku.hk)		

Teachers Involved	(Prof Z H	Liu,Earth Sciences)				
Course Objectives			of humans in global change and the nange will be discussed.	e environmental response	es t	o such changes
Course Contents & Topics	Global warming, greenhouse gas emission, past climates, climatic and environmental changes vs. culture evolution, natural vs. anthropogenic climate change, model projections of future climate change, scientific uncertainty, impacts of climate change, including sea level, fresh water, food, ecosystems and human health					
0				er, food, ecosystems and	hun	nan health
Course Learning		<u> </u>	course, students should be able to:			
Outcomes		CLO 1 recognise the complexity of global climate systems				
		CLO 2 recognise the controversy of anthropogenic global warming				
	CLO 3	identify modern env				
<b>.</b>	CLO 4		y of various scientific arguments			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	ASC2404 or ENVS200 <sup>2</sup>	l			
Offer in 2021 - 2022	N Off	fer in 2022 - 2023 : Y		Examination		
Grade Descriptors (A+ to F)	A	learning outcomes. Show s to apply knowledge to a wi draw appropriate and insig range of high quality source	stery at an advanced level of extensive kno strong analytical and critical abilities and logic de range of complex, familiar and unfamiliar s htful conclusions. Show insightful use and crit es and to quote/reference aptly.	al thinking, with evidence of or situations. Demonstrate critical u ical analysis / evaluation of info	gina ise ( rma	al thought, and ability of data and results to tion drawn from a fu
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Demonstrate correct use of data and results to draw appropriate conclusions. Show critical use of relevant information from sources and ability to make meaningful comparisons between different secondary interpretations and to quote/reference aptly.					
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Demonstrate mostly correct but some erroneous use of data and results to draw appropriate conclusions. Show use of relevant information from sources and ability to make comparisons between different interpretations and to quote/reference aptly.				
	D					
		Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Demonstrate misuse of data and results and/or unable to draw appropriate conclusions. Show limited use of secondary sources and no critical comparison of them.				sions. Show use and
	Fail	Demonstrate little or no evi of analytical and critical a problems. Demonstrate m	idence of command of knowledge and skills re abilities, logical and coherent thinking. Show hisuse of data and results and/or unable to	equired for attaining the course very little or no ability to ap	ply	ning outcomes. Lack knowledge to solve
	Fail N	Demonstrate little or no evi of analytical and critical a problems. Demonstrate m	idence of command of knowledge and skills re abilities, logical and coherent thinking. Show hisuse of data and results and/or unable to	equired for attaining the course very little or no ability to ap	ply	ning outcomes. Lack knowledge to solve
intensive Course	N	Demonstrate little or no ev of analytical and critical a problems. Demonstrate m secondary sources and no	idence of command of knowledge and skills re abilities, logical and coherent thinking. Show hisuse of data and results and/or unable to	equired for attaining the course very little or no ability to ap	ply	ning outcomes. Lack knowledge to solve
intensive Course Course Type	N Lecture-b	Demonstrate little or no evior analytical and critical a problems. Demonstrate m secondary sources and no mased course	idence of command of knowledge and skills re abilities, logical and coherent thinking. Show issuse of data and results and/or unable to critical comparison of them.	equired for attaining the course very little or no ability to ap	ply	ning outcomes. Lack knowledge to solve know limited use of
ntensive Course Course Type Course Teaching	N Lecture-b	Demonstrate little or no ev of analytical and critical a problems. Demonstrate m secondary sources and no cased course	idence of command of knowledge and skills re abilities, logical and coherent thinking. Show hisuse of data and results and/or unable to	equired for attaining the course very little or no ability to ap	ply	ning outcomes. Lack knowledge to solve show limited use of
ntensive Course Course Type Course Teaching	N Lecture-b Activities Lectures	Demonstrate little or no ev of analytical and critical a problems. Demonstrate m secondary sources and no lased course	idence of command of knowledge and skills re abilities, logical and coherent thinking. Show issuse of data and results and/or unable to critical comparison of them.	equired for attaining the course very little or no ability to ap	ply	ning outcomes. Lack knowledge to solve show limited use of No. of Hours 36
ntensive Course Course Type Course Teaching	N Lecture-b Activities Lectures Project w	Demonstrate little or no evior analytical and critical aproblems. Demonstrate misecondary sources and no sased course	idence of command of knowledge and skills re abilities, logical and coherent thinking. Show issuse of data and results and/or unable to critical comparison of them.	equired for attaining the course very little or no ability to ap	ply	ning outcomes, Lack knowledge to solve show limited use of No. of Hours 36 30
ntensive Course Course Type Course Teaching	N Lecture-b Activities Lectures Project w Tutorials	Demonstrate little or no evior analytical and critical aproblems. Demonstrate misecondary sources and no sased course  S	idence of command of knowledge and skills re abilities, logical and coherent thinking. Show issuse of data and results and/or unable to critical comparison of them.	equired for attaining the course very little or no ability to ap	ply	No. of Hours 36 30 12
ntensive Course Course Type Course Teaching	N Lecture-b Activitie: Lectures Project w Tutorials Discussio	Demonstrate little or no evior analytical and critical aproblems. Demonstrate misecondary sources and no secondary sources and no sased course s	idence of command of knowledge and skills re abilities, logical and coherent thinking. Show issuse of data and results and/or unable to critical comparison of them.	equired for attaining the course very little or no ability to ap	ply	No. of Hours 36 30 12 24
intensive Course Course Type Course Teaching & Learning Activities	N Lecture-b Activitie: Lectures Project w Tutorials Discussic Reading	Demonstrate little or no evior analytical and critical a problems. Demonstrate in secondary sources and no secondary sources are secondary sources and no secondary sources are secondary sources and no secondary sources are secondary sources and no secondary sources are secondary sources and no secondary sources are secondary sources and no secondary sources are secondary sources and no secondary sources are secondary sources and no secondary sources are secondary sources and no secondary sources are secondary sources and no secondary sources are secondary sources and no secondary sources are secondary sources are secondary sources are secondary sources are secondary sources are secondary sources are secondary sources are secondary sources are secondary sources are secondary sources are secondary sources are secondary sources are secondary sources are secondary sources are secondary sources are secondary sour	idence of command of knowledge and skills re ibilities, logical and coherent thinking. Show issues of data and results and/or unable to critical comparison of them.	equired for attaining the course very little or no ability to ap or draw appropriate conclusion	ply	No. of Hours 36 30 12 24 48
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture-b Activitie: Lectures Project w Tutorials Discussio	Demonstrate little or no evior analytical and critical a problems. Demonstrate in secondary sources and no secondary sources are secondary sources and no secondary sources are secondary sources and no secondary sources are secondary sources and no secondary sources are secondary sources and no secondary sources are secondary sources and no secondary sources are secondary sources and no secondary sources are secondary sources and no secondary sources are secondary sources and no secondary sources are secondary sources and no secondary sources are secondary sources and no secondary sources are secondary sources are secondary sources are secondary sources are secondary sources are secondary sources are secondary sources are secondary sources are secondary sources are secondary sources are secondary sources are secondary sources are secondary sources are secondary sources are secondary sources are secondary sour	idence of command of knowledge and skills re abilities, logical and coherent thinking. Show issuse of data and results and/or unable to critical comparison of them.	equired for attaining the course very little or no ability to ap	ply s. S	No. of Hours 36 30 12 24
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods	N Lecture-b Activitie: Lectures Project w Tutorials Discussic Reading	Demonstrate little or no evior analytical and critical a problems. Demonstrate in secondary sources and no secondary sources are secondary sources and no secondary sources are secondary sources and no secondary sources are secondary sources and no secondary sources are secondary sources and no secondary sources are secondary sources and no secondary sources are secondary sources and no secondary sources are secondary sources and no secondary sources are secondary sources and no secondary sources are secondary sources and no secondary sources are secondary sources and no secondary sources are secondary sources are secondary sources are secondary sources are secondary sources are secondary sources are secondary sources are secondary sources are secondary sources are secondary sources are secondary sources are secondary sources are secondary sources are secondary sources are secondary sources are secondary sour	idence of command of knowledge and skills re ibilities, logical and coherent thinking. Show issues of data and results and/or unable to critical comparison of them.	equired for attaining the course very little or no ability to ap or draw appropriate conclusion  Weighting in final	ply s. S	No. of Hours 36 30 12 24 48  Assessment Methods
Communication- intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting	N Lecture-b Activitie: Lectures Project w Tutorials Discussic Reading Methods	Demonstrate little or no evi of analytical and critical a problems. Demonstrate m secondary sources and no sased course s	idence of command of knowledge and skills re ibilities, logical and coherent thinking. Show issues of data and results and/or unable to critical comparison of them.  Details  Details	equired for attaining the course very little or no ability to ap or draw appropriate conclusion  Weighting in final course grade (%)	ply s. S	No. of Hours 36 30 12 24 48 Assessment Methods o CLO Mapping

EASC3402	Petrology (6 credits)	Academic Year	2021			
Offering Department	Earth Sciences	Quota				
Course Co-ordinator	Prof G Zhao, Earth Sciences (gzhao@hku.hk)					
Teachers Involved	(Dr J King,Earth Sciences) (Dr M C Cheung,Earth Sciences) (Prof G Zhao,Earth Sciences)					
Course Objectives	To give students an understanding of the features in sedimentary, ign ability to identify major rock types and their textures and structures in b					
Course Contents & Topics	Magma and magmatism; textures and structures of igneous rocks volcanism and plutonism     Basic igneous rocks     Intermediate igneous rocks     Acid igneous rocks     Sedimentary diagenesis, classification of sedimentary rocks; textures     Clastic sedimentary rocks: conglomerate and sandstone, siltstone and Biochemical sedimentary rocks: limestone and dolostone     Metamorphism; controlling factors of metamorphism; textures and strometamorphic rocks     Meta-pelitic rocks     Meta-basic rocks     Meta-carbonate rocks and meta-felsic rocks	s, classification of igneous and structures of sediment d mudstone	rocks, including			
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 identify major igneous rocks and their textures and structures in both hand specimens and under microscope					
	CLO 2 identify major sedimentary rocks and their textures and structures in both hand specimens and under microscope					
	CLO 3 identify major metamorphic rocks and their textures and structures in both hand specimens and under microscope					
	CLO 4 make full description and write report on the above rock types					

Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in EASC2407					
Offer in 2021 - 2022	Y 2n	2nd sem Offer in 2022 - 2023 : Y Examination May				
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations.				
	В					
	С			nowledge and skills required ical abilities and logical thinkin		
	D					
	Fail					
Communication- intensive Course	N					
Course Type	Lecture v	vith laboratory componer	t course			
Course Teaching	Activitie	s	Details		No. of Hours	
& Learning Activities	Lectures		12 sessions x 2 hours			24
	Laboratory		specimen descriptions & thin-section observations under microscope			24
	Reading	/ Self study				100
Assessment Methods and Weighting	Methods	3	Details		ting in final e grade (%)	Assessment Methods to CLO Mapping
	Assignm	ents			35	CLO 1,2,3,4
	Examina	tion			55	CLO 1,2,3,4
	Test				10	CLO 1,2,3,4
Required/recommended reading and online materials	Harvey B	latt and Robert J. Tracy,	Petrology (Second Ed	lition; W.H. Freman and	Company, New	York)

EASC3403	Sedime	ntary environment	ts (6 credits)		Academic Year	2021			
Offering Department	Earth Sci	Earth Sciences Quota							
Course Co-ordinator	Dr N R M	Dr N R McKenzie, Earth Sciences (ryan00@hku.hk)							
Teachers Involved	(Dr J Kin	(Dr J King,Earth Sciences)							
	(Dr N R McKenzie,Earth Sciences)								
Course Objectives	This cou	rse discusses the ori	igin, diagenesis, classification	and economic in	nportance of sec	dimentary rocks			
-	Students	Students will learn features and processes of sedimentary geology, paleontology and depositional processes.							
Course Contents  Course Learning Outcomes	<ul><li>Physics</li><li>Sedime</li><li>Deposit</li><li>Deposit</li><li>Sequen</li><li>Basin a</li><li>Sedime</li><li>Sedime</li></ul>	Overview of sedimentary geology Physics of erosion, transportation and sedimentation Sedimentary structures Depositional environments (non-marine) Depositional environments (marine) Sequence stratigraphy Basin analysis Sedimentary environment around Hong Kong Sedimentary environment on Mars On successful completion of this course, students should be able to:							
	CLO 2		nd siliciclastic rocks in hand sam						
	CLO 3 describe the facies in a depositional environment								
		uescribe the racies in							
				the field					
Pre-requisites	CLO 4 CLO 5	undertake detailed st	tudy of a stratigraphic section invations and interpretations from						
and Co-requisites and Impermissible combinations)	CLO 4 CLO 5 Pass in E	undertake detailed st conduct basic observ ASC2402 or EASC340	tudy of a stratigraphic section in vations and interpretations from 02	outcrops	Evamination	May			
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022	CLO 4 CLO 5 Pass in E	undertake detailed st conduct basic observ ASC2402 or EASC340 d sem Offer in 2022	tudy of a stratigraphic section in vations and interpretations from 02 - 2023 : Y	outcrops	Examination	May			
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	CLO 4 CLO 5 Pass in E	undertake detailed st conduct basic observed. CASC2402 or EASC340 d sem Offer in 2022 Demonstrate thorough gr	tudy of a stratigraphic section in vations and interpretations from 02  - 2023 : Y  rasp of the subject. Show strong analyti	outcrops	thinking, with evidence	ce of original thoug			
Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)	CLO 4 CLO 5 Pass in E	undertake detailed st conduct basic observ ASC2402 or EASC340 d sem Offer in 2022 Demonstrate thorough gr Apply highly effective lab Demonstrate substantial	tudy of a stratigraphic section in vations and interpretations from 02  - 2023: Y rasp of the subject. Show strong analyti  //fieldwork skills and techniques. Apply I  grasp of the subject. Show strong analyti	outcrops  ical abilities and logical highly effective organizalytical abilities and log	thinking, with evidend ational and presentati	ce of original though			
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(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	CLO 4 CLO 5 Pass in E Y 2n A B C	undertake detailed st conduct basic observable. EASC2402 or EASC340 d sem Offer in 2022 Demonstrate thorough gr Apply highly effective lab Demonstrate substantial skills and techniques. Ap Demonstrate general but effective lab/fieldwork skill Demonstrate partial but I lab/fieldwork skills and te Demonstrate little or no	tudy of a stratigraphic section in vations and interpretations from 02  - 2023: Y - 2023: Y - rasp of the subject. Show strong analyti //fieldwork skills and techniques. Apply I grasp of the subject. Show strong analyti pliphighly effective organizational and p t incomplete grasp of the subject. Show lills and techniques. Apply moderately e limited grasp of the subject. Show som	outcrops  ical abilities and logical highly effective organizalytical abilities and logoresentational skills.  w some analytical abilities are analytical abilities are ive organizational and logoresentational and logoresentations.	thinking, with evident ational and presentati gical thinking. Apply e ties and logical thinking and presentational skind logical thinking. Ap presentational skills. ilities and logical thinli	ce of original though ional skills. Iffective lab/fieldwong. Apply moderate ills. Inply partially effective			
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and Co-requisites and Impermissible combinations)  Offer in 2021 - 2022  Grade Descriptors (A+ to F)  Communication- Intensive Course Course Type Course Teaching	CLO 4 CLO 5 Pass in E  Y 2n A B C D Fail	undertake detailed st conduct basic observed. ASC2402 or EASC340 d sem Offer in 2022 Demonstrate thorough gr Apply highly effective lab Demonstrate substantial skills and techniques. Ap Demonstrate general but effective lab/fieldwork ski Demonstrate partial but lab/fieldwork skills and te Demonstrate little or no geffective lab/fieldwork ski	tudy of a stratigraphic section in vations and interpretations from 02  - 2023: Y rasp of the subject. Show strong analyti //fieldwork skills and techniques. Apply I grasp of the subject. Show strong analyty highly effective organizational and principle of the subject. Show strong analyty highly effective organizational and principle of the subject. Show som ills and techniques. Apply moderately ellimited grasp of the subject. Show som schniques. Apply limited or barely effect grasp of the subject. Evidence of little of ills and techniques. Organization and principle or subject. Show som schniques. Organization and principle or subject. Show strong analytic subject. Show strong analytic subject. Show strong analytic subject. Show strong analytic subject. Show strong analytic subject. Show strong analytic subject. Show strong analytic subject. Show strong analytic subject. Show strong analytic subject. Show strong analytic subject. Show strong analytic subject. Show som schniques. Organization and principle subject. Show strong analytic subject. Show som schniques. Organization and principle subject. Show strong analytic subject. Sho	outcrops  ical abilities and logical highly effective organizalytical abilities and logoresentational skills.  w some analytical abilities are analytical abilities are ive organizational and logoresentational and logoresentations.	thinking, with evident ational and presentati gical thinking. Apply e ties and logical thinking and presentational skind logical thinking. Ap presentational skills. ilities and logical thinli	ce of original though ional skills. Iffective lab/fieldwong. Apply moderate ills. Inply partially effective			
and Co-requisites and Impermissible combinations)  Offer in 2021 - 2022  Grade Descriptors (A+ to F)  Communication- Intensive Course Course Type Course Teaching	CLO 4 CLO 5 Pass in E  Y 2n A B C D Fail N Lecture v	undertake detailed standard conduct basic observed. ASC2402 or EASC340  d sem Offer in 2022  Demonstrate thorough grapply highly effective lab Demonstrate substantial skills and techniques. Ap Demonstrate general but effective lab/fieldwork skills pemonstrate partial but lab/fieldwork skills and techniques observed between the pemonstrate partial but lab/fieldwork skills and techniques observed by the pemonstrate little or no geffective lab/fieldwork skills and techniques observed by the pemonstrate little or no geffective lab/fieldwork skills and techniques observed by the pemonstrate little or no geffective lab/fieldwork skills and techniques observed by the pemonstrate little or no geffective lab/fieldwork skills and techniques observed by the pemonstrate little or no geffective lab/fieldwork skills and techniques observed by the pemonstrate little or no geffective lab/fieldwork skills and techniques observed by the pemonstrate little or no geffective lab/fieldwork skills and techniques observed by the pemonstrate little or no geffective lab/fieldwork skills and techniques observed by the pemonstrate little or no geffective lab/fieldwork skills and techniques observed by the pemonstrate little or no geffective lab/fieldwork skills and techniques observed by the pemonstrate little or no geffective lab/fieldwork skills and techniques observed by the pemonstrate little or no geffective lab/fieldwork skills and techniques observed by the pemonstrate little or no geffective lab/fieldwork skills and techniques observed by the pemonstrate little or no geffective lab/fieldwork skills and techniques observed by the pemonstrate little or no geffective lab/fieldwork skills and techniques observed by the pemonstrate little or no geffective lab/fieldwork skills and techniques observed by the pemonstrate little or no geffective lab/fieldwork skills and techniques observed by the pemonstrate little or no geffective lab/fieldwork skills and techniques observed by the pemonstrate little or no geffective lab/fieldwork skills	tudy of a stratigraphic section in vations and interpretations from 02  - 2023: Y rasp of the subject. Show strong analyti //fieldwork skills and techniques. Apply I grasp of the subject. Show strong analyty highly effective organizational and principle of the subject. Show sills and techniques. Apply moderately ellimited grasp of the subject. Show somethiques. Apply limited or barely effect grasp of the subject. Evidence of little of the subject. Organization and principle should be subject. Organization should be subject. Organization should be subject. Organization should be subject. Organization should be subject. Organization should be subject. Organization should be subject. Organization should be	outcrops  ical abilities and logical highly effective organizalytical abilities and logoresentational skills.  w some analytical abilities are analytical abilities are ive organizational and logoresentational and logoresentations.	thinking, with evident ational and presentati gical thinking. Apply e ties and logical thinking and presentational skind logical thinking. Ap presentational skills. ilities and logical thinli	ce of original though ional skills. sffective lab/fieldwong. Apply moderate ills. pply partially effective king. Apply minima			
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and Co-requisites and Impermissible combinations)  Offer in 2021 - 2022  Grade Descriptors  (A+ to F)  Communication- ntensive Course Course Type Course Teaching	CLO 4 CLO 5 Pass in E  Y 2n A B C D Fail N Lecture v Activitie Lectures Laborato	undertake detailed standard conduct basic observed. ASC2402 or EASC340  d sem Offer in 2022  Demonstrate thorough grapply highly effective lab Demonstrate substantial skills and techniques. Ap Demonstrate general but effective lab/fieldwork skills and techniques and Demonstrate partial but lab/fieldwork skills and techniques and teffective lab/fieldwork skills and techniques and teffective lab/fieldwork skills and techniques and teffective lab/fieldwork skills and techniques and temperature and techniques and t	tudy of a stratigraphic section in vations and interpretations from 02  - 2023 : Y rasp of the subject. Show strong analyti //fieldwork skills and techniques. Apply I grasp of the subject. Show strong analyti highly effective organizational and pt incomplete grasp of the subject. Show sills and techniques. Apply moderately ellimited grasp of the subject. Show schniques. Apply limited or barely effect grasp of the subject. Show schniques. Apply limited or barely effect grasp of the subject. Evidence of little grasp of the subject. Evidence of little of little and techniques. Organization and properties of the subject school of little of li	outcrops  ical abilities and logical highly effective organiz- alytical abilities and log- oresentational skills.  w some analytical abilities are ive organizational at- e analytical abilities ar ive organizational and or lack of analytical abi- resentational skills are i	thinking, with evident ational and presentati gical thinking. Apply e ties and logical thinking and presentational skind logical thinking. Ap presentational skills. ilities and logical thinli	ce of original thoughtonal skills.  Siffective lab/fieldwords.  Apply moderate tills.  Sply partially effective king. Apply minima  No. of Hours  24  12			

Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Examination	Final	40	CLO 1,2,3,4
	Laboratory reports	Labs and Field Exercise	20	CLO 1,2,3,4,5
	Presentation		10	CLO 3
	Test	Quizzes	30	CLO 1,2,3
Required/recommended reading and online materials	Sedimentology and Stratign	raphy (Second Edition), Gary Nichols		

EASC3404	Structural geology (6 credits)  Academic Y				Academic Ye	ar 2021
Offering Department	Earth Scient		•		Quota	40
Course Co-ordinator	Dr J R Ali	, Earth Sciences	(jrali @hku.hk)		'	'
Teachers Involved	(Dr A A G	Webb,Earth Scie	nces)			
	(Dr J R A	li,Earth Sciences)				
Course Objectives	Structural Geology is the study of rock deformation. Participants in this course will learn about the geometries kinematics, and mechanics of rock deformation, and how to answer structural geology questions. The course w involve heavy use and generation of geological maps and cross sections and explore their utility for interpretin structure.					
Course Contents	Class-roo	m based: lecture	and laboratory			
& Topics	- Stress - Stereon - Deforma - Strain - Joints - Rheolog - Faults a - Fault pla - Folds - Shear Z - Fabrics - Contrac - Kink me - Structur - Balance - Key Stru	ets ation mechanisms  y nd fault systems ane solutions  ones (foliations, lineatic tional and extensi thod for cross-sec ally focused map d cross sections uctures in HK	onal systems tion construction			
			wantumaad fald linah Ma Ta			
Carrea I camaina			verturned fold limb Ma Ts			
Course Learning Outcomes		·	of this course, students sh			
Outcomes	CLO 1		a moderate level rock def			
	CLO 2		uctural data from a geolog			
	CLO 3		rpret structural data on a			
	CLO 4		BD rock and 4D rock-time	relationships		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	ASC2402 and EA	SC3402			
Offer in 2021 - 2022	Y 1st	sem Offer in 20	22 - 2023 : Y		Examination	Dec
Grade Descriptors (A+ to F)	В	complex, familiar and appropriate and ins Substantial grasp of	the subject; evidence of stron d unfamiliar situations; highly e ightful conclusions; integration of f the subject; evidence of critical fieldwork skills and techniques	ffective fieldwork skills and te of the full range of appropriate I abilities and logical thinking;	echniques; critical use of theories, principles, evid apply knowledge to fam	data and results to draw dence and techniques. iliar and some unfamiliar
	С	integration of theori General but incom	es, principles, evidence and technolete grasp of the subject; evidence moderately effective fieldwork	hniques. ence of some critical abilities	s and logical thinking; a	pply knowledge to most
	D	results to draw app Limited grasp of th ability to apply kno	opriate conclusions; some parti e subject, retention of some re wledge to solve problems; part	al integration of theories, prin levant information of the sub- ially effective fieldwork skills	ciples, evidence and tec pject; evidence of limited and techniques; limited	hniques. I critical abilities; limited I ability to use data and
	Fail	Fail  Fail				
Communication-	N	Pinioipios, evidence	ana toomiquos.			
intensive Course						
Course Type	Lecture w	ith laboratory con	ponent course			
Course Teaching	Activitie	•	Details			No. of Hours
& Learning Activities	Lectures		eleven 2-hour ses	ssions		22
-	Laborato			interpretation with a stru	uctural focus	22
	Field wor	•	3 days field work	•		24
	Project w		additional 1-2 da	additional 1-2 days self directed 'field' studies of facing stones showing interesting structural features		20
	Reading	/ Self study	3			50
Assessment Methods and Weighting	Methods	·	Details		eighting in final ourse grade (%)	Assessment Methods to CLO Mapping

	Assignments		60	CLO 1,2,3,4
	Examination		40	CLO 1,2,3,4
	Davis, Reynolds & Kluth. 2012. Str Suppe. 1985. Principles of structur. Twiss & Moores. 2007. Structural C van der Pluijm & Marshak. 2004. E	al geology, # 551.8 S95. Geology, 2nd edition. # 551.8 T974.		
Additional Course Information	Structural geology has lots of asso hosted materials. Therefore the foundations of the structural geology has lots of associated as the structural geology has lots of associated as the structural geology has lots of associated as the structural geology has lots of associated as the structural geology has lots of associated as the structural geology has lots of associated as the structural geology has lots of associated as the structural geology has lots of associated as the structural geology has lots of as the structural geology has lots of as the structural geology has lots of as the structural geology has lots of as the structural geology has lots of as the structural geology has lots of as the structural geology has lots of as the structural geology has lots of a structural geology has lots of a structural geology has lot as the structural			nere are lots of web-

EASC3405	Environ	mental remote se	ensing (6 credits)	Academic \	<b>Year</b> 2021		
Offering Department	Earth Sci			Quota	54		
Course Co-ordinator	Dr J Mich	alski, Earth Sciences	(jmichal@hku.hk)				
Teachers Involved	(Dr J Mic	halski,Earth Sciences	)				
	(Dr J Wu	Biological Sciences)					
Course Objectives	on remot	This course serves as an introduction to remote sensing of the Earth and other planets. In this course, we wantend on remote sensing of the Earth using visible, infrared, and microwave radiation.  Familiarity with remote sensing data is an essential skill for the modern day geoscientist and environ					
	such as:	1) how to obtain rem	h you not only about the fundamen ote sensing data, 2) how to process h) how to report on your results, 5) h	, correct and interpret im	ages, 3) how to app		
	represen	represent your new skills on your CV.					
Course Contents			ntals of remote sensing				
& Topics			ensing platforms, sensers and their pu	ırposes.			
			on Earth and other planets.				
		interpret remote sens	d correct remote sensing data.				
		•	ote sensing. You will be an expert in	highly employable skills it	f vou work hard		
			sing data with Geographic Information		you work nard.		
			ng to modern problems in geoscience		tary science, and vo		
	science.	11.7	3	, , , , , ,	, ,		
	9. How to		igger career goals and how to be a p				
	10. How	to integrate your new :	skills into your CV so that you have a	n advantage in the job ma	arket.		
Course Learning	On succe	essful completion of th	is course, students should be able to	:			
Outcomes	CLO 1	demonstrate knowle	edge of how remotely sensed data are	e acquired			
	CLO 2	comprehend the bas	sic techniques of image processing				
	CLO 3		nsed data within geographic informati				
	CLO 4	understand how ren	notely sensed be used for environme	ntal assessment			
	CLO 5	evaluate and interpr	ret remotely sensed data				
	CLO 6	present and discuss	s results				
Pre-requisites	Pass in E	ASC2404 or EASC24	106 or EASC2407 or ENVS2002				
(and Co-requisites and Impermissible combinations)							
Offer in 2021 - 2022	N Of	fer in 2022 - 2023 : Y		Examinatio	n		
Grade Descriptors (A+ to F)	A	strong analytical and crit unfamiliar situations. Cr	mastery of extensive knowledge and skills rec tical abilities and logical thinking, and ability to ritical use of data and results to draw appr entational skills	apply knowledge to a wide ran	ge of complex, familiar a		
	В	learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familia and some unfamiliar situations. Correct use of data and results to draw appropriate conclusions. Apply effective organizationa					
	С	outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to mos familiar situations. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderatel					
	D	effective organizational and presentational skills.					
	Fail	effective organizational and presentational skills.					
Communication-	N	effective or ineffective.	and anison drawn to draw appropriate contour	Organization and presen	and the same are milling		
ntensive Course							
Course Type		vith laboratory compor					
Course Teaching	Activitie		Details		No. of Hours		
& Learning Activities	Lectures				24		
	Laboratory				24		
	Project work				12		
		/ Self study			100		
Assessment Methods and Weighting	Methods	5	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignm	ents	Written assignments (weekly)	30	CLO 1,2,3,4,5,6		
	Test		Two in-class examination (35% each)	70	CLO 1,2,3,4,5,6		
Required/recommende reading and online materials	Author(s)	Sensing: Principles an : Floyd F. Sabins : Waveland Press	d Applications (3rd edition)				

Edition: 3rd

	Print ISBN: 9781577665076, 1577665074 eText ISBN: 9781478618171.0  If you sign up for the course, plan on buying the book. The e-version is inexpensive. You will be expected to know
	the material from the book.
Course Website	http://www.clays.space
Additional Course Information	You can learn more by visiting the website http://www.clays.space

EASC3406	Reconst	truction of past cl	imate (6 credits)	Academic Yea	r  2021		
Offering Department	Earth Scie			Quota			
Course Co-ordinator	Dr S H Li,	Earth Sciences (shli)	@hku.hk)				
Teachers Involved	(Dr S H Li	i,Earth Sciences)					
	(Prof Z H	Liu,Earth Sciences)					
Course Objectives	This cours	se provides students v	with an understanding of how d	ynamic earth is and how it has ch	anged over the las		
		•	troduces the theory and metho	ds of climate reconstructions.			
Course Contents		ernary period (1),					
& Topics		hanges in the last 2.6					
		ces of climate change	` '				
		ve reconstruction met	. ,				
		alysis and biological p hange in arid regions					
		ry geochronology (1)	(1)				
		hanges in East Asia ( <i>¹</i>	1)				
			nan evolution and society (1)				
		rming and future clim					
		hange in Asia and Eui	• ,				
Course Learning			s course, students should be al	ble to:			
Outcomes	CLO 1	understand the earl	th climate change during last 2.	6 million years			
	CLO 2	understand the driv	ing forces of climate changes ir	n different scales			
	CLO 3	learn the methods f	or palaeo-environment reconstr	ruction			
	CLO 4	understand the imp	acts of climate changes				
	CLO 5	synthesize and inte	rpret data sets of climate chang	ge proxies			
Pre-requisites	Pass in E.	ASC2401					
(and Co-requisites							
and Impermissible							
combinations)							
Offer in 2021 - 2022	Y 2nd	d sem Offer in 2022	- 2023 : N	Examination	May		
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and						
	presentational skills.  B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar						
	and some unfamiliar situations. Apply effective organizational and presentational skills.  C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most						
	familiar situations. Apply moderately effective organizational and presentational skills.  Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply						
	Fail	knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack					
	of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve						
Communication-	N	problems. Organization a	and presentational skills are minimally e	effective or ineffective.			
intensive Course	IN						
Course Type	Lecture	ith laboratory compon	ent course				
Course Teaching	Activities	•	Details		No. of Hours		
& Learning Activities	Lectures	•	12 sessions x 2 hours		No. of Hours		
a Learning Activities	Laborator	rs /	2 sessions	4			
	Field wor		1 half-day fieldtrip		5		
	Tutorials	N.	8 sessions		16		
		/ Salf study	0 565510115		90		
Accessment Matheda		/ Self study	D. C. II.	W. L. L. C. L. C. L.			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments			50	CLO 1,2,3,5		
	Examinat			50	CLO 1,2,3,4		
Required/recommended			Reconstructing Quaternary	Environments. (Harlow, Essex :			
reading and		, 1997, 2nd ed)	g	(·······,	,		
online materials	W.F. Rud	diman: Earths climate	: Past and future (Freeman, 20 d A.G. Parker: Global Environn		ord, 2007)		
		E. Anderson, A.S. Goudie and A.G. Parker: Global Environments through the Quaternary (Oxford, 2007)					
Additional Course	Previous	course code & title: E	ASC2131 A Cool World: Ice Ag	jes and Climate Change			

EASC3408	Geophysics (6 credits)	Academic Year	2021
Offering Department	Earth Sciences	Quota	
Course Co-ordinator	Dr B Zhang, Earth Sciences (binzh@hku.hk)		
Teachers Involved	(Dr B Zhang,Earth Sciences) (Prof L S Chan,Earth Sciences)		
Course Objectives	An overview of the geophysical characteristics and processes of the solid e	arth and a surve	y of the various

Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods	
	Reading / Self study		goophysical methods	goophysical methods		
	Laboratory		2 computer exercises, 2 fie geophysical methods	2 computer exercises, 2 field exercises on exploration geophysical methods		
& Learning Activities	Lectures		12 sessions x 2 hours	12 sessions x 2 hours		
Course Teaching	Activitie	S	Details			
Course Type	Lecture w	vith laboratory co	mponent course			
Communication- intensive Course	N					
	Fail	, , ,				
	D	Demonstrated an insufficient understanding of the subject as total course mark achieved is below 60%. The pass grade is reflective only of the time the student puts in on the subject.				
	L .	Coursework and examination results reflect only a basic understanding of the subject without the ability to carry out in-depth analysis. Achieved 60-70% of total course marks.				
	С	course marks. A greater effort and further preparation are needed if student plans to pursue further study of geophysics.				
(A · 10 F)	B Demonstrate an understanding of the subject at the appropriate level of a university student and achieving 70% of the total					
Grade Descriptors (A+ to F)	A Demonstrated an in-depth understanding of the subject well above the expected level of an university undergraduate and achieving over 80% of total marks and an ability to pursue advance-level study in some of the geophysics subdisciplines.					
Offer in 2021 - 2022			022 - 2023 : Y	Examination	No Exam	
(and Co-requisites and Impermissible combinations)						
Pre-requisites	Pass in E	ASC2401 or PH	YS2250			
			sity, pressure and temperature of the e	earth's interior are determined		
			ethods of paleomagnetism and describ		etisation	
			edure to determine gravity anomalies a	i e		
			igues in measurements of earthquakes	,		
Outcomes			coaches and methods geophysicists us		rth	
Course Learning	- Seismol	0,	of this course, students should be able	to:		
		Properties of the	e Earth			
& Topics	- Geomag					
Course Contents		and gravity anom	ialies			

EASC3409	Igneous and metamorphic petrogenesis (6 credits)	Academic Year	2021				
Offering Department	Earth Sciences	Quota	30				
Course Co-ordinator	Prof G Zhao, Earth Sciences (gzhao @hku.hk)						
Teachers Involved	(Prof G Zhao,Earth Sciences) (Prof M Sun,Earth Sciences)						
Course Objectives	To provide a comprehensive coverage of the principles and techniques igneous and metamorphic rocks and their cause-and-effect relationsh evolution.						
Course Contents & Topics	<ul> <li>Magma generation: physiochemical conditions and tectonic settings.</li> <li>Application of trace elements and isotopes to the study of magma genesi</li> <li>Basaltic magmatism and mantle characteristics</li> <li>Granitic magma and crustal characteristics</li> <li>Magmatism at convergent boundaries</li> <li>Magmatism and crustal growth</li> <li>Types of metamorphism</li> <li>Chemical equilibrium/disequilibrium in metamorphism; metamorphic phase</li> <li>Metamorphic petrogenesis and evolution of pelitic rocks</li> <li>Metamorphism in different tectonic settings; metamorphic pressure-tetectonic implications.</li> </ul>	se diagrams (ACF, A'KF	· · ,				
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 use rock associations, textures, structures and geochemical characteristics to infer the petrogene major igneous rocks CLO 2 use magmatic rocks to study the mantle and crustal characteristics CLO 3 apply mineral assemblages, microtextures, mineral reaction relationships and metamorphic P-T painfer the tectonothermal evolution of metamorphic rocks CLO 4 demonstrate knowledge and understanding of magmatic and metamorphic processes and their caus						
Pre-requisites (and Co-requisites and Impermissible combinations)	effect relationships with tectonic settings and crustal evolution  Pass in EASC3402						
Offer in 2021 - 2022	Y 2nd sem Offer in 2022 - 2023 : Y	Examination	May				
Grade Descriptors (A+ to F)	A Demonstrate extensive knowledge and skills at an advanced level required fo strong analytical and critical abilities and logical thinking, and ability to apply problems. Critical use of data and results to draw appropriate and insightful and presentational skills.	highly effective lab skills and	d techniques to solve				
	B Demonstrate substantial command of a broad range of knowledge and skills learning outcomes. Show evidence of analytical and critical abilities and logic and techniques to solve problems. Correct use of data of results to draw appr	al thinking, and ability to ap	oly effective lab skills				

		and presentational skills.					
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the co outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply moder lab skills and techniques to solve problems. Mostly correct but some erroneous use of data and results to draw conclusions. Apply moderately effective organizational and presentational skills.					
	D	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities, and limited ability to apply partially effective lab skills and techniques to solve problems. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.					
	Fail						
Communication- intensive Course	N						
Course Type	Lecture wi	th laboratory componer	nt course				
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures					24	
	Laboratory					24	
	Reading /	Self study				100	
Assessment Methods and Weighting	Methods	·	Details		Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	nts			45	CLO 1,2,3,4	
	Examination				55	CLO 1,2,3,4	
Required/recommended reading and online materials		G. Best: Igneous and Metamorphic Petrology (Oxford Blackwell Science, 2003, 2nd ed.) hn D Winter: An Introduction to Igneous and Metamorphic Petrology (Prentice Hall, 2001)					

EASC3410	Hydroge	eology (6 credits	s)	Academic Ye	ar 2021			
Offering Department	Earth Sci	ences	-	Quota	40			
Course Co-ordinator	Prof J J J	liao, Earth Sciences	(jjiao @hku.hk)					
Teachers Involved	(Prof J J	Prof J J Jiao,Earth Sciences)						
Course Objectives	studies in	n HK. It consists of n of groundwater a	e some basic concepts and theories three components: 1) fundamenta as a resource; and 3) influence of	als of groundwater physics; 2)	well hydraulics and			
Course Contents & Topics	Hydrologi Properties Hydraulic Basic Equ Groundwa Analysis ( Well insta Regional	ydrologic Cycle And water Budgets, Introduction to Hydrogeology (1 Week) roperties Of Aquifers (2 Weeks) ydraulic head and flow net(2 Weeks) asic Equations of Groundwater Flow (1 Week) iroundwater Flow To Wells (1 Week) nalysis Of Aquifer Test(2 Weeks) /ell installation & pumping test design(1 Week) egional Groundwater Flow Systems (HK case study)(1 Week) iroundwater contamination (China case study)(Week 12)						
Course Learning	On succe	ssful completion of	this course, students should be able	e to:				
Outcomes	CLO 1 a	ppreciate the import	tance of hydrogeology in geotechnic	cal and environmental engineer	ing			
		nderstand basic cor nd surface water	ncepts of hydrological cycle and wa	ater balance, and interaction be	tween groundwate			
	CLO 3 appreciate the close relationship between groundwater system and geology and topography							
	CLO 4 understand basic concepts of aquifer and aquifer properties, hydraulic head, flow net, and basic principles of groundwater flow							
			er tests to estimate some important	aquiter parameters				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	EASC2402						
Offer in 2021 - 2022	Y 1st	t sem Offer in 202	2 - 2023 : Y	Examination	Dec			
Grade Descriptors (A+ to F)	A	Demonstrate thoroug learning outcomes. S	h mastery at an advanced level of extens how strong analytical and critical abilities ar	sive knowledge and skills required for nd logical thinking, with evidence of ori	ginal thought, and ability			
	В	to apply knowledge to a wide range of complex practical problems. Apply highly effective organizational and presentational skills.  Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to most practical problems. Apply effective organizational and presentational skills.						
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to some practical problems. Apply moderately effective organizational and presentational skills.						
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes.  Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve practical problems. Apply limited or barely effective organizational and presentational skills.							
	Fail	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve practical problems. Organization and presentational skills are minimally effective or ineffective.						
Communication- intensive Course	N		•					
Course Type	Lecture w	vith laboratory comp	onent course					
Course Teaching	Activitie	S	Details					
& Learning Activities	Lectures		12 sessions x 2 hours		24			
	Laborato	ry	10 x 2 hours		20			
	Field wor	rk	Half day field trip					
	Reading	/ Self study			100			
					100			

				to CLO Mapping
	Assignments		30	CLO 1,2,3,4
	Examination		70	CLO 1,2,3,4,5
Required/recommended reading and online materials	C. W. Fetter: Applied Hydrogeolog	y (Pearson Education Limited, 2014	1, 4th ed.)	

EASC3412		sources (6 credits)		Acaden	nic Yea	r 2021
Offering Department	Earth Scie			Quota		40
Course Co-ordinator	Prof M F Z	hou, Earth Sciences <i>(m</i>	nfzhou @hku.hk)			
Teachers Involved	`	iao,Earth Sciences) Zhou,Earth Sciences)				
Course Objectives	understan	d the processes that le	ead to their formation; to	tion of mineral deposits and gain hand on experience wide distributions of mineral ar	ith mini	ng procedures. In
Course Contents & Topics	deposit, n	nineral deposit models		oration and mining methods sulfide deposits, skarn dep source evaluation.		
Course Learning	On succes	ssful completion of this of	course, students should be	able to:		
Outcomes	CLO 1 u	nderstand the terminolo	gy and nomenclature in th	e mining industrial and mine	ral depo	sits
	CLO 2 u	nderstand factors that a	ire key to the formation of	metallic and industrial resour	ces	
	CLO 3 u	nderstand the controls	of earth resources in a glo	bal scale		
	CLO 4 u	nderstand methods of e	exploration and exploitation	n for mineral deposits		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in EA	ASC2402 or EASC3402				
Offer in 2021 - 2022	Y 1st	sem Offer in 2022 - 20	023 : Y	Examin	ation	Dec
Grade Descriptors (A+ to F)	A Demonstrate thorough understanding at an advanced level of extensive knowledge and skills with evidence for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking. Evidence of original thoughts, excellent field observation and ability to solve problems. Highly effective organization and presentation skills.					
	В	Demonstrate substantial understanding at an advanced level of extensive knowledge and skills with evidence for attaining all the course learning outcomes. Show analytical and critical abilities and logical thinking. Evidence of original thoughts and abilities of field observation. Effective organization and presentation skills.				
	С	Demonstrate general but incomplete understanding required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking. Moderately effective organization and presentation skills.				
	D	Demonstrate partial but limited understanding for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to solve problems. Apply limited or barely effective organizational and presentational skills.				
	Fail  No or little knowledge about the subject. No evidence for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Very little or no ability for field observation and for solving problems. Poor organization and presentational skills.					
Communication- intensive Course	N					
Course Type	Lecture wi	th laboratory componer	t course			
Course Teaching	Activities		Details			No. of Hours
& Learning Activities	Lectures		2 hour lectures per week for 10 weeks			20
	Laboratory					20
	Reading / Self study					100
Assessment Methods and Weighting	Methods	•	Details	Weighting in f course grade		Assessment Methods to CLO Mapping
	Examinat	ion		50		CLO 1,2,3,4
	Laborator	y reports		50		CLO 1,2,4
Required/recommended reading and online materials	TBC					

EASC3413	Engineering geology (6 credits)	Academic Year	2021				
Offering Department	Earth Sciences	Quota	35				
Course Co-ordinator	Dr L N Y Wong, Earth Sciences (Inywong@hku.hk)						
Teachers Involved	(Dr L N Y Wong,Earth Sciences) (Prof J J Jiao,Earth Sciences)						
Course Objectives	To present some of the concepts and skills of importance in the profession of Engineering Geology and illustrate their use by case histories.						
Course Contents & Topics	Introduction to engineering design and the role of the Engineering Geologist; site investigation concepts and skills (air photo interpretation, soil and rock description, engineering geological plans, reporting); slopes, foundations. Case histories from Hong Kong.						
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 appreciate how civil engineering design is carried out and understand the work of the geologist on engineering projects, particularly the economic- and safety-critical duties						
	CLO 2 make simple engineering-geological models and understand how desk study, site reconnaissance survey and ground investigation design should be carried out						
	CLO 3 carry out simple air photo interpretation tasks and elementary soil and rock description and classification for engineering purposes						
	CLO 4 understand major types of slope failures and basic methods to control and mitigate landslides						
	CLO 5 carry out stability analyses using methods such as the limit equilibrium and stereographic projection method						
Pre-requisites	Pass in EASC3410 and EASC3414, or already enrolled in these courses						
(and Co-requisites	This course is only for final year students.						

and Impermissible combinations)						
Offer in 2021 - 2022	Y 2nd	sem Offer in 2022 - 2	2023 : Y	Examination	May	
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge and skills to solve a wide range of complex, familiar and unfamiliar practical problems. Apply highly effective organizational and presentational skills.				
	В	learning outcomes. Show e	evidence of analytical and critical abil	edge and skills required for attaining at lities and logical thinking, and ability to a effective organizational and presentation	oply knowledge and skills	
	С	outcomes. Show evidence	of some analytical and critical abilities	e and skills required for attaining most es and logical thinking, and ability to apply moderately effective organizational and	y knowledge and skills to	
	D	Show evidence of some co	herent and logical thinking, but with	cills required for attaining some of the co limited analytical and critical abilities. Sh limited or barely effective organizational	ow limited ability to apply	
	Fail					
Communication- intensive Course	N					
Course Type	Lecture w	ith laboratory componer	nt course			
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures				24	
	Laboratory				20	
	Field work		half day field trip		5	
	Reading	/ Self study			90	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignments		including field report	30	CLO 2,3,4,5	
	Examinat	ion	-	70	CLO 1,2,3,4,5	
Required/recommended reading and online materials	Goodman	, R. E.: Engineering Ge	ology (Wiley, 1993).			

EASC3414	Soil and rock mechanics (6 credits)  Academic Y				Academic Ye	ar 2021
Offering Department	Earth Sciences Quota					40
Course Co-ordinator	Prof J J J	liao, Earth Sciences	s (jjiao @hku.hk)			
Teachers Involved	(Dr L N Y	Wong,Earth Scien	ces)			
	(Prof J J	Jiao,Earth Sciences	s)			
Course Objectives	To provid	le a basic knowledg	ge of soil and rock mechai	nics for those wishing to	consider further	studies on a caree
		ering geology/geote				
Course Contents			and classifications of soil			
& Topics			nitial stresses and their m	easurement; deformation	; consolidation;	planes of weaknes
		ground treatment m				
Course Learning			this course, students show			
Outcomes		nderstand basic co riteria	ncepts of stress and stra	in, pore pressure and ef	fective stress, s	strength and failure
	CLO 2 u	nderstand basic pro	perties and classifications	s of soil and rock		
	CLO 3 a	ppreciate the proce	ss of rock deformation and	d soil consolidation		
Pre-requisites	Pass in E	ASC3410, or alread	dy enrolled in this course			
(and Co-requisites						
and Impermissible						
combinations)						
Offer in 2021 - 2022			22 - 2023 : Y		Examination	May
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking. Apply highly effective organizational and presentational skills.					
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking. Apply effective organizational and presentational skills.					
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking. Apply moderately effective organizational and presentational skills.					
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes.  Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Apply limited or barely effective organizational and presentational skills.					
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Organization and presentational skills are minimally effective or ineffective.					
Communication- intensive Course	N	,				
Course Type	Lecture v	vith laboratory comp	onent course			
Course Teaching	Activitie		Details			
& Learning Activities	Lectures			Details		
•	Laborato					24 24
		/ Self study				100
Assessment Methods and Weighting	Methods	•	Details		nting in final se grade (%)	Assessment Methods to CLO Mapping
	Assignm	ents			30	CLO 1,2,3
	Examina				70	CLO 1,2,3
Required/recommended reading and			(Chapman & Hall, 6th ed.) i to Rock Mechanics (Johr			

online materials

EASC3415	Meteoro	logy (6 credits	5)	Academic Yea	ar 2021		
Offering Department	Earth Scie	nces		Quota			
Course Co-ordinator	-	Dr Jed Kaplan, Earth Sciences <i>(jkaplan</i> @hku.hk)					
Teachers Involved		ıplan,Earth Scien	,				
Course Objectives	(3) observato provide	ation and analysi students with a	five major components of meteorologis, (4) dynamics, and (5) weather sys modern understanding of drivers and ructure and behavior, weather elemer	tems (cyclones, fronts, thunder behavior of weather by exam	rstorms). The aim is		
Course Contents & Topics	- Atmosphi - Solar & Ir - Thermod - Water Va - Atmosphi - Clouds - Precipital - Satellites - Weather	eric Basics nfrared Radiation ynamics por eric Stability tion Processes	Analysis	<b>,</b>			
	- Thunders - Thunders - Tropical (	Air Masses storm Fundament storm Hazards Cyclones					
Course Learning Outcomes	CLO 1	describe key asp	of this course, students should be able ects of weather phenomena elements of atmospheric processes				
			inciples to construct models for some				
			charts (weather maps)				
			ong weather (typhoons etc.)				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in EA	ASC2404					
Offer in 2021 - 2022	Y 1st	sem Offer in 20	)22 - 2023 : Y	Examination	No Exam		
Grade Descriptors (A+ to F)	В	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Demonstrate critical use of data and results to draw appropriate and insightful conclusions. Show insightful use and critical analysis / evaluation of information drawn from a full range of high quality sources and to quote/reference aptly.  Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Demonstrate correct use of data and results to draw appropriate conclusions. Show critical use of relevant information from sources and ability to make meaningful comparisons between different secondary interpretations					
	С	and to quote/reference aptly.  Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Demonstrate mostly correct but some erroneous use of data and results to draw appropriate conclusions. Show use of relevant information from sources and ability to make comparisons between different interpretations and to quote/reference aptly.					
	D  Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes.  Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Demonstrate limited ability to use data and results to draw appropriate conclusions. Show use and reference of several sources, but mainly through summary rather than analysis and comparison.						
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Demonstrate misuse of data and results and/or unable to draw appropriate conclusions. Show limited use of secondary sources and no critical comparison of them.						
Communication- intensive Course	N	,	,				
Course Type Course Teaching		sed course	Dotoile		No of Harris		
& Learning Activities	Activities Lectures		Details		No. of Hours		
ourning Addition	Project wo	ork			48		
	Tutorials				10		
	Discussion	n Self study			14 50		
	Assessme	ent			2		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	nts	problem sets	15	CLO 1,2,3		
	Presentati		in-class presentations (weath reports)	15	CLO 1,4,5		
	Project rep	μοτι	research report midterm examination (1h50)	40 30	CLO 1,4,5 CLO 1,2,3		
Required/recommended reading and online materials	Stull, R. (2 Dept. o https://mod	of Éarth, O	midterm examination (1150)   Meteorology: An Algebra-based Suncean & Atmospheric Scienc   file.php/2646870/mod_resource/con	vey of Atmospheric Science. Ves, University of Briti	ancouver, Canada sh Columbia.		

EASC3416 Advanced geochemistry and geochronology (6 credits) Academic Year 2021		
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Offering Department	Earth Scie	ences		Quota	50				
Course Co-ordinator	Prof M F Z								
Teachers Involved			·						
Course Objectives	To present key concepts of modern geochemistry and geochronology and their application to environmental and Earth science problems.								
Course Contents		•	isotopic dating and modern instrume	nts					
Topics	2. Zircon l	J-Pb isotopic dati	ing and its application						
	3. Principl	es and technique	es for dating mineral deposits						
			ry geochronology						
		Principle, development and applications of Luminescence dating							
Course Learning			of this course, students should be ab						
Outcomes			edge of concepts and ideas of mode	rn geocnemistry					
			of radiogenic isotopic dating odern analytical techniques are appli	and to dating earth materials					
			eochemical methods are applied to g	•	wirenmental and Eart				
		derstand now ge ciences	eochemical methods are applied to g	alli insigni into process in er	Miorimental and Eart				
re-requisites	Pass in E	ASC2401 or EAS	C2406 or EASC2407						
and Co-requisites									
and Impermissible									
combinations)	N 000		N						
Offer in 2021 - 2022 Grade Descriptors	-	er in 2022 - 2023	: <b>IN</b> ites thorough mastery at an advanced level of	Examination					
(A+ to F)	A	learning outcomes. ability to apply his/ knowledge in geocl fluxes of materials	Shows strong analytical and critical abilities fher knowledge to a wide range of problems hemistry to understand the interactions amon over geological time periods and on a glo	and logical thinking, with evidence in geochemistry, and at the same ng minerals, fluids and gases and h	of original thought, and the e, can combine fundament now these processes impa				
	B Student demonstrates substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and apply his/her knowledge to a								
	range of problems in geochemistry, and at the same combine knowledge in geochemistry to understand material fluxes among minerals, fluids and gases over geological time periods and on a global scale. Student shows the ability to apply effective organizational and presentational skills.								
	С								
	D Student demonstrates partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to understand key topics in geochemistry and limited capability to transfer this knowledge to geological phenomena.								
	Student shows the ability to apply limited or barely effective organizational and presentational skills.								
	Fail  Student demonstrates little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Shows very little or no ability to apply knowledge to understand basic topics related to the geochemistry and the application of these principles to geological problems. Organization and presentational skills are minimally effective or ineffective.								
Communication- ntensive Course	N	Organization and pi	resentational skills are minimally effective or i	lenective.					
Course Type	Lecture w	ith laboratory com	nponent course						
Course Teaching	Activities		Details		No. of Hours				
Learning Activities	Lectures			Details					
· ·	Laborator	ν	Up to 24 hours		24				
	Group wo	•			24				
	Discussion		Up to 24 hours		24				
	Reading /	/ Self study			60				
Assessment Methods	Methods	•	Details	Weighting in final	I Assessment				
nd Weighting				course grade (%)					
	Examinat	ion	One 2-hour written examina	tion 60	CLO 1,2,3,4				
	Presentat		One E near written examina	20	CLO 1,2,3,4				
	Projective			20	CLO 1.2 3 4				
Required/recommended reading and	Project re Geochem	•	1. White (Wuley, Apr 1, 2013)	20	CLO 1,2,3,4				

EASC3417	Earth through time (6 credits)	Academic Year	2021				
Offering Department	Earth Sciences	Quota					
Course Co-ordinator	Dr S C Chang, Earth Sciences (suchin@hku.hk)						
Teachers Involved	(Dr N R McKenzie,Earth Sciences) (Dr S C Chang,Earth Sciences)						
Course Objectives	To introduce the concept of geological time and basic geological principles. To provide an understanding of the fossil record and the integration of Earth Systems and plate tectonics. To gain an appreciation of our place in the Universe, an understanding of the evolution of Earth and life on Earth through time.						
Course Contents & Topics	Geological time, the origin of life, fossils and diversification of life through time such as Snowball Earth, the Cambrian explosion of life, the Permian/Triassic Tertiary extinction event, the origins of humans						
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 define basic geological principles						
	CLO 2 explain critical geological relationships						
	CLO 3 outline the history of the development of our planet						
	CLO 4 interpret the geological record of evolution through time						
	CLO 5 compare and contrast various hypotheses put forward to explain major events in Earth history						
	CLO 6 describe major fossil groups						
Pre-requisites (and Co-requisites	Pass in EASC3403						

and Impermissible combinations)					
Offer in 2021 - 2022	Y 1s	t sem Offer in 2022 -	2023 : Y	Examination	Dec
Grade Descriptors (A+ to F)	A	to draw appropriate and laboratory classes; show language and correct res	insightful conclusions. Apply highly or ing strong ability in experiments, data ults.	with evidence of original thought. Critice effective organizational and presentation a processing and analysis; presenting I	nal skills. Attend all the ab reports with accurate
	B Evidence of analytical and critical abilities and logical thinking. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills. Attend all the laboratory classes; showing ability in experiments, data processing and analysis; presenting lab reports with correct results.				
	С	to draw appropriate cor	nclusions. Apply moderately effective	nking. Mostly correct but some erroneous organizational and presentational ski essing and analysis; presenting lab rep	lls. Attend most of the
	D	results to draw appropria	te conclusions. Apply limited or barely	ed analytical and critical abilities. Limite effective organizational and presentation processing and analysis; presenting lab	nal skills. Attend >50% of
	Fail	to draw appropriate conc	lusions. Organization and presentation	I and coherent thinking. Misuse of data a al skills are minimally effective or ineffec use computer and software for data produce	ctive. Miss more than half
Communication- intensive Course	N				
Course Type	Lecture v	with laboratory compon	ent course		
Course Teaching	Activities		Details	No. of Hours	
& Learning Activities	Lectures	3			24
	Laboratory				12
	Project work				12
	Reading	/ Self study			90
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Examina	ation		40	CLO 1,2,3,4,5,6
	Laborato	ory reports		20	CLO 1,2,3,4,5,6
	Presenta		Group Presentation	20	CLO 2,3,4,5
	Test		MCQ Test	20	CLO 2,4,5
Required/recommended reading and online materials	Stanley,	S. M and Luczaj, J. A.:	Earth System History (4th Edit	ion)	

EASC3418	Coasts	and coastal change (6 credits)	Academic Year	2021			
Offering Department	Earth Scie	ences	Quota				
Course Co-ordinator	Dr N Khai	Dr N Khan, Earth Sciences (nskhan@hku.hk)					
Teachers Involved	(Dr N Kha	an,Earth Sciences)					
Course Objectives	fieldtrips. human dr	This course offers students an opportunity to explore coastal systems through classroom studies, lab sessions and fieldtrips. Teaching material covers short-term to long-term processes of different coastal systems, natural and human drivers for coastal landform formation and evolution, and economic development and natural hazards on coastal environments.					
Course Contents & Topics	- Major co - Natural o - Coastal - Human o	The content of this course includes:  - Major coastal environments: rocky coast, beaches and dunes, lagoons, estuaries, river deltas  - Natural drivers for coastal processes: wave, tide, coastal currents, freshwater and sediment discharge  - Coastal processes: sediment transport and deposition, biological activity  - Human drivers for coastal change: settlements, infrastructures and coastal hazards  - Short and long term coastal change: storms, climate and sea-level change					
Course Learning		ssful completion of this course, students should be	•				
Outcomes	CLO 1	Describe the tectonic geomorphological processes					
	CLO 2	Assess quantitatively uplift and erosion	'				
	CLO 3	Demonstrate knowledge of weathering processes	and relationship to climate				
	CLO 4 Understand fundamental elemental cycles at Earth's surface						
	, · · · · · · · · · · · · · · · · · · ·						
Pre-requisites	CLO 5	·	ess studies				
(and Co-requisites and Impermissible	CLO 5	Apply methods and proxies for Earth surface proce	ess studies				
(and Co-requisites and Impermissible combinations)	CLO 5 Pass in E	Apply methods and proxies for Earth surface proce	ess studies  Examination	Мау			
Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)	CLO 5 Pass in E.  Y 2nc A	Apply methods and proxies for Earth surface procedured ASC2401 and EASC2402 OR Pass in ENVS2001  d sem Offer in 2022 - 2023 : Y  Demonstrate thorough mastery of the course material. Shevidence of original thought, and ability to apply knowledge Demonstrate highly effective organizational and presentations.	<b>Examination</b> now strong ability for analytical, critical and le to a wide range of complex, familiar and al skills.	logical thinking, with unfamiliar situations.			
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	CLO 5 Pass in E	Apply methods and proxies for Earth surface procedured ASC2401 and EASC2402 OR Pass in ENVS2001  d sem Offer in 2022 - 2023 : Y  Demonstrate thorough mastery of the course material. She evidence of original thought, and ability to apply knowledge.	Examination  now strong ability for analytical, critical and le to a wide range of complex, familiar and al skills.  and an ability to apply knowledge to familiar	logical thinking, with unfamiliar situations.			
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	CLO 5 Pass in E.  Y 2nc A	Apply methods and proxies for Earth surface proced ASC2401 and EASC2402 OR Pass in ENVS2001  d sem Offer in 2022 - 2023 : Y  Demonstrate thorough mastery of the course material. Shevidence of original thought, and ability to apply knowledg Demonstrate highly effective organizational and presentational Demonstrate substantial command of the course material a situations. Show evidence of analytical, critical thought	Examination  now strong ability for analytical, critical and le to a wide range of complex, familiar and al skills.  and an ability to apply knowledge to familiar to some complex issues. Apply effective lirse material and an ability to apply knowledge material and an ability to apply knowledge.	logical thinking, with unfamiliar situations. and some unfamiliar organizational and edge to most familiar			
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	CLO 5 Pass in E.  Y 2nd A B	Apply methods and proxies for Earth surface proced ASC2401 and EASC2402 OR Pass in ENVS2001  d sem Offer in 2022 - 2023 : Y  Demonstrate thorough mastery of the course material. Shevidence of original thought, and ability to apply knowledgen Demonstrate highly effective organizational and presentational Demonstrate substantial command of the course material a situations. Show evidence of analytical, critical thought presentational skills  Demonstrate general but incomplete command of the course situations. Show evidence of some critical and logical the standard of the course situations. Show evidence of some critical and logical the standard process of the supplementation of the course situations.	Examination  now strong ability for analytical, critical and le to a wide range of complex, familiar and al skills.  and an ability to apply knowledge to familiar to some complex issues. Apply effective lirse material and an ability to apply knowle hinking abilities. Apply moderately effective rial and a limited ability to apply knowledge to	logical thinking, with unfamiliar situations. and some unfamiliar organizational and edge to most familiar organizational and solve problems. Show			
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	CLO 5 Pass in E.  Y 2nd A B C	Apply methods and proxies for Earth surface proced ASC2401 and EASC2402 OR Pass in ENVS2001  d sem Offer in 2022 - 2023 : Y  Demonstrate thorough mastery of the course material. Shevidence of original thought, and ability to apply knowledge Demonstrate highly effective organizational and presentations Demonstrate substantial command of the course material a situations. Show evidence of analytical, critical thought presentational skills  Demonstrate general but incomplete command of the course situations. Show evidence of some critical and logical the presentational skills.  Demonstrate partial but limited command of the course materievidence of some coherent and logical thinking, but with limited command of the course materievidence of some coherent and logical thinking, but with limited command of the course materievidence of some coherent and logical thinking, but with limited command of the course materievidence of some coherent and logical thinking, but with limited command of the course materievidence of some coherent and logical thinking, but with limited command of the course materievidence of some coherent and logical thinking, but with limited command of the course materievidence of some coherent and logical thinking.	Examination  now strong ability for analytical, critical and the to a wide range of complex, familiar and all skills.  and an ability to apply knowledge to familiar to some complex issues. Apply effective thinking abilities. Apply moderately effective rial and a limited ability to apply knowledge to a little analytical and critical abilities. Apply limit material with very little or no ability to apply	logical thinking, with unfamiliar situations. and some unfamiliar organizational and edge to most familiar organizational and solve problems. Show ted or barely effective y knowledge to solve			
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)	CLO 5 Pass in E.  Y 2nd A B C	Apply methods and proxies for Earth surface proced ASC2401 and EASC2402 OR Pass in ENVS2001  d sem Offer in 2022 - 2023 : Y  Demonstrate thorough mastery of the course material. Shevidence of original thought, and ability to apply knowledge Demonstrate highly effective organizational and presentations Demonstrate substantial command of the course material a situations. Show evidence of analytical, critical thought presentational skills  Demonstrate general but incomplete command of the course situations. Show evidence of some critical and logical the presentational skills.  Demonstrate partial but limited command of the course mater evidence of some coherent and logical thinking, but with lim organizational and presentational skills.  Demonstrate little or no evidence of command of course reproblems. Lack of critical thinking abilities and incoherent thir	Examination  now strong ability for analytical, critical and the to a wide range of complex, familiar and all skills.  and an ability to apply knowledge to familiar to some complex issues. Apply effective thinking abilities. Apply moderately effective rial and a limited ability to apply knowledge to a little analytical and critical abilities. Apply limit material with very little or no ability to apply	logical thinking, with unfamiliar situations. and some unfamiliar organizational and edge to most familiar organizational and solve problems. Show ted or barely effective y knowledge to solve			
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	CLO 5 Pass in E.  Y 2nd A B C D Fail	Apply methods and proxies for Earth surface proced ASC2401 and EASC2402 OR Pass in ENVS2001  d sem Offer in 2022 - 2023 : Y  Demonstrate thorough mastery of the course material. Shevidence of original thought, and ability to apply knowledge Demonstrate highly effective organizational and presentations Demonstrate substantial command of the course material a situations. Show evidence of analytical, critical thought presentational skills  Demonstrate general but incomplete command of the course situations. Show evidence of some critical and logical the presentational skills.  Demonstrate partial but limited command of the course mater evidence of some coherent and logical thinking, but with lim organizational and presentational skills.  Demonstrate little or no evidence of command of course reproblems. Lack of critical thinking abilities and incoherent thir	Examination  now strong ability for analytical, critical and the to a wide range of complex, familiar and all skills.  and an ability to apply knowledge to familiar to some complex issues. Apply effective thinking abilities. Apply moderately effective rial and a limited ability to apply knowledge to a little analytical and critical abilities. Apply limit material with very little or no ability to apply	logical thinking, with unfamiliar situations. and some unfamiliar organizational and edge to most familiar organizational and solve problems. Show ted or barely effective y knowledge to solve			
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)  Communication-intensive Course	CLO 5 Pass in E.  Y 2nd A B C D Fail	Apply methods and proxies for Earth surface proced ASC2401 and EASC2402 OR Pass in ENVS2001  d sem Offer in 2022 - 2023 : Y  Demonstrate thorough mastery of the course material. Shevidence of original thought, and ability to apply knowledge Demonstrate highly effective organizational and presentational Demonstrate substantial command of the course material a situations. Show evidence of analytical, critical thought presentational skills  Demonstrate general but incomplete command of the course material as ituations. Show evidence of some critical and logical the presentational skills.  Demonstrate partial but limited command of the course materiories evidence of some coherent and logical thinking, but with lim organizational and presentational skills.  Demonstrate little or no evidence of command of course reproblems. Lack of critical thinking abilities and incoherent thir or ineffective.	Examination  now strong ability for analytical, critical and the to a wide range of complex, familiar and all skills.  and an ability to apply knowledge to familiar to some complex issues. Apply effective thinking abilities. Apply moderately effective rial and a limited ability to apply knowledge to a little analytical and critical abilities. Apply limit material with very little or no ability to apply	logical thinking, with unfamiliar situations. and some unfamiliar organizational and edge to most familiar organizational and solve problems. Show ted or barely effective y knowledge to solve			

	Laboratory			18		
	Field work			16		
	Reading / Self study			100		
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments		40	CLO 1,2,3,4,5		
	Examination		30	CLO 1,2,3,4		
	Project report		30	CLO 1,2,3,4,5		
Required/recommended reading and online materials	Davidson-Arnott, 2010. Introduction to Coastal Processes and Geomorphology. Cambridge University Press.  Masselink, Hughes and Knight, 2011. Introduction to Coastal Processes and Geomorphology. Routledge.					

EASC3419	Earth 9	System Science	Field Studies (6 credits)	Academic Yea	ar 2021			
Offering Department	Earth S	-	•	Quota	15			
Course Co-ordinator	Dr Jed (	O Kaplan, Earth Scie	ences (jkaplan@hku.hk)					
Teachers Involved		Dr Jed O Kaplan,Earth Sciences) Dr Nicole S Khan,Earth Sciences)						
Course Objectives	glaciers	n this field-based course, students will study the structure and dynamic processes of coastal zones, mountain placiers, deserts and loess landforms. Students will learn basic methods of field observation and survey so as to ind out the systematic links between the different components of the Earth system.						
Course Contents & Topics	dynamic	Dynamic interactions between the atmospheric, oceanic, and terrestrial parts of the coastal zones; structure and lynamics of mountain glaciers; structure, mineral composition, and the role of wind in the formation of deserts and bess landforms.						
Course Learning Outcomes	CLO 1 CLO 2 CLO 3 CLO 4	on successful completion of this course, students should be able to:  CLO 1 describe interactions between the sea, atmosphere and terrestrial environments at the coastal zone  CLO 2 describe principal characteristics of mountain glaciers, deserts and loess  CLO 3 explain causes and dynamic processes of these environments  CLO 4 show knowledge and critical understanding of the systematic relationships between these environments						
	CLO 5	demonstrate capabi	lity in analyzing the sustainable develo	oment of the human-environr	ment relationships			
Pre-requisites (and Co-requisites and Impermissible combinations)	EASC24	ne of the following 20 402 or ENVS2001 or n special arrangemer						
Offer in 2021 - 2022	Y S	Summer Offer in 20	22 - 2023 : Y	Examination	To be confirmed			
Grade Descriptors (A+ to F)	A	strong analytical and analyze the Earth s	gh mastery at an advanced level of knowledge d critical abilities and logical thinking, with evide system structure. Can insightfully combine the n the different components of the Earth system entation skills.	ence of insights, and the ability to field investigation and indoor ana	apply the knowledge to lysis to understand the			
	В	-						
	С							
	D							
	Fail							
Communication- intensive Course	N							
Course Tune	Field ca	ımps						
Course Type	·							
Course Teaching	Activiti	ies	Details		No. of Hours			
Course Teaching	Field w	ork	Field trip (23 days x 8 hours per	- ,	184			
Course Teaching & Learning Activities	Field w			- ,				
Course Teaching & Learning Activities  Assessment Methods	Field w	ork g / Self study	Field trip (23 days x 8 hours per	- ,	184 16 Assessment Methods			
Course Teaching & Learning Activities  Assessment Methods	Field w	ork g / Self study ds	Field trip (23 days x 8 hours per Preparation of final video (in gro	weighting in final	184 16 Assessment			
Course Teaching & Learning Activities  Assessment Methods	Field work Reading  Method  Assignman Report	ork g / Self study ds ments	Field trip (23 days x 8 hours per Preparation of final video (in gro  Details  Daily assessement  Video project	Weighting in final course grade (%)  33 34	184 16 Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2,3,4,5			
Course Teaching & Learning Activities  Assessment Methods	Field work Reading Method Assignment	ork g / Self study ds ments	Field trip (23 days x 8 hours per Preparation of final video (in gro  Details  Daily assessement	Weighting in final course grade (%)	184 16 Assessment Methods to CLO Mapping CLO 1,2,3			
Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommender reading and	Field w Reading Method  Assignman Report Test Require Three to	ork g / Self study ds ments ed reading to be annow-hour pre-trip cour	Field trip (23 days x 8 hours per Preparation of final video (in ground per per per per per per per per per per	Weighting in final course grade (%)  33 34 33	184 16 Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2,3,4,5			
Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommender reading and online materials Additional Course	Field w Reading Method Assignr Report Test Require Three to Practical	ork g / Self study ds ments ed reading to be annowo-hour pre-trip cour al seminar with a doc	Field trip (23 days x 8 hours per Preparation of final video (in ground per Details  Daily assessement Video project Oral examination punced.	Weighting in final course grade (%)  33 34 33 ngs and discussion.	184 16 Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2,3,4,5 CLO 1,2,3,4			

EASC3999	Directed studies in earth sciences (6 credits)	Academic Year	2021
Offering Department	Earth Sciences	Quota	
Course Co-ordinator	Prof Z H Liu, Earth Sciences (zhliu@hku.hk)		
Teachers Involved	(Various teachers in the Department, Earth Sciences)		
Course Objectives	To enhance the student's knowledge of a particular topic and the student's	self-directed lear	ning and critical

	thinking	skills.					
Course Contents & Topics	The student undertakes a self-managed study on a topic in earth sciences under the supervision of a staff member. The topic is preferably one not sufficiently covered in the regular curriculum. The directed study can be a critical review or a synthesis of published work on the subject, or a laboratory or field study that would enhance the student's understanding of the subject. The project may not require an element of originality.						
Course Learning Outcomes	CLO 1 e	enhance the ability in esearch in earth science		d analysis, critical thinking,	doing independent		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in a System S Cumulati This cou Earth Sy	CLO 2 write scientific dissertation, and conduct oral presentation of the research results  Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in the Geology or Earth System Science Majors; and  Cumulative GPA of 2.5 or above.  This course is not a capstone course and students cannot use this course to fulfill the capstone requirement of the Earth System Science and Geology Majors.  The earliest that a student is allowed to take this course is their year 3 study.					
Offer in 2021 - 2022		ear long Offer in 2022		Examination	No Exam		
Grade Descriptors (A+ to F)	A	Demonstrate thorough groriginal thought. Insightfut to quote/reference aptly.	rasp of the subject. Show strong analytic I use and critical analysis / evaluation of in Critical use of data and results to draw ins ntational skills. [Work of A+ should show of	al and critical abilities and logical the formation drawn from a full range of sightful conclusions and solve probler	ninking, with evidence of high quality sources and ms. Apply highly effective		
	В	B Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Critical use of relevant information from sources, showing ability to make meaningful comparisons between different secondary interpretations and to quote/reference aptly. Correct use of data of results to draw appropriate conclusions to draw insightful conclusions and solve problems. Apply effective organizational and presentational skills.					
	С						
	D Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Demonstrate use and reference of several sources, but mainly through summary rather than analysis and comparison. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.						
	Fail	Demonstrate evidence o analytical and critical ab	f little or no grasp of the knowledge and ilities, logical and coherent thinking. Limi and results and/or unable to draw appropri	d understanding of the subject. Evid ted use of secondary sources and r	no critical comparison of		
Communication- intensive Course	N						
Course Type	Project-b	pased course					
	Activities		Details				
Course Teaching	ACTIVITIE			No. of Hours			
Course Teaching		g / Self study	The student is expected to s the project	pend at least 120 hours on	No. of Hours		
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting		•		Weighting in final course grade (%)			

EASC4403	Biogeoc	nemical cycles (6	credits)		Academic Year	2021	
Offering Department	Earth Scie	nces			Quota		
Course Co-ordinator	Dr Y Li, Ea	rth Sciences (yiliang@	Dhku.hk)				
Teachers Involved	(Dr Y Li,Ea	rth Sciences)					
Course Objectives	hydrosphe particular,	This course presents how the basic geochemistries of the Earth system, from atmosphere to the geosphere and to hydrosphere, have been and are being affected by the origin, evolution and existence of life. Human activities in particular, from the rapid consumption of resources to the destruction of the rainforests and the expansion of cities are leading to rapid changes in the geochemistry of the Earth systems.					
Course Contents & Topics	2) Geobiolo 3) Terrestr 4) Aquatic 5) Marine I 6) Phospho 7) Sulfur co 8) Carbon 9) Nitroger	al biogeochemical cycles biogeochemical cycles biogeochemical cycles brous cycle ycle cycle cycle	cal cycles: their role in t cles s	,			
Course Learning		•	course, students shoul				
Outcomes	CLO 1 describe the major geochemical cycles on Earth						
	CLO 2 illustrate the interactions between the geochemical cycles and the main environments on Earth						
	CLO 3 draw connections between changes to the Earth systems and the cause/effect relationships of changes to biogeochemical cycles						
	CLO 4 knows why the anthropogenic activities become a significant part of globe change						
Pre-requisites (and Co-requisites and Impermissible combinations)		Pass in EASC3403 or EASC3416 or ENVS3313					
Offer in 2021 - 2022	Y 1st s	sem Offer in 2022 - 2	2023 : Y		Examination	Dec	
Grade Descriptors (A+ to F)	A	learning outcomes. Show s	strong analytical and critical a		·		
,	В	learning outcome. Show e	vidence of analytical and criti	of knowledge and skills required abilities and logical thinking	ı.		
	C			nowledge and skills required and presentational skills. Show			
	D	Demonstrate partial but lin	nited command of knowledg	e and skills required for attaini	ing some of the cours	e learning outcomes	

				with limited analytical and critical abilities. Sught topics. Able to answer more than half of			
	Fail						
Communication- intensive Course	N						
Course Type	Lecture-b	pased course					
Course Teaching	Activitie	s	Details		No. of Hours		
& Learning Activities	Lectures				28		
	Tutorials						
	Field work				8		
	Group work		PBL group work	PBL group work			
	Project work		Writing course thesis	Writing course thesis			
	Reading / Self study				54		
Assessment Methods and Weighting	Methods	5	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Essay			60	CLO 1,2,3,4		
	Examina	ition		40	CLO 1,2,3,4		
Required/recommended reading and online materials			is of Global Change, William ochemistry, Susan M. Libes,	H. Schlesinger, Emily Bernhardt. Elsevier, 2009.			

EASC4406	Earth of	ynamics & global te	ctonics (6 credits)		Academic Year	2021		
Offering Department	Earth So	ences			Quota			
Course Co-ordinator	Prof G Z	Prof G Zhao, Earth Sciences (gzhao @hku.hk)						
Teachers Involved	(Prof G Zhao,Earth Sciences)							
Course Objectives	This cou	se is intended to provide	esses that shape the configure students with an understa ses through an examination	nding of the driving	forces of Earth p	rocesses and the		
Course Contents & Topics	- Mantle - Method - Structu - Sea flo - Subdu - Forma - Contin - Sedim - Mecha - Hadea atmosph - Archea formatio - Paleop - Supero	- Plate tectonics; orogenesis; accretionary and collisional orogensis.  - Mantle convection; hot spots and plumes; - Methods of investigation of large scale structures and processes; - Structure and physical properties of the planet; - Sea floor spreading; ocean ridges; transform faults; - Subduction zones; mountain belts and orogenesis; - Formation of continental crust; - Continental rifts and continental margins; - Sedimentary basins; - Mechanism, consequence and implication of plate tectonics Hadean Earth: Accretion of the Earth from the solar nebula; differentiation of the Earth; formation of the initial atmosphere and oceans; the earliest felsic crust; Late Heavy Bombardment Archean cratons: greenstones and TTG gneisses; origin of komattites; role of mantle plumes in Archean crustal formation and evolution; when did plate tectonics start on Earth? - Paleoproterozoic collision tectonics Supercontinents in Earth history: the assembly, outgrowth and breakup of supercontinents Columbia (Nuna), Rodinia and Pangea.						
Course Learning Outcomes	CLO 1 CLO 2 CLO 3 CLO 4	ave an appreciation of the nderstand how energy reppreciate the importance istill of a wide range of d	course, students should be a the Earth as a dynamic plane elease within the Earth is tra e of a knowledge of the histo lata to differentiate competir	et anslated into geolog ory of investigation ng geological theori	of global scale ted es			
	CLO 5	roduce concise written a	and oral summaries of literat	ure research on sp	ecific topics in glo	bal dynamics		
Pre-requisites and Co-requisites and Impermissible combinations)	Pass in	ASC3403 or EASC3404	4 or EASC3408 or EASC340	09				
Offer in 2021 - 2022	Y 2	d sem Offer in 2022 - 2	2023 : Y		Examination	May		
Grade Descriptors (A+ to F)	A	in-depth grasp of the subject Show outstanding and effect	thorough mastery of the knowledg ct, and provide evidence of strong ctive organizational and presentati- gh level of critical analysis and dra ples, and evidence.	analytical and logical th on skills, and the insigh	inking, where possible tful use of data, literatu	with original thought ire reviews and othe		
	В	The student should show a substantial knowledge of a significant range of the skills necessary for attaining most, if not all, of the course outcomes, and have a substantial grasp of the subject. Show evidence of the ability to think critically and to have effective organizational and presentational skills and make critical use of relevant information from different sources, showing the ability to make comparisons between consequent interpretations. Be capable of the general integration of theories, principles and evidence.						
	C	The student should have a general command of the knowledge, competencies and skills required for attaining the majority of the course outcomes, and a general grasp of the subject. Show some evidence of critical ability and logical thinking and moderately effective organizational and presentational skills. The student should be moderately effective in the use of data to draw appropriate conclusions, should be able to use relevant information from sources and able to make comparisons between different interpretations, through partial integration of theories, principles and evidence.						
	D	The student should have a partial but limited command of the knowledge, competencies and skills necessary for attaining number of the course learning outcomes, and a limited grasp of the subject. Show evidence of some analytical competence are critical thinking and at least marginally effective organizational and presentational skills. Have limited ability to use data are results to draw appropriate conclusions and use and reference a variety of sources mainly in summary rather than through analysis and comparison.				tical competence and ility to use data and		
	Fail	The student shows little o outcomes, lacks an overall little ability to a apply knowledge.	or no evidence of knowledge and I grasp of the subject area and sh ledge to solve problems and has p ation of theories, principles and evic	ows an absence of and oor and ineffective pres	alytical and critical thin	king abilities. Shows		
Communication-	N							

intensive Course					
Course Type	Lecture-based course				
Course Teaching	Activities	Details		No. of Hours	
& Learning Activities	Lectures				
	Tutorials	student seminars and exercises	student seminars and exercises		
	Reading / Self study	essay, presentation plus additiona	l reading	100	
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignments		10	CLO 1,2,3,4,5	
	Essay	Including essays and seminars	40	CLO 1,2,3,4,5	
	Examination		50	CLO 1,2,3,4,5	
Required/recommended reading and online materials	Turcotte, D and Schubert, G. 0	al tectonics (Oxford: Blackwell Science, Seodynamics (Cambridge Univ Press, 2 Invection for geologists (Cambridge 201	2002, 2nd ed.)		

EASC4407	Regiona	al geology (6 credit	ts)	Academic Ye	ear 2021		
Offering Department	Earth Scie	ences		Quota	40		
Course Co-ordinator	Dr A A G	Webb, Earth Sciences	(aagwebb@hku.hk)				
Teachers Involved	,	(Dr A A G Webb,Earth Sciences) (Dr J R Ali,Earth Sciences)					
Course Objectives	This cour	. ,	geologies as well as the app	proaches that geologists use	to resolve regional		
Course Contents			ore how regional investigations	integrating field-based and ana	lytical research tools		
& Topics	can test r various cli of East A America,	can test models for the evolution of large-scale geological systems. Likely case studies include exploration of various climate-tectonic interactions across mountain belts (Andes, Himalaya), the complex intraplate deformation of East Asia, and the progressive development of metamorphic core complexes via low-angle normal faults (N. America, NE China). Students will advance their abilities to synthesize and communicate geological knowledge by creating new Wikipedia pages complete with original figures on regional geological topics of their interest.					
Course Learning	On succes	ssful completion of this	s course, students should be ab	le to:			
Outcomes		opreciate the influential egional tectonic phenor	I (and commonly conflicting) mo mena	odels that have been proposed t	to explain a range of		
	th	e evolution of tectonica	"tools" that are commonly used ally complicated regions		·		
			cientific literature review on a rritten communication in an eng				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in EASC3402; and (EASC3403 or EASC3404)						
Offer in 2021 - 2022	Y 1st	sem Offer in 2022 -	2023 : Y	Examination	No Exam		
Grade Descriptors (A+ to F)	A Thorough grasp of the subject; evidence of strong critical abilities and logical thinking; highly effective organizational and presentational skills; insightful use and critical analysis / evaluation of information drawn from a full range of high quality sources and to quote/reference aptly.						
	В	B Substantial grasp of the subject; evidence of critical abilities and logical thinking; effective organizational and presentational skills; critical use of relevant information from sources, showing ability to make meaningful comparisons between different secondary interpretations and to quote/reference aptly.					
	General but incomplete grasp of the subject; evidence of some critical abilities and logical thinking; moderately effective organizational and presentational skills; use of relevant information from sources, showing ability to make comparisons between different interpretations and to quote/reference aptly.						
	D Limited grasp of the subject, retention of some relevant information of the subject; evidence of limited critical abilities; limited or barely effective organizational and presentational skills; use and reference of several sources, but mainly through summary rather than analysis and comparison.						
	Fail  Little or no grasp of the knowledge and understanding of the subject; little or no evidence of critical abilities and logical / coherent thinking; incoherent organization and poor presentational skills; limited use of secondary sources and no critical comparison of them.						
Communication- intensive Course	Υ						
Course Type	Lecture w	rith laboratory compone	ent course				
Course Teaching	Activities	S	Details				
& Learning Activities	Lectures				28		
	Laborator	ry	guided literature surveys & v	vikipedia training	20		
	Reading /	/ Self study		<u> </u>	80		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Α .						
	Assignme	ents	assignments	70	CLO 1,2,3		

EASC4408	Special topics in earth sciences (6 credits)	Academic Year	2021
Offering Department	Earth Sciences	Quota	30
Course Co-ordinator	Dr M H Lee, Earth Sciences (mhlee@hku.hk)		
Teachers Involved			
Course Objectives	Topic: Planetary system and Biogeochemistry The overall aim of this special topic is to develop an advanced understanding universe, the origins of our planetary system, and geological processes in ex Students will explore the concept of abiotic chemical evolution and learn a targeted for life detection in modern space exploration missions. The course meteorites and their relationship to the origin of the Earth, solar system & un including impacts, differentiation, and volcanism on planetary objects.	treme extraterrestr bout various impo also provides oppo	ial environments ortant biomarkers ortunities to study
Course Contents	The course will cover the following aspects of planetary science. The following	topics will be cover	ed in lectures:

& Topics	2. Star for 3. Meteor 4. Impact 5. Evoluti 6. Prebiod 7. Biosyn 8. Biomar 9. Symme 10. Mass 11. Plane 12. Life d	1. The interstellar medium 2. Star formation and the accretion of planets 3. Meteorites and comets 4. Impacts and craters 5. Evolution of other terrestrial planets 6. Prebiotic chemistry and the origins of life 7. Biosynthetic isotopic fractionations 8. Biomarker and molecular signatures 9. Symmetry-breaking mechanisms 10. Mass spectrometry for organic geochemists 11. Planetary mission concepts 12. Life detection on habitable planet and moons				
Course Learning Outcomes	CLO 1 id CLO 2 ui CLO 3 re th of CLO 4 e sp CLO 5 us	On successful completion of this course, students should be able to:  CLO 1 identify various planetary materials in the Solar System and understand how they formed and evolve  CLO 2 understand how planetary events shaped the history of the Earth and the structure of our solar system  CLO 3 recognise and differentiate between the organic signatures of biotic and abiotic materials, and appreciate the use of particular chemical structures as molecular fossils to interpret past life based on understandings of extant life  CLO 4 evaluate contemporary theories on the origin of life and the formation of complex organic molecules in space and their delivery to planetary surfaces  CLO 5 use modern analytical techniques to reconstruct organic constituents in samples and interpret data generated from the latest planetary missions				
			and curiosity in the field of planet	ary science		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in a	ny EASC3XXX or EA	ASC4XXX COURSE			
Offer in 2021 - 2022	N Off	fer in 2022 - 2023 : N		Examination		
Grade Descriptors (A+ to F)	A	learning outcomes, and logical thinking, with exfamiliar and unfamiliar insightful conclusions.	mastery at an advanced level of exter d evidence of productive reading supplex vidence of original thought, and ability to situations. Demonstrate critical use of da Apply highly effective organizational and	menting lectures. Show strong analytical synthesize and apply knowledge to atta, literature reviews, and other source presentational skills.	al and critical abilities and a wide range of complex, s to draw appropriate and	
	С	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to synthesize and apply knowledge to familiar and some unfamiliar situations, but falling short on excellence in some of these aspects. Demonstrate correct use of data, literature reviews, and other sources to draw appropriate conclusions. Apply effective organizational and presentational skills.  Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning				
	D	outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to synthesize and apply knowledge to most familiar situations. Demonstrate mostly correct but some erroneous use of data, literature reviews, and other sources to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.  Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to synthesize and apply knowledge to solve problems. Demonstrate limited ability to use of data, literature reviews, and other				
	Fail	sources to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to synthesize and apply knowledge to solve problems. Demonstrate misuse of data, literature reviews, and other sources and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.				
Communication-	N					
intensive Course Course Type	Lecture	vith laboratory compo	onent course			
Course Teaching	Activitie	•	Details		No. of Hours	
& Learning Activities	Lectures		12 sessions x 2 hours			
-	Laborato		6 sessions x 2 hours		24 12	
	Group wo	ork	preparation + presentation		15	
	Tutorials		6 sessions x 2 hours	6 sessions x 2 hours		
		/ Self study			60	
	Assessm				15	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignm			30	CLO 1,2,3,4,5,6	
			group presentation	20	01040045	
		Presentation group presentation 20 CLO 1,2,3,4,6 Project report individual essay 50 CLO 1,2,3,4,6 Meteorites and their parent planets, McSween, 1999 . ISBN: 9780521587518 Introduction to Astrobiology. Gilmour and Sephton, 2004. ISBN 9780521837361 Introduction to Organic Geochemistry. Killops and Killops, 2013. ISBN: 9780632065042 How to build a habitable planet, Langmuir and Broeker, 2012. ISBN: 9780691140063 In Quest of the Universe, Koupelis, 2012. ISBN: 9781449647940  Enrichment:				

EASC4911	Earth system: contemporary issues (6 credits)	Academic Year	2021			
Offering Department	Earth Sciences	Quota				
Course Co-ordinator	Dr S C Chang, Earth Sciences (suchin@hku.hk)					
Teachers Involved	(Dr S C Chang, Earth Sciences)					
Course Objectives	This is a capstone course that provides students with an opportunity to synthesize and correlate the knowledge gained in previous courses in Earth System Science for them to gain a more in-depth appreciation and awareness of the Earth System, the interplay between its component parts, and some of the global issues. Students will also get some basic concepts on how to do strategic analysis on global trends of natural resources.					
Course Contents	Introductions to Contemporary Environmental Issues					

& Topics	Overpopu Global Tre Global Tre	Overpopulation & Natural Resources Overpopulation & Waste Management Global Trend in Green Technology Global Trend in Space Exploration					
	-	Contemporary Environmental Issues & Solutions					
Course Learning		•	course, students should be able to				
Outcomes			th the nature of the issues confro				
			terrelationships through feedbacl				
			available from a variety of so	urces and apply the data	o problem solving,		
		particularly in areas of contemporary concern  CLO 4 understand how past and present activities on the planet will affect its future					
Pre-requisites		•	anced level (level 3 or 4) disciple		in the Farth System		
(and Co-requisites			vo of the following courses: EAS				
and Impermissible			System Science Major students				
combinations)			ed to take this capstone course i				
Offer in 2021 - 2022	Y 2nd	l sem Offer in 2022 - 2	023 : Y	Examination	No Exam		
Grade Descriptors (A+ to F)	A	learning outcomes. Show st to synthesize and apply kno data, literature reviews, and and presentational skills.	tery at an advanced level of extensive k trong analytical and critical abilities and I sowledge to a wide range of complex, fa I other sources to draw appropriate and	ogical thinking, with evidence of or miliar and unfamiliar situations. De insightful conclusions. Apply highl	iginal thought, and ability emonstrate critical use of y effective organizational		
	В	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to synthesize and apply knowledge to familiar and some unfamiliar situations. Demonstrate correct use of data, literature reviews, and other sources to draw appropriate conclusions. Apply effective organizational and presentational skills.					
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to synthesize and apply knowledge to most familiar situations. Demonstrate mostly correct but some erroneous use of data, literature reviews, and other sources to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.						
	D						
	Fail						
Communication- intensive Course	N						
Course Type	Project-ba	sed course					
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities		vith supervisor			36		
		Self study			100		
	Assessm				24		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Oral pres	entation		60	CLO 1,2,3,4		
	Research	·		40	CLO 1,2,3,4		
Required/recommended reading and online materials	Diego, Ča The earth Hall, c200	lifornia: Academic Press system. Lee R. Kump, v 4.	James F. Kasting, Robert G. Cra				
	Living in the environment / G. Tyler Miller, Jr., Scott E. Spoolman. Belmont, CA : Brooks/Cole, c2012.						

EASC4955	Integrated field studies (6 credits)	Academic Year	2021
Offering Department	Earth Sciences	Quota	35
Course Co-ordinator	Dr J A King, Earth Sciences (jessking@hku.hk)		
Teachers Involved	(Dr J A King,Earth Sciences)		
Course Objectives	The aims of a geological field camp activities are to provide:  1) essential training and experience in geological mapping techniques.  2) the opportunity to gain confidence in independently applying these skil complexity.  3) opportunities to study at first-hand areas of particular geological interest The course requires integration of geological knowledge from multiple geological knowledge.	and importance of an c	
Course Contents & Topics	Students will visit areas of geological interest and will undertake indepersolving exercises in each area. The curriculum comprised 3 x 6-day long interest), where each week long project is typically scheduled as follows:  Day 1-2: Instructor-lead learning.  Day 3-5: Technique application/independent field mapping and site visit.  Day 6: Field examination.  Day 7: Write up/Rest.  For each project area students is required to produce:  A detailed geologic map of the area. (15% x 3 = 45%)  A cross-section of the area. (5% x 3 = 15%)	g projects (based on an	i ∼2x5km area o
	To accompany these maps, the students must prepare ONE report (15stectonic evolution of region, synthesized from the all three projects and si depositional environments, magmatic events and structural data. To assess field skills:  3 one-day field exam, where students, working INDEPENDENTLY of the state	te visits, complete with	interpretations o

		map and cross sectio field exam)	ns in a small (~1km x ~1km) area that	they have not previously	visited. (5% for each	
		be awarded for profes				
Course Learning			is course, students should be able to:			
Outcomes			by and petrogenesis of rocks and mine	rals.		
		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	ng from lithologies and stratigraphy.			
			nalyse structural data.			
			aps and cross-sections.	- 1	:	
	E	evolution.	logical information pertaining to an area		ic model of tectonic	
	CLO 6 Identify and basically evaluate areas of potential natural hazard/economic potential.  Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in the Geology I					
Pre-requisites and Co-requisites and Impermissible	Geology	Major (Intensive).	dvanced level (level 3 or 4) disciplinary S in, or student must be already enrolle			
combinations)			ology Major/ Geology Major (Intensive)		404 and EA3C3409.	
combinations			lowed to take this capstone course is the			
Offer in 2021 - 2022		nd sem Offer in 2022	•	Examination	No Exam	
Grade Descriptors (A+ to F)	Α	original thought. Apply	grasp of the subject. Show strong analytical an highly fieldwork skills and techniques. Critical us ly effective organizational and presentational skill	e of data and results to draw a		
	В	Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Apply effective fieldwork skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.				
	C Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Apply moderately effective fieldwork skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.					
	D	D Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Apply partially effective fieldwork skills and techniques. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.				
	Fail  Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Apply minimally effective or ineffective fieldwork skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.					
Communication- intensive Course	N					
Course Type	Field car	nps				
Course Teaching	Activitie	es	Details		No. of Hours	
& Learning Activities	Lectures	3	18 sessions x 1 hour	18 sessions x 1 hour		
	Field wo	ork	18 field days x 5 hours/day		90	
	Reading	j / Self study				
Assessment Methods and Weighting	Method	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignm	nents	Area Maps & Cross-sections (3 x 20% each	60	CLO 1,2,3,4	
	Report		1 Final Report (15%) + 10% for professional conduct	25	CLO 1,2,3,4,5,6	
	Test		3 Field Test (5% each)	15	CLO 1,2,3,4	
Additional Course Information	courses	underway during the	ne right to withdraw any students with semester (semester 2) prior to leavi m examination result or laboratory perf	ing for field camp (May		

EASC4966	Earth scie	nces internsl	hip (6 cr	edits)			Academic Year	2021
Offering Department	Earth Science	es					Quota	
Course Co-ordinator	Dr M C Cheu	ing, Earth Scier	nces (hmc	c @hku.hk)	)			
Teachers Involved	(Dr M C Che	ung,Earth Scier	nces)					
Course Objectives	study. The w	course aims to offer students the opportunities to gain work experience in the industry related to their major of The workplace learning experience would be of great benefits to the students to apply their knowledge d in the study to the real work environments. Students have to take on at least 160 hours of internship work within the University or outside the University arranged by the School/Departments.						
Course Contents & Topics	various tasks (2) Outside t will be super Department/S	<ol> <li>Within the university: The student will be supervised by a staff member (Supervisor), working on a project or various tasks as instructed by the Supervisor.</li> <li>Outside the university: The student will work in an external agency related to the major of study. The student will be supervised under a staff member of the external agency (the External Supervisor) and a staff member of the Department/School of the student (the Internal Supervisor). The work to be performed by the student will normally be instructed by the External Supervisor, with prior agreement of the Internal Supervisor.</li> </ol>						
Course Learning		ul completion of	•	•				
Outcomes	CLO 1 gain at least 4 weeks of work experience in a geosciences-related firm or the Government							
	CLO 2 acquire an understanding and appreciation of the real work environment							
	CLO 3 have some experience with applying learned knowledge to solving real world problems							
Pre-requisites (and Co-requisites and Impermissible combinations)	System Scier This course i Earth System	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in the Geology or Earth System Science Majors.  This course is not a capstone course and students cannot use this course to fulfill the capstone requirement of the Earth System Science and Geology Majors.  The earliest that a student is allowed to take this course is their year 3 study.						
Offer in 2021 - 2022		m 2nd sem			022 - 2023		Examination	No Exam
Grade Descriptors Distinction/Pass/Fail	Distincti on	performance in ha	andling and ation and co out in the Co	carrying out ommunication urse Descript	t the work req with supervisition regarding	to solve problems in uired in the job or ass or(s), colleagues, and working hours, with exce	igned by supervisor(s) clients in the job. Su	. Establishes highly ccessfully fulfills the
	Pass					ce. Successfully handles aboration and communi		

	oral report, a awarded a gra	clients in the job. Successfully fulfills the requirements set out in the Course Description regarding working hours, written and oral report, and evaluation by supervisor(s), etc. Students demonstrating excellent performance in the above would be awarded a grade of "Distinction".			
	assigned by s	or no ability to solve problems in the workplace. Fails supervisor(s). Fails to establish effective collaboration or job. Fails to satisfy the requirements set out in the Cours luation by supervisor(s), etc.	communication with supervisor	r(s), other colleagues, or	
Communication- intensive Course	N				
Course Type	Internship				
Course Teaching	Activities	Details	Details		
& Learning Activities	Internship work	•	it is expected that students are to work at least 160 hours (or the equivalent of 4 weeks full-time)		
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Written report	written report, employer's feedback and oral presentation	100	CLO 1,2,3	
Additional Course Information	contact the Department t Enrolment of this course	This course will be assessed on "Pass/Fail" basis. Students who are interested to enrol in this course should contact the Department to obtain the approval.  Enrolment of this course is not conducted via the online course selection system and should be made through the relevant Department/School office after approval has been obtained from the course coordinator.			

EASC4999	Earth s	sciences project (12	credits)	Academic Yea	ar 2021		
Offering Department	Earth So			Quota			
Course Co-ordinator	Prof Z H	l Liu, Earth Sciences (zh.	liu @hku.hk)				
Teachers Involved	(Various	s teachers in the Departm	nent,Earth Sciences)				
Course Objectives			edge, ability and interest in advance be engaged in an advanced resear		ences by providin		
Course Contents & Topics	The proj	The student undertakes a research project in the form of a senior thesis under the supervision of a staff member. The project could be based on a particular component of a staff member's research or one proposed and designed by the student. The student must involve in the project in a non-trivial manner, and play a major role in the project formulation, data collection and analysis, and presentation. The project should contain an element of originality.					
Course Learning	On succ	cessful completion of this	course, students should be able to:				
Outcomes		•	arch experience in earth sciences supervision of a supervisor	by doing an individual	research project		
		critical thinking	design research path, choose rese		, ,		
		•	ng independent earth/environmental				
Pre-requisites (and Co-requisites and Impermissible combinations)	System Cumulat This cou Earth Sy	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in the Geology or Eart System Science Majors; and Cumulative GPA of 2.7 or above.  This course is not a capstone course and students cannot use this course to fulfill the capstone requirement of th Earth System Science and Geology Majors.  The earliest that a student is allowed to take this course is their year 3 study.					
Offer in 2021 - 2022		ear long Offer in 2022	•	Examination	No Exam		
Grade Descriptors (A+ to F)	A Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and creative thinking, with evidence of original thought. Insightful use and critical analysis / evaluation of information drawn from a full range of high quality sources and to quote/reference aptly. Critical use of first-hand data and results to draw insightful conclusions and solve problems. Apply highly effective organizational and presentational skills. [Work of A+ should show considerable creative thinking and additional work beyond that is required in wider areas relevant to the topic.]						
	B Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and creative thinking. Critical use of relevant information from sources, showing ability to make meaningful comparisons between different secondary interpretations and to quote/reference aptly. Correct use of first-hand data of results to draw appropriate conclusions to draw insightful conclusions and solve problems. Apply effective organizational and presentational skills.						
	C Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and creative thinking. Use of relevant information from sources, showing ability to make comparisons between different interpretations and to quote/reference aptly. Mostly correct but some erroneous use of first-hand data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.						
	D Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Demonstrate use and reference of several sources, but mainly through summary rather than analysis and comparison. Limited ability to use first-hand data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.						
	Fail  Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Limited use of secondary sources and no critical comparison of them. Misuse of first-hand data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.						
		are minimum encoure or i	neffective.				
Communication-	N	are minimally encouve of h	neffective.		·		
ntensive Course		,	neffective.				
ntensive Course Course Type	Project-l	based course			No. of U		
ntensive Course Course Type Course Teaching	Project-l	based course	Details The student is expected to spend	d at least 240 hours on	No. of Hours		
Communication- intensive Course Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	Project-l	based course ies g / Self study	Details	d at least 240 hours on  Weighting in final course grade (%)			

ENVS1401	Introduction to environmental science (6 credits)	Academic Year	2021
Offering Department	Earth Sciences	Quota	
Course Co-ordinator	Dr C Not, Earth Sciences (cnot@hku.hk)		
Teachers Involved	(Dr C Dingle,School of Biological Sciences)		
	(Dr C Not,Earth Sciences)		

Course Objectives	To provide students with an inter-disciplinary introduction to Environmental Science highlighting the interconnections between biological, geological, and chemical processes.  To convey the basic science behind environmental interactions and place it within the context of human impacts and dependence on the natural world.  To better understand how humans interact, manage, and sustain the environment within the context of our economies, governments and individual choices.						
Course Contents & Topics	The teaching and learning will be organized around key issues, and loosely divided into three sections.  Part I: The basics: application of science to solve environmental problems; key ecological, chemical, and earth science concepts essential to environmental science, understanding the underlying causes of environmental problems (human population growth and economics).  Part II: Using and conserving our resources: how we use and misuse key natural resources; the difficulty in assuring a sustainable supply of energy; waste management and air pollution issues.  Part III: Global issues: How do our actions change the face of the planet? Urban ecology and understanding our contribution to global climate change.						
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 Ex	plain and describe	connections between the physic	cal and biological components	of the environment.		
			of human activities on the environ				
		plain the concept on achieve sustainabiles	of environmental sustainability a ity.	nd give examples of how soci	ety can adapt behavior		
			are overusing our resources and	d compare different approache	es to resolving specific		
		oblems presented in	n class.				
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL						
Offer in 2021 - 2022	Y 1st	sem Offer in 2022	2 - 2023 : Y	Examinati	on No Exam		
Grade Descriptors (A+ to F)	A Demonstrate thorough understanding of the subject and an ability to apply knowledge gained in class to a wide range of complex, familiar and unfamiliar situations. Show evidence of logical thinking and some original thought. Coursework completed on time and to a high academic standard.						
	В	Demonstrate a good understanding of the subject and an ability to apply knowledge to familiar and some unfamiliar situations. Show evidence of logical thinking abilities. Coursework completed on time and to a good academic standard.					
	С	Demonstrate general but incomplete understanding of the subject and an ability to apply knowledge to most familiar situations. Show some evidence of logical thinking, but with some inconsistencies. Some coursework incomplete, but submitted on time and in an adequate academic standard.					
	Demonstrate partial but limited grasp of the subject and a limited ability to apply knowledge to some familiar situations. Show only able to apply knowledge to simple examples. Show little evidence of logical thinking. Coursework submitted late to a poor standard.						
	Fail  Demonstrate little or no understanding of the subject and very little or no ability to apply knowledge to familiar situations. Show no evidence of logical or coherent thinking. Coursework missing or substandard.						
Communication- intensive Course	N	no evidence of logical	or conerent thinking. Coursework missir	ng or substandard.			
Course Type	Lecture-ba	ased course					
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures	,	Dotailo		24		
· ·	Tutorials		group discussion/case stu	dies	24		
	Field worl	ζ	two half day field trips		10		
	Reading /	Self study			100		
Assessment Methods and Weighting	Methods	·	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents	Group projects an independent work	d 70	CLO 1,2,3,4		
	Test		3 quizzes	30	CLO 1,2,3,4		
Required/recommended reading and online materials			ent (Thomson, 2007, 15th ed.) nvironmental Science (Wiley, 20	008)			

ENVS2020	Biogeochemistry of th	ne environment (6 credits) Acade	emic Year 2021
Offering Department	Earth Sciences	Quota	
Course Co-ordinator	, ()	'	
Teachers Involved			
Course Objectives			
Course Contents & Topics			
Course Learning Outcomes	On successful completion of	of this course, students should be able to:	
Pre-requisites (and Co-requisites and Impermissible combinations)			
Off ! 0004 0000			44
Offer in 2021 - 2022	N Offer in 2022 - 2023	: N Exami	ination
	N Offer in 2022 - 2023	: N Exami	ination
		: N Exami	ination
Grade Descriptors	Α	: N Exami	ination
Grade Descriptors	A B	: N Exami	nation
Offer in 2021 - 2022 Grade Descriptors (A+ to F)	A B C	: N Exami	ination
Grade Descriptors	A B C D	: N Exami	ination
Grade Descriptors (A+ to F)  Communication-	A B C D Fail	: N Exami	ination

ENVS3007	Natural	hazards and mit	igation (6 credits)	Academic Ye	ar  2021			
Offering Department	Earth Scie	ences		Quota				
Course Co-ordinator	Dr N S K	HAN, Earth Sciences	s (nskhan@hku.hk)					
Teachers Involved		Dr N S KHAN,Earth Sciences)						
Course Objectives	landslide natural, a protection	This course introduces students the mechanisms of major natural hazards including earthquake, storm and flood, landslide and tsunami. The teaching emphasizes the fundamental concepts: natural hazards are not entirely natural, and understanding the frequency and processes of these hazards is essential in developing prevention, protection and mitigation measures. With case studies, the course will help students explore the political, economical and engineering means of dealing with natural hazards.						
Course Contents & Topics	Geologica Climatic h Preparedi Risk asse	Key characteristics of natural hazards Geological hazards and mitigation measures Climatic hazards and mitigation measures Preparedness and responses to large natural disasters Risk assessment and disaster management Financial (insurance) instruments for economic recovery						
Course Learning	On succe	ssful completion of t	his course, students should be a	able to:				
Outcomes	CLO 1 de	emonstrate knowled		the key characteristics of major r	natural hazards, the			
Pre-requisites (and Co-requisites and Impermissible combinations)		ASC2404 or ENVS2						
Offer in 2021 - 2022	Y 1st	sem Offer in 2022	2 - 2023 : N	Examination	Dec			
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery of the course material. Show strong ability for analytical, critical and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Demonstrate highly effective organizational and presentational skills.							
	B Demonstrate substantial command of the course material and an ability to apply knowledge to familiar and some unfamiliar situations. Show evidence of analytical, critical thought to some complex issues. Apply effective organizational and presentational skills.							
	Demonstrate general but incomplete command of the course material and an ability to apply knowledge to most familiar situations. Show evidence of some critical and logical thinking abilities. Apply moderately effective organizational and presentational skills.							
	Demonstrate partial but limited command of the course material and a limited ability to apply knowledge to solve problems. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Apply limited or barely effective organizational and presentational skills.							
	Fail  Demonstrate little or no evidence of command of course material with very little or no ability to apply knowledge to solve problems. Lack of critical thinking abilities and incoherent thinking. Organization and presentational skills are minimally effective or ineffective.							
Communication- intensive Course	N							
Course Type	Lecture-b	ased course						
Course Teaching	Activities	3	Details		No. of Hours			
& Learning Activities	Lectures							
	Tutorials		,	Project tutorials				
	Discussion		Group discussion		16 100			
	Reading	/ Self study						
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Examinat	ion		40	CLO 1			
	Project re	ports		40	CLO 1			
	Test	•	Four in-class quizzes	20	CLO 1			
Required/recommended		Environmental Haza	ards: Assessing Risk and Reduc					
eading and			Cambridge University Press, 200					
online materials			ural Hazards and Diasters (Ama					
Additional Course	-	course code: ENVS	,	,				
nformation								

ENVS3042	Pollution (6 credits)	ademic Year	2021
Offering Department	Earth Sciences Quo	ota	50
Course Co-ordinator	Dr X Luo, Earth Sciences (xinluo@hku.hk)		
Teachers Involved	(Dr X Luo,Earth Sciences)		
Course Objectives	This multi-disciplinary course will introduce students to the most important physicontaminants that pollute the environment. The course will provide the basics of cont pollution monitoring and environmental risk assessment. The course will also mechanisms and pathways for water, atmosphere, soil and land pollution. The studer on the socio-economic aspect of pollution and remediation.	ntaminant trans explore in	sport, toxicology details different
Course Contents & Topics	Overview of Global Pollution Physical-Chemical Characteristic of Soils, water and the atmosphere Physical, Chemical and Biological Contaminants Contaminants Transport Processes Environmental Toxicology Water Pollution Atmospheric Pollution Soil, Land and subsurface Pollution Urban and Household pollution Monitoring and Risk Assessment Strategy		

	Introduction to remediation, restoration, treatment and reuse Global system and the human dimensions to environmental pollution						
Course Learning			is course, students should b				
Outcomes		identify the most impo		- unio te:			
			•	sport of pollutants in the environme	nt		
			nental toxicity of different typ				
			ortant cases of environment				
			d data and communicate the				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	Pass in EASC2401 or CHEM2241 or BIOL2103 or ENVS2001					
Offer in 2021 - 2022	Y 1st	Y 1st sem Offer in 2022 - 2023 : Y Examination Dec					
Grade Descriptors (A+ to F)	Α	original thought. Critical organizational and prese	al use of data and results to drentational skills.	analytical and critical abilities and logical t aw appropriate and insightful conclusions	s. Apply highly effective		
	В			analytical and critical abilities and logical thi	nking. Correct use of data		
	С			organizational and presentational skills. Evidence of some analytical and critical abi	ilities and logical thinking		
	C Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.						
	D Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.						
	Fail  Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.						
Communication- intensive Course	N						
Course Type	Lecture-b	ased course					
Course Teaching	Activitie	S	Details	No. of Hours			
& Learning Activities	Lectures			24			
	Tutorials				24		
	Reading	/ Self study			92		
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents		25	CLO 1,2,3,4,5		
	Examina	tion		50	CLO 1,2,3,4,5		
	Presenta	tion		10	CLO 4,5		
	Project reports			15	CLO 1,2,3,4,5		
Required/recommended reading and online materials		Environmental and Pollution Science, Third Edition, 2019 by Mark L. Brusseau (Author), Ian L. Pepper (Author), Charles P. Gerba (Author)					
Additional Course	The tutori	The tutorials include theoretical and practical assignments.					

ENVS3313	Environ	mental oceanography (6 credits)	Academic Year	2021				
Offering Department	Earth Scient	ences	Quota					
Course Co-ordinator	Dr C Not,	Earth Sciences (cnot@hku.hk)						
Teachers Involved	(Dr C Not	E,Earth Sciences)						
Course Objectives	importance To conve	To provide students with a thorough introduction to coastal and ocean processes with key questions to highlight the importance of the (paleo)oceanographic processes to environmental and ecological conditions.  To convey the basic science behind ocean-atmosphere and ocean-biosphere interactions and place it within the context of human's connectedness and impact to the physical world.						
Course Contents & Topics	their impa the water water, we (paleo)cli	To provide a solid foundation of knowledge about the physical processes dictating the oceans movements and their impacts on the environment and ecosystems. The oceans take up 71% of earth's surface and contain 98% of the water. By looking at the structure of the atmosphere, thermodynamic principals and properties governing sea water, we will evaluate the critical roles the ocean plays in the environmental system including its influence or (paleo)climate, coastal resources, and nutrient cycling. Case studies specifically examining changes in sea lever rise, El Nino, and (paleo)climate will be used to connect oceanographic principles to environmental problems.						
Course Learning		ssful completion of this course, students should be able to:		·				
Outcomes	CLO 1 describe the major surface and deep currents of the ocean							
	CLO 2 identify and describe important processes in the ocean controlling large scale circulation and nutrient transport  CLO 3 describe sources and distribution of critical chemicals and sea water properties in the ocean  CLO 4 illustrate connections between physical ocean processes, climate systems and biological activity							
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in B	IOL2306 or EASC2404 or ENVS2001 or ENVS2002	·	·				
Offer in 2021 - 2022	Y 2nd	d sem Offer in 2022 - 2023 : Y	Examination	No Exam				
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining the entire course learning outcomes. Show ability to think logically and critically, with evidence of original thought. Critically evaluate data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills.							
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of logical and critical thought. Apply effective organizational and presentational skills. Correctly use of data and results to draw appropriate conclusions.							
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some logical and critical thinking. Apply moderately effective organizational and presentational skills. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.							
	D	Demonstrate partial but limited command of knowledge and skills required for attainin Show evidence of some coherent and logical thinking, but with limited critical at organizational and presentational skills. Limited ability to use data and results to draw a	g some of the cours pilities. Apply limited	or barely effective				

	Fail	of critical, logical ar	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcome of critical, logical and/or coherent thinking. Organization and presentational skills are minimally effective or ineffective. Mi data and results and/or unable to draw appropriate conclusions.				
Communication- intensive Course	N	<b>J</b>					
Course Type	Lecture w	ith laboratory com	nponent course				
Course Teaching	Activities	S	Details		No. of Hours		
& Learning Activities	Lectures		12 sessions x 2 hours		24		
	Laboratory		10 labs x 2 hours	10 labs x 2 hours			
	Project work		group project	group project			
	Reading / Self study						
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents	lab exercises and project	60	CLO 1,2,3,4		
	Test		2 Tests	40	CLO 1,2,3		
Required/recommended reading and online materials		Sarrison, 2004. Oceanography: An Invitation to Marine Science. 5th edition. Brooks Cole.  Cronin, 2009. Paleoclimates: Understanding Climate Change Past and Present. Columbia University Press.					
Additional Course Information	Course w	ill be offered ever	y year starting from 2014-2015 and co	ordinated by DES.			

ENVS3999	Directe	ed studies in enviro	nmental science (6 credits)	Academic Ye	ar 2021				
Offering Department	Earth Sc	ciences		Quota					
Course Co-ordinator	Dr C Din	gle, Biological Sciences	(cdingle@hku.hk)						
Teachers Involved		(Various teachers (ERS),Earth Sciences) (Various teachers (SBS),Biological Sciences)							
Course Objectives	knowledg knowledg	This is a Capstone Course designed to provide an opportunity for Environmental Science students to integrate the knowledge obtained through their Environmental Science courses. Through this course, students will enhance thei knowledge on a particular topic in environmental science and critical thinking skills through self-directed learning Both the written and oral report emphasize communication skills.							
Course Contents & Topics	The directed study is typically a review of the literature on a specific topic related to environmental sciences undertaken under the supervision of a staff member. However, the exact format of the project is flexible and alternative formats can be considered with the approval of the supervisor and the Course Coordinator. The topic is flexible, but must be related to the field of environmental science. Students should seek approval from a prospective supervisor prior to selecting this course. After admission to the course is approved by the course coordinator, students will work under the guidance of their supervisor to complete the study and the research report.								
Course Learning	On succe	essful completion of this	s course, students should be able to	o:					
Outcomes	CLO 1	complete a research to	ask independently in one or more t	opical areas of the major					
	CLO 2	show competence in f	ormulating their own scientific argu	ıment					
Pre-requisites (and Co-requisites and Impermissible combinations)	Science This cap	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in Environmenta Science Major.  This capstone course is for Environmental Science Major students only.  The earliest that a student is allowed to take this capstone course is their year 3 study.							
Offer in 2021 - 2022	Y 1s	st sem 2nd sem Offe	er in 2022 - 2023 : Y	Examination	No Exam				
Grade Descriptors (A+ to F)	A Demonstrates excellent understanding of the topic, excellent development of argument, logical analysis and insight into the topic, with evidence of original thought. Insightful use and critical analysis of information drawn from a full range of high quality sources to draw appropriate and insightful conclusions. Presented in high academic standard. Work of A+ should show considerable additional work beyond that is required in wider areas relevant to the topic.								
	B Most aspects of the chosen topic were addressed and researched adequately. Demonstrates understanding of most key concepts, evidence of elementary analysis and development of argument. Critical use of relevant information from sources, showing ability to make meaningful comparisons between different secondary interpretations. Presented in adequate standard.								
	С	Demonstrate general but incomplete grasp of the chosen topic. Most aspects of the chosen topic were addressed and researched at a very basic level. Mostly correct but some erroneous use of relevant information from sources, demonstrates mainly description, and shows basic understanding, but lacking depth.							
	D Demonstrate partial but limited grasp of the chosen topic, with retention of some relevant information. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Demonstrate use and reference of several sources, but mainly through summary rather than analysis and comparison. Limited to draw appropriate conclusions from the sources.								
	Fail  Show little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Limited use of secondary sources and no critical comparison of them. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.								
Communication- intensive Course	N	·							
Course Type	Project-b	pased course							
Course Teaching	Activitie	es	Details	No. of Hours					
& Learning Activities	Reading	g / Self study	research work & report		120				
Assessment Methods and Weighting	Method	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping				
	Oral presentation			00					
	Oral pre	Sentation		20	CLO 1,2				

ENVS4955	Environmental science in practice (6 credits)	Academic Year	2021	
Offering Department	Earth Sciences	Quota	8	
Course Co-ordinator	Dr M Yasuhara, Biological Sciences (yasuhara@hku.hk)			
Teachers Involved	(Dr M Yasuhara, Biological Sciences)			
Course Objectives	To provide students experiential learning experience in the field of environmental science. The course is primarily based on an array of experiential studies covering essential areas of environmental science during a residential fieldtrip.			
Course Contents	Students to attend a residential field trip outside Hong Kong to learn about envi	ronmental science	e in practice. The	

& Topics	residential field trip will be, for example, to Japan and may include marine environmental survey, sediment core sampling, practical learning of ecological, paleoecology and environmental problems, environmental geology/paleontology excursion, and other activities. Students are required to write an independent report on an environmental science issue.						
Course Learning	On succes	sful completion of this c	ourse, students should be able to:				
Outcomes	CLO 1	recognize ways of env	vironmental science in practice				
	CLO 2						
	CLO 3	present and communic	cate their field observations and fir	ndings			
Pre-requisites (and Co-requisites and Impermissible combinations)		Pass in at least 12 credits of advanced level (level 3 or 4) disciplinary core/elective courses in Environmental Science Major.					
Offer in 2021 - 2022	N Offe	er in 2022 - 2023 : N		Examination			
Grade Descriptors (A+ to F)	В	original thought. Apply highl and insightful conclusions. A Demonstrate substantial gra	p of the subject. Show strong analytical a y effective lab / fieldwork skills and techni pply highly effective organizational and pre sp of the subject. Evidence of analytical ar	ques. Critical use of data and res sentational skills. Id critical abilities and logical think	sults to draw appropriate king. Apply effective lab /		
		presentational skills.	es. Correct use of data of results to draw a	* * * * * * * * * * * * * * * * * * * *	•		
	С	Apply moderately effective I draw appropriate conclusion	complete grasp of the subject. Evidence of ab / fieldwork skills and techniques. Mostl s. Apply moderately effective organizations	y correct but some erroneous us il and presentational skills.	se of data and results to		
	D						
	Fail  Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Apply minimally effective or ineffective lab / fieldwork skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.						
Communication- intensive Course	N						
Course Type	Laboratory	and workshop course					
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Field work		Field work and other learning students will take part in at least 66 hours of field trips and other learning 66 hours		66		
	Reading / Self study				100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Laborator	, i	field reports	30	CLO 1,2,3		
	Presentat	ion	group presentations	30	CLO 1,2,3		
	Project re	ports	individual report	40	CLO 1,2,3		
Course Website	http://www	biosch.hku.hk/ecology/	lsc/				
Additional Course Information	quota set. mail to Dr. this is 2nd not be ac interested future aca academic The select other factor	So, interested student in Moriaki Yasuhara (yasu semester course, but w cepted. The proposal s in joining this course; (demic/career path; (3) b details; (2) ID photograption will be made based ors. Only accepted stude ential field trip will be org	capacity of this course is limited nust apply for the course with a shuhara@hku.hk) and Ms. Maria Lo e need applications well in advance should include the following: (1) to prief description of academic interests; (4) GPA; (5) Pre-requisite course on the quality of proposal and the ents through this application processanized in the reading week. Stude ntact us for details and financial differences with a specific proposal and the ents through this application processanized in the reading week. Studentact us for details and financial differences where the course were supplied to the course of the	ort proposal (2 pages max (gylo@hku.hk) not later that e, on or before this date). I he specific reason(s)/motive from this course, especiests. The CV should includes taken and grades receive justification of academic lies will be able to register the other than the course of the c	imum) and CV via e- an 1st August (Note: _ate applications will vation why you are cially regarding your le: (1) Personal and ved. merit, in considering is course.		
		1 (1	ntact us for details and financial dif to a minimum enrollment number	,	f teachers		

ENVS4966	Environme	ental science i	nternshi	p (6 credits)		Academic Year	2021
Offering Department	Earth Science	ces				Quota	
Course Co-ordinator	Dr C Dingle,	, Biological Scienc	es (cdingle	e @hku.hk)			
Teachers Involved	(Dr C Dingle	Biological Scienc	ces)				
Course Objectives				, ,	ork experience related flage gained in their studie	•	•
Course Contents & Topics	the external work is carrie	In the case of the work being carried out in an external agency, students will be supervised by a staff member of the external agency (the External Supervisor) and a staff member of the University (the Internal Supervisor). If the work is carried out within HKU, there is no need for an additional internal supervisor. The work to be performed by students will normally be instructed by the External Supervisor, with prior agreement of the Internal Supervisor.					
Course Learning Outcomes	CLO 1 gain	On successful completion of this course, students should be able to: CLO 1 gain at least 4 weeks of work experience environmental-related firm or the Government CLO 2 acquire an understanding and appreciation of the real work environment					
Pre-requisites (and Co-requisites and Impermissible combinations)	Science Major This capston	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in Environmental Science Major.  This capstone course is for Environmental Science Major students only.  The earliest that a student is allowed to take this capstone course is their year 3 study.					
Offer in 2021 - 2022	Y 1st se	em 2nd sem Su	ummer C	Offer in 2022 - 2	023 : Y	Examination	No Exam
Grade Descriptors Distinction/Pass/Fail	Distincti on	performance in han effective collaboration	ndling and ca on and comi t in the Cours	arrying out the wo munication with su se Description rega	edge to solve problems in k required in the job or assi pervisor(s), colleagues, and rding working hours, with exce	gned by supervisor(s) clients in the job. Suc	. Establishes highly ccessfully fulfills the

	Pass Fail	or assigned by sulclients in the job. So oral report, and evawarded a grade of Very limited or no assigned by supervicients in the job. Fa	pervisor(s). Establishes effective of uccessfully fulfills the requirements aluation by supervisor(s), etc. St "Distinction".  ability to solve problems in the wisor(s). Fails to establish effective	cplace. Successfully handles and carries out the collaboration and communication with supervi- s set out in the Course Description regarding we tudents demonstrating excellent performance orkplace. Fails to handle or carry out the wor collaboration or communication with supervisor out in the Course Description regarding workin	isor(s), colleagues, and orking hours, written and in the above would be to require in the job or r(s), other colleagues, or		
Communication- intensive Course	N	report, or evaluation	1 by Supervisor(6), Sto.				
Course Type	Internship						
Course Teaching & Learning Activities	Activities		Details		No. of Hours		
	Internship	work	it is expected that students are to work at least 160 hours (or the equivalent of 4 weeks full-time)		160		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Oral prese	ntation		10	CLO 3		
	Supervisor	's feedback		20	CLO 1,2		
	Written rep	ort		70	CLO 1,2,3		
Course Website	http://mood	le.hku.hk/					
Additional Course Information	of 4 weeks Satisfactory be recorde interested to Enrolment	http://moodle.hku.hk/ No formal lecture is to be given, but it is expected that students are to work for at least 160 hours (or the equivalent of 4 weeks full-time), supervised by a staff member.  Satisfactory completion of this course can be counted towards the Capstone requirement. Details of internship will be recorded on the student's transcript. This course will be assessed on "Pass/Fail" basis. Students who are interested to enrol in this course should contact the Department to obtain the approval.  Enrolment of this course is not conducted via the online course selection system and should be made through the relevant Department/School office after approval has been obtained from the course coordinator.					

ENVS4999	Environmental science project (12 credits)  Academic Ye			ear 2021				
Offering Department	Earth Sci		,	Quota				
Course Co-ordinator	Dr C Ding	Dr C Dingle, Biological Sciences (cdingle@hku.hk)						
Teachers Involved	(Various teachers (ERS),Earth Sciences)							
		teachers (SBS),Biologica						
Course Objectives	skills obta	ained from the Environm	o provide an opportunity for stu ental Science major. Students v ating the results of their researc	will gain experience in designi				
Course Contents & Topics	staff men should be supervise	Students will undertake a research project in the form of an undergraduate dissertation under the supervision of a staff member. The dissertation will be written in the style of a scientific paper. The research topic is flexible but should be related to the field of Environmental Science. Students should seek approval from a prospective supervisor prior to selecting this course. After admission to the course is approved by the course coordinator, students will work under the guidance of their supervisor to complete the research project.						
Course Learning	On succe	ssful completion of this	course, students should be able	to:				
Outcomes	CLO 1	complete a dissertation p	project of undergraduate level in	one of the four areas of the r	najor			
			nulation, data collection, analys		•			
Pre-requisites (and Co-requisites and Impermissible	Science In This caps	Major; and stone course is for Enviro	dvanced level (level 3 or 4) di	ts only.	es in Environmenta			
combinations)			ved to take this capstone course		N - F			
Offer in 2021 - 2022 Grade Descriptors	Y Ye	ar long Offer in 2022 -	ZUZ3: Y derstanding of the topic, excellent deve	Examination				
(A+ to F)	with evidence of original thought. Insightful use and critical analysis of information drawn from a full range of high quality sources to draw appropriate and insightful conclusions. Presented in high academic standard. [Work of A+ should show considerable additional work beyond that is required in wider areas relevant to the topic.]  B Most aspects of the chosen topic were addressed and researched adequately. Demonstrates understanding of most key concepts, evidence of elementary analysis and development of argument. Critical use of relevant information from sources,							
	showing ability to make meaningful comparisons between different secondary interpretations. Presented in adequate standard.  C Demonstrate general but incomplete grasp of the chosen topic. Most aspects of the chosen topic were addressed and researched at a very basic level. Mostly correct but some erroneous use of relevant information from sources, demonstrates mainly description, and shows basic understanding, but lacking depth.							
	D							
	Fail  Show little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Limited use of secondary sources and no critical comparison of them. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.							
Communication-	N							
intensive Course								
Course Type		ased course						
Course Teaching	Activitie		Details		No. of Hours			
& Learning Activities	Reading	/ Self study	research work & report		240			
Assessment Methods and Weighting	Methods	3	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Dissertat	ion		80	CLO 1,2			
	Oral pres	sentation		20	CLO 2			
Additional Course Information		course code: ENVS3015 from major coordinator is						

MATH1009	Basic ma	athematics for	business and economics (6 credit	s) Academic Ye	ar 2021		
Offering Department	Mathemati	ics		Quota	540		
Course Co-ordinator	Dr Y M Ch	r Y M Chan (1st sem); Dr K H Law (2nd sem), Mathematics ( <i>ymchan</i> @ <i>maths.hku.hk; lawkaho</i> @ <i>connect.hku.</i>					
Teachers Involved	(Dr Y M Cl	aw,Mathematics) han,Mathematics)					
Course Objectives	Business application	and Economics.	cing important topics of mathematics for Mathematical concepts and methods, a hasized so that students could be furnish disciplines.	s well as some Busine	ss and Economics		
Course Contents & Topics	3. Quadrat 4. Graphs 5. Differen 6. Uncons 7. Partial o 8. Constra 9. Integrati 10. Geome 11. Differe 12. Differe	Logic Linear Equations Quadratic Equations Graphs and Functions Differentiation Unconstrained optimization Partial differentiation Constrained optimization Integration Geometric series Difference equations (optional) Matrix algebra (optional)					
Course Learning	On succes	sful completion of	this course, students should be able to:				
Outcomes	CLO 2 ap	ply mathematical	dge and understanding of the essential ma skills to model and solve basic problems in coping with a higher level of mathematics	business and economic	s		
Pre-requisites	NIL	oapabio oi t	agilor lovel of mathematics		2.30ipiii 100		
(and Co-requisites and Impermissible combinations)	Mathemati in these co This cours	The course has no pre-requisite, but students are expected to have already achieved Level 2 or above in HKDS Mathematics or equivalent. Not for students who have passed MATH1011 or MATH1013, or have already enrolle in these courses.  This course is exclusively for non-Science and non-Engineering students (i.e. not for students from the Faculty of Science or Engineering).					
Offer in 2021 - 2022			Offer in 2022 - 2023 : Y	Examination	Dec May		
Grade Descriptors	A						
(A+ to F)	B C D	applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumenta and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.  Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and t applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.  Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorem but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument appresentation or a number of minor computational errors.  Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation with substantial computational errors.			o solving problems, riate theorems and their entifying the appropriate fy appropriate theorems, ith poor argument and oriate theorems, but with ument or presentation or		
Communication-	N	being able to comple	te the solution.				
intensive Course	'`						
Course Type	Lecture-ba	ased course					
Course Teaching	Activities	•	Details		No. of Hours		
& Learning Activities	Lectures				36		
	Tutorials				12		
	Reading /	Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents	Tutorials and Assignments	10	CLO 1,2,3		
	Examinati	ion		50	CLO 1,2,3		
	Test			40	CLO 1,2,3		
Required/recommended reading and online materials	M. J. Ross Martin Ant	ser: Basic Mathem hony and Norman	or Economics and Business (New York: Peatics for Economists (London: Routledge, Biggs: Mathematics for Economics and F	2003, 2nd edition) nance:	9th edition)		
Course Website			mbridge: Cambridge University Press, 199	U)			
Course Website		dle.hku.hk/					
Additional Course Information		nath.hku.hk/~math	n/Timetable/timetable2122_S1.pdf n/Timetable/timetable2122_S2.pdf				

MATH1011	University mathematics I (6 credits)  Academic Year 20				
Offering Department	Mathematics	Quota	400		
Course Co-ordinator	Dr H Y Zhang, Mathematics (hyzhang@maths.hku.hk)				
Teachers Involved	(Dr H Y Zhang, Mathematics)				
Course Objectives	This course aims at students with only HKDSE Mathematics (or equivalent) basic knowledge of mathematics that serves as essential foundation in various followed by MATH1013.				
Course Contents & Topics	<ul> <li>Sets, Venn diagram, set operations.</li> <li>Permutations, combinations and elementary probabilities.</li> <li>Mathematical induction.</li> <li>Exponential and logarithmic functions.</li> <li>Trigonometric functions, trigonometric formulae.</li> <li>Limits of algebraic, exponential and logarithmic functions.</li> </ul>				

	- Derivativ	ves of algebraic eyno	nential and logarithmic functions.			
	- Differentiation rules: addition, product, quotient and chain rule.					
	- Maxima and minima.					
		e and definite integral	S.			
	- Area.					
	- Integration	on by substitution.				
		idal rule with error est	timation.			
Course Learning			is course, students should be able t	o:		
Outcomes	CLO 1		; calculate probabilities; and prove			
	CLO 2		ving exponential, logarithmic and tri			
	CLO 3	evaluate limits and d	0 1 / 0	gonomo namonomo		
			nite and indefinite integrals			
	CLO 5		ems such as determining maxima a	nd minima: finding area		
Pre-requisites			2 or above in M1 or M2 of HKDSE		we passed or already	
(and Co-requisites and Impermissible combinations)	enrolled in		rses: MATH1009, 1013, 1821, 1851			
Offer in 2021 - 2022	Y 1st	sem 2nd sem Off	fer in 2022 - 2023 : Y	Examinatio	n Dec May	
Grade Descriptors (A+ to F)	A	applications through cor	nt understanding of key concepts and ideas rectly analysing problems, clearly and elega	antly presenting correct logical rea	ropriate theorems and their asoning and argumentation	
	В	and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.  B Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and the				
	applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.					
	C Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems,					
	but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.					
	D Emonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with					
	substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or					
	with substantial computational errors.  Fail Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not					
	Fail   Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not being able to complete the solution.					
Communication- intensive Course	N	poing able to complete a				
Course Type	Lecture-ba	ased course				
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures	•	Dotano	36		
<b>3</b>	Tutorials				12	
		/ Self study			100	
Assessment Methods	Methods	•	Details	Weighting in final	Assessment	
and Weighting	Wethous		Details	course grade (%)	Methods to CLO Mapping	
	Assignme	ents	assignments, tutorials, participation, etc	5	CLO 1,2,3,4,5	
	Examinat	tion		50	CLO 1,2,3,4,5	
	Test		3 tests	45	CLO 1,2,3,4,5	
Required/recommended reading and						
online materials	http://moo	odle.hku.hk/				
online materials Course Website Additional Course	http://moo					

MATH1013	University mathematics II (6 credits)	Academic Year	2021
Offering Department	Mathematics	Quota	500
Course Co-ordinator	Dr C W Wong, Mathematics (cwwongab@hku.hk)		
Teachers Involved	(Dr C W Wong, Mathematics)		
Course Objectives	This course aims at students with Core Mathematics plus Module 1 or C background and provides them with basic knowledge of calculus and some lir various disciplines. It is expected to be followed by courses such as MATMATH2211, and MATH2241.	near algebra that o	an be applied in
Course Contents & Topics	<ul> <li>Functions; graphs; inverse functions.</li> <li>Limits; continuity and differentiability.</li> <li>Mean value theorem; Taylor's theorem; implicit differentiation; L'Hopital's rule.</li> <li>Higher order derivatives; maxima and minima; graph sketching.</li> <li>Radian, calculus of trigonometric functions.</li> <li>Definite and indefinite integrals; integration by substitutions; integration by part</li> <li>Complex numbers, polar form, de Moivre's formula.</li> <li>Applications: Solving simple ordinary differential equations.</li> <li>Basic matrix and vector (of orders 2 and 3) operations, determinants of 2x2 or</li> </ul>		artial fractions.
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 describe properties of functions and inverse functions  CLO 2 evaluate limits, and determine continuity and differentiability of functions  CLO 3 apply advanced rules/techniques of differentiation and integration to a sketch graphs of functions; approximation of functions  CLO 4 solve problems involving complex numbers  CLO 5 solve simple first and second order ordinary differential equations		es and integrals;
Pre-requisites (and Co-requisites and Impermissible combinations)	Level 2 or above in Module 1, or Module 2 of HKDSE Mathematics or equivalen Pass in MATH1009 or MATH1011; and Not for students who have passed MATH1821, or (MATH1851 and MATH185 course.	•	y enrolled in this

Offer in 2021 - 2022	Y 1s	st sem 2nd sem O	ffer in 2022 - 2023 : Y	Examination	Dec Ma	ay	
Grade Descriptors (A+ to F)	A	A Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.					
	В	applications through co	prrectly analysing problems, but we cations and presentation or with so		dentifying the app	propriate	
	С	but with some inaded		pts and ideas by being able to correctly ident s through incorrectly analysing problems w			
	D		es in applying the theorems throug	deas by being able to correctly identify appro th incorrectly analysing problems with poor arg			
	Fail	Demonstrate poor and being able to complete		being able to identify appropriate theorems or	their application	is, or not	
Communication- intensive Course	N						
Course Type	Lecture-l	based course					
Course Teaching	Activities		Details	Details			
& Learning Activities	Lectures						
	Tutorials				12		
	Reading / Self study				100		
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessn Metho to CLO Ma	ds	
	Assignm	nents		10	CLO 1,2,	3,4,5	
	Examina	ation		50	CLO 1,2,	3,4,5	
	Test			40	CLO 1,2,	,3,4,5	
Required/recommended reading and online materials	2007)			u Need to Excel at Calculus (Princet mas' Calculus (12th edition, Addison )	,	Press,	
Course Website		,		,			
Additional Course Information	Timetabl	p://moodle.hku.hk/ udents who have passed MATH1013 are not allowed to take MATH1009. netable: p://hkumath.hku.hk/~math/Timetable/timetable2122_S1.pdf					

MATH1641	Mathen	natical laboratory a	nd modeling (6 credits)	Academic Yea	r 2021		
Offering Department	Mathema	Quota	30				
Course Co-ordinator	Dr B Kan	e, Mathematics (bkane	@hku.hk)				
Teachers Involved	Dr S Va	ne,Mathematics) radharajan,Mathematics omiyasu,Mathematics)	5)				
Course Objectives	This cou explore v Python p objects.	This course aims to use SageMath, a Python based free and open source mathematical software system to explore various examples of Mathematical Modeling. The course will begin with the introduction of the basic Python programming language, and a quick introduction of SageMath software along with plotting 2D and 3D objects. The main focus will be on using SageMath to explore topics in Calculus, Linear Algebra and numerica methods for Mathematical Modeling. No prior knowledge on these topics is assumed.					
Course Contents & Topics	SageMat	SageMath/Python. Golden ratio and self-similarity. Power law and linear regression. Elementary linear algebra Differentiation and integration of one variable. Taylor series expansion. Phyllotaxis, HIV modeling, tumor growth					
Course Learning	On succe	essful completion of this	course, students should be able t	o:			
Outcomes	CLO 1	recognize the importar	nce of numerical methods in mathe	ematical modeling			
	CLO 2	demonstrate basic algo	ebraic and arithmetic computations	s in the Scilab environment			
	CLO 3	write and interpret prog	grams in Scilab programming lang	uage			
	CLO 4 solve simple numerical problems by using interactive Scilab commands						
	CLO 5	solve moderately comp	olicated numerical problems by wr	iting Scilab programs			
and Impermissible combinations)							
Offer in 2021 - 2022	V 1e	t sam Offer in 2022 -	2023 · N	Evamination	Dec		
		t sem Offer in 2022 - 2		Examination	Dec		
Grade Descriptors	Y 1s	Demonstrate an excellent to solve numerical probler	understanding of key concepts and prograns by writing SageMath codes appropriatel	imming skills by correctly analysing p	roblems and being able		
	A B	Demonstrate an excellent to solve numerical probler Demonstrate a good unde solve numerical problems	understanding of key concepts and progra ns by writing SageMath codes appropriatel erstanding of key concepts and programm by writing SageMath codes, with some mir	nmming skills by correctly analysing pay.  y.  ing skills by correctly analysing problem errors.	roblems and being able		
Offer in 2021 - 2022 Grade Descriptors (A+ to F)	Α	Demonstrate an excellent to solve numerical probler Demonstrate a good unde solve numerical problems Demonstrate an accepta	understanding of key concepts and progra ns by writing SageMath codes appropriatel erstanding of key concepts and programm by writing SageMath codes, with some mir ble understanding of key concepts and	imming skills by correctly analysing py.  ing skills by correctly analysing probinor errors.  programming skills by solving nur	roblems and being able		
Grade Descriptors	A B	Demonstrate an excellent to solve numerical probler Demonstrate a good unde solve numerical problems Demonstrate an accepta SageMath with a number Demonstrate some under	understanding of key concepts and progra ns by writing SageMath codes appropriatel erstanding of key concepts and programm by writing SageMath codes, with some mir	Imming skills by correctly analysing py.  ing skills by correctly analysing problem for errors.  programming skills by solving nur.  s.  ng skills by solving numerical problem	roblems and being able to merical problems with		
Grade Descriptors	A B C	Demonstrate an excellent to solve numerical probler Demonstrate a good und solve numerical problems Demonstrate an accepta SageMath with a number Demonstrate some under analysing problems or with	understanding of key concepts and programs by writing SageMath codes appropriatel erstanding of key concepts and programm by writing SageMath codes, with some mir ble understanding of key concepts and of minor programming/computational errorstanding of key concepts and programming of key concepts and programming of key concepts and programming.	amming skills by correctly analysing py. y. ing skills by correctly analysing probior errors. programming skills by solving nurs. s. ng skills by solving numerical proble errors.	roblems and being able lems and being able to merical problems with		
Grade Descriptors (A+ to F)  Communication-	A B C	Demonstrate an excellent to solve numerical probler Demonstrate a good und solve numerical problems Demonstrate an accepta SageMath with a number Demonstrate some under analysing problems or with	understanding of key concepts and programs by writing SageMath codes appropriatel erstanding of key concepts and programm by writing SageMath codes, with some mir ble understanding of key concepts and of minor programming/computational errors standing of key concepts and programming of the programming substantial programming/computational errors.	amming skills by correctly analysing py. y. ing skills by correctly analysing probior errors. programming skills by solving nurs. s. ng skills by solving numerical proble errors.	roblems and being able to merical problems with		
Grade Descriptors (A+ to F)  Communication- ntensive Course	A B C D Fail	Demonstrate an excellent to solve numerical probler Demonstrate a good und solve numerical problems Demonstrate an accepta SageMath with a number Demonstrate some under analysing problems or with	understanding of key concepts and programs by writing SageMath codes appropriatel erstanding of key concepts and programm by writing SageMath codes, with some mir ble understanding of key concepts and of minor programming/computational errors standing of key concepts and programming of the programming substantial programming/computational errors.	amming skills by correctly analysing py. y. ing skills by correctly analysing probior errors. programming skills by solving nurs. s. ng skills by solving numerical proble errors.	roblems and being able to merical problems with		
Grade Descriptors (A+ to F)  Communication- Intensive Course Course Type	A B C D Fail	Demonstrate an excellent to solve numerical probler Demonstrate a good und solve numerical problems Demonstrate an accepta SageMath with a number Demonstrate some under analysing problems or with Demonstrate poor and ina	understanding of key concepts and programs by writing SageMath codes appropriatel erstanding of key concepts and programm by writing SageMath codes, with some mir ble understanding of key concepts and of minor programming/computational errors standing of key concepts and programming of the programming substantial programming/computational errors.	amming skills by correctly analysing py. y. ing skills by correctly analysing problem for errors. programming skills by solving nur. s. ng skills by solving numerical problem force.	roblems and being able to merical problems with		
Grade Descriptors (A+ to F)  Communication- Intensive Course Course Type Course Teaching	A B C D Fail N Lecture-t	Demonstrate an excellent to solve numerical probler Demonstrate a good under solve numerical problems Demonstrate an accepta SageMath with a number. Demonstrate some under analysing problems or with Demonstrate poor and ina	understanding of key concepts and programs by writing SageMath codes appropriatel erstanding of key concepts and programm by writing SageMath codes, with some mir ble understanding of key concepts and of minor programming/computational errorstanding of key concepts and programmin substantial programming/computational edequate understanding by not being able to	amming skills by correctly analysing py. y. ing skills by correctly analysing problem for errors. programming skills by solving nur. s. ng skills by solving numerical problem force.	roblems and being able to lems and being able to merical problems with ems through incorrectly		
Grade Descriptors (A+ to F)  Communication- Intensive Course Course Type Course Teaching	A B C D Fail N Lecture-t Activitie	Demonstrate an excellent to solve numerical probler Demonstrate a good under solve numerical problems Demonstrate an accepta SageMath with a number Demonstrate some under analysing problems or with Demonstrate poor and inal De	understanding of key concepts and programs by writing SageMath codes appropriatel erstanding of key concepts and programm by writing SageMath codes, with some mir ble understanding of key concepts and of minor programming/computational errorstanding of key concepts and programmin substantial programming/computational edequate understanding by not being able to	amming skills by correctly analysing py. y. ing skills by correctly analysing problem for errors. programming skills by solving nur. s. ng skills by solving numerical problem force.	roblems and being able to lems and being able to merical problems with ems through incorrectly		
Grade Descriptors	A B C D Fail N Lecture-t Activitie Lectures Tutorials	Demonstrate an excellent to solve numerical probler Demonstrate a good under solve numerical problems Demonstrate an accepta SageMath with a number Demonstrate some under analysing problems or with Demonstrate poor and inal De	understanding of key concepts and programs by writing SageMath codes appropriatel erstanding of key concepts and programm by writing SageMath codes, with some mir ble understanding of key concepts and of minor programming/computational errorstanding of key concepts and programmin substantial programming/computational edequate understanding by not being able to	amming skills by correctly analysing py. y. ing skills by correctly analysing problem for errors. programming skills by solving nur. s. ng skills by solving numerical problem force.	roblems and being able to lems and being able to merical problems with ems through incorrectly  No. of Hours 36		
Grade Descriptors (A+ to F)  Communication- intensive Course Course Type Course Teaching	A B C D Fail N Lecture-t Activitie Lectures Tutorials	Demonstrate an excellent to solve numerical probler Demonstrate a good undersolve numerical problems olve numerical problems Demonstrate an accepta SageMath with a number. Demonstrate some under analysing problems or with Demonstrate poor and inal passed course	understanding of key concepts and programs by writing SageMath codes appropriatel erstanding of key concepts and programm by writing SageMath codes, with some mir ble understanding of key concepts and of minor programming/computational errorstanding of key concepts and programmin substantial programming/computational edequate understanding by not being able to	amming skills by correctly analysing py. y. ing skills by correctly analysing problem for errors. programming skills by solving nur. s. ng skills by solving numerical problem force.	roblems and being able to lems and being able to merical problems with ems through incorrectly  No. of Hours  36 12		
Grade Descriptors (A+ to F)  Communication- Intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods	A B C D Fail N Lecture-t Activitie Lectures Tutorials Reading	Demonstrate an excellent to solve numerical probler Demonstrate a good und solve numerical problems Demonstrate an accepta SageMath with a number Demonstrate some under analysing problems or with Demonstrate poor and ina	understanding of key concepts and programs by writing SageMath codes appropriatel erstanding of key concepts and programm by writing SageMath codes, with some mir ble understanding of key concepts and of minor programming/computational errorstanding of key concepts and programmin substantial programming/computational edequate understanding by not being able to the programming by	umming skills by correctly analysing py. y. ing skills by correctly analysing probior errors. programming skills by solving nur. s. ng skills by solving numerical problemors. o complete the solution.  Weighting in final	roblems and being able to lems and being able to merical problems with the sms through incorrectly  No. of Hours 36 12 100 Assessment Methods		

	Test		30	CLO 1,2,3,4,5
Required/recommended reading and online materials	G. A. Anastassiou & R. A. Mezei: and Technology, 2015). K. K. Tung: Topics in Mathematica	Numerical Analysis Using Sage (S I Modeling (Princeton University Pro usv/ncmm/notes/download/topics-ir	ess, 2016,	
Additional Course Information		• •		

MATH1821	Mathema	atical methods f	or actuarial science I (6 credits)	Academic Ye	ar 2021		
Offering Department	Mathemat	ics		Quota			
Course Co-ordinator	Dr C W W	Dr C W Wong, Mathematics (cwwongab@hku.hk)					
Teachers Involved	(Dr C W Wong, Mathematics)						
Course Objectives	backgroun single vari	nd of calculus of one	two mathematics courses designed to e and several variables and an introdu elementary matrix theory. It aims at stu le 2 background.	ction to linear algebra. Th	e course focuses or		
Course Contents & Topics	- Function: - Limits, co - Mean val - Bisection	s; graphs; inverse fo ontinuity and differe lue theorem; implici o method and Newto	unctions. ntiability. t differentiation; L'Hopital's rule.				
	- Improper - Numerica - Basic ma	al integration, Trape	actions, integration by parts. zoidal rule and Simpson's rule. orders 2 and 3) operations, determinan	ds.			
Course Learning	On succes	sful completion of t	his course, students should be able to:				
Outcomes	CLO 2 ev CLO 3 ap sk CLO 4 ap CLO 5 pe	On successful completion of this course, students should be able to:  CLO 1 describe properties of a function and an inverse function  CLO 2 evaluate various kinds of limits, and determine continuity and differentiability of functions  CLO 3 apply advanced rules/techniques of differentiation and integration to compute derivatives and integrals sketch graphs of functions  CLO 4 approximate integrals by numerical methods  CLO 5 perform matrix and vector operations, compute determinants					
			second order ordinary differential equa				
Pre-requisites (and Co-requisites and Impermissible combinations)	2, or equive Not for stu- courses. For BSc(A	Level 4 or above in HKDSE Mathematics plus Module 1, or Level 4 or above in HKDSE Mathematics plus Module 2, or equivalent; and Not for students who have passed MATH1013 or (MATH1851 and MATH1853), or have already enrolled in these courses. For BSc(ActuarSc) students only.					
Offer in 2021 - 2022		sem Offer in 2022		Examination	Dec		
Grade Descriptors (A+ to F)	B C D	A Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and arguments and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.  B Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and tapplications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.  C Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorem but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument presentation or a number of minor computational errors.  D Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation with substantial computational errors.					
Communication- intensive Course	N	being able to complete	the solution.				
Course Type	Lecture-ha	ased course					
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures						
•	Tutorials				36 12		
		Self study			100		
Assessment Methods	Methods	<b></b>	Details	Weighting in final	Assessment		
and Weighting			Details	course grade (%)	Methods to CLO Mapping		
	Assignme			10	CLO 1,2,3,4,5,6		
	Examinati	ion		50	CLO 1,2,3,4,5,6		
	Test			40	CLO 1,2,3,4,5,6		
			I la Marris a D. Maria and I and I la	ss: Thomas' Calculus (Ad	dison Wesley 12th		
Required/recommended reading and online materials	George B edition)	,	sed by Maurice D. Weir and Joel Ha	oo. Momae Galearde (Ale	ulodii vvedley, 12tii		
reading and	George B edition)	. Thomas; as revis	ed by Maurice D. Weir and Joel Ha	oo. Monae Galeana (76	dison Wesley, 12a		
reading and online materials	George B edition)  http://moorginetable:	dle.hku.hk/	red by Maurice D. Well and Joel Ha	oo. Momao Galoado (16	dison vvesicy, 124		

MATH1851	Calculus and ordinary differential equations (6 credits)	Academic Year	2021
Offering Department	Mathematics	Quota	700
Course Co-ordinator	Prof Y K Lau (1st sem); Dr X Zhang (2nd sem), Mathematics (yklau@maths.hku	.hk; xzhang@mat	hs.hku.hk)
Teachers Involved	(Dr L Xu,Mechanical Engineering)		

	(Dr X Zhang,Mathematics) (Dr Y Chen,Mechanical Engineering) (Prof K W Chow,Mechanical Engineering) (Prof Y K Lau,Mathematics)						
Course Objectives	In this cou with a view various en engineering	In this course, students will be introduced to fundamental concepts of calculus and ordinary differential equations with a view on applications in different engineering fields. A concrete foundation of mathematics that underpins the various engineering subjects will be built. Mathematical concepts and principles, as well as some typical engineering applications, would be emphasized so that students could enhance their mathematical skills in solving engineering problems, and be well prepared in learning a higher level of applied mathematics required in different engineering disciplines.					
Course Contents & Topics	elementar representa decompos - Ordinary separable equations of parame physical in - Laplace derivatives	y functions, derivativation of curves, sition, definite integral differential equation equations, homog with constant coeffitters, higher-order in inplication of resonat transforms [Laplaces and integrals, derivation of curves]	ves by implicit differentiation, polar coordinates, indefinite als, the fundamental theorem ins [first order equations, integeneous equations, exact difficients, characteristic polynominomogeneous linear ordinary ince, Cauchy-Euler equations, be transforms of elementary vatives of Laplace transform,	and continuity, derivatives, (higher- the mean value theorem, L'H\^{o}pi e integrals, integration by parts of calculus, and their applications] grating factors and linear equations, ferential equations, higher-order h ials, methods of undetermined coef of differential equations, choice of pa and their applications] functions, inverse Laplace transfor first and second shifting theorems, e problems) using Laplace transfor	ital's rule, parametric s, partial fractions Bernoulli equations omogeneous linear ficients and variation rticular solutions and orms, transforms of convolutions, partia		
Course Learning Outcomes	CLO 1 de the de inv	emonstrate knowled eir relationship with etails for the solutio volved	some typical physical/engin n, and accurately correlate	c calculus and ordinary differential of eering applications: unerringly per the solution approach with the fur	form the calculation adamental concepts		
	CLO 3 un	CLO 2 apply mathematical skills to model and solve some basic physical/engineering problems: analyze the given problem, identify the appropriate mathematical skills, articulate a convincing rationale for the approach used, clearly give the mathematical formulation, and correctly find the solution  CLO 3 understand well established methods to solve differential equations, and correlate qualitatively with potential applications in engineering topics like oscillations and electric circuits. Identify the occurrence of resonance where large amplitude displacements can be expected					
	CLO 4 explore the technique and usage of integral transform, using the Laplace transform as an illustrative example. Appreciate the power of these techniques in initial value problems and applications like vibrations and signal processing  CLO 5 be well prepared to cope with a higher level of engineering mathematics required in different engineering disciplines						
Pre-requisites (and Co-requisites and Impermissible combinations)	Level 2 or Pass in M	above in Module 1, ATH1011.	or Module 2 of HKDSE Mathe Engineering students.)	ematics or equivalent, or			
Offer in 2021 - 2022	Y 1st	sem 2nd sem O	ffer in 2022 - 2023 : Y	Examination	Dec May		
Grade Descriptors (A+ to F)	A Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and methods and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.  B Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and methods and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the						
	appropriate theorems and methods or their applications and presentation or with some minor computational errors.  C Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems and methods, but with some inadequacies in applying them through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.						
	D Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems and methods, but with substantial inadequacies in applying them through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.  Fail Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems and methods or their						
Communication- intensive Course	N	applications, and not b	eing able to complete the solution.				
Course Type	Lecture-ba	ased course					
Course Teaching & Learning Activities	Activities	3	Details		No. of Hours		
Tourning Addition	Lectures Tutorials				36 12		
		Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme Examinat			10 70	CLO 1,2,3,4,5 CLO 1,2,3,4,5		
	Test	IUII	2 tests	20	CLO 1,2,3,4,5 CLO 1,2,3,4,5		
Required/recommended reading and online materials	G.B. Thon	nas, et al.: Thomas' e, et al.: Fundame	culus and Differential Equatio Calculus (Pearson Education				
Course Website							
Additional Course Information	There will Students a This cours Timetable	ttp://moodle.hku.hk/ here will be no 'make-up' for a missed test or assignment under normal circumstances. tudents are advised not to take MATH1851 and MATH1853 together in the same semester. his course is offered by the Department of Mathematics and the Faculty of Engineering.					

MATH1853		• '.	ty and statistics (6 credits)	Academic Ye		
Offering Department	Mathemat		(	Quota	700	
Course Co-ordinator		n, Mathematics <i>(gha</i>	•			
Teachers Involved	(Dr S H Cl	ng,Electrical & Electr neung,Civil Engineer an,Mathematics)	σ σ,			
	,	Yue,Civil Engineerin	g)			
Course Objectives	-		of MATH1851, students will be intro	duced to more topics of mat	thematics commonl	
-	applied in	engineering so that	students could be further enhanced v	with a concrete skill in mathe	ematics underpinne	
	for differer	nt engineering subje	ects. The course emphasizes mather	matical concepts, principles	, analysis, and the	
			f engineering systems. Students cou			
			e typical engineering problems to pro		-	
Course Contents			l scalars, inner product, vector proj			
& Topics	rule, matri their applic	x rank, eigenvalue, cations]	verse, system of linear equations, meigenvector, matrix diagonalization, oles [arithmetics of complex numbers]	, positive, negative and ser	mi-definiteness, an	
	Moivre's the Basic po	neorem, roots of unit robability theory [ax	ry, complex functions, and their applic kioms of probability, conditional pro (joint) probability distribution, expe	cations] bbability, Bayes' theorem, t	the total probabilit	
	application	ns]	ns [Bernoulli, Binomial, Geometric,			
	- Basic st		applications] ates, sample mean, sample varian n with known or unknown population			
	application	•				
Course Learning			nis course, students should be able to			
Outcomes	sta pe	atistics as well as `	ge and understanding of linear alge their relationship with some typical n details for the solution, and accur involved	l physical/engineering appl	ications: unerringly	
	CLO 2 apply such knowledge and understanding to solve certain practical problems that are relevant to physical/engineering applications: analyze the given problem, identify the appropriate mathematical skills, articulate a convincing rationale for the approach used, and clearly give the mathematical formulation, and correctly find the solution					
		well prepared to co sciplines	ppe with a higher level of engineering	g mathematics required in d	lifferent engineerin	
Pre-requisites (and Co-requisites and Impermissible combinations)		1 and MATH1853	, or Module 2 of HKDSE Mathematic concurrently in the same semester	•		
Offer in 2021 - 2022	Y 1st	sem 2nd sem Of	ffer in 2022 - 2023 : Y	Examination	Dec May	
Grade Descriptors	A		ent understanding of key concepts and idea			
(A+ to F)	methods and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.					
	B Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and methods and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems and methods or their applications and presentation or with some minor computational errors.					
	Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems and methods, but with some inadequacies in applying them through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.					
	Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems and methods, but with substantial inadequacies in applying them through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.					
	Fail		inadequate understanding by not being abing able to complete the solution.	le to identify appropriate theorem	s and methods or thei	
Communication-	N					
ntensive Course						
Course Type		ased course			No. of Hours	
Course Teaching	Activities	•	Details	Details		
& Learning Activities	Lectures				36 12	
	Tutorials	0 15 1 1				
		Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents		20	CLO 1,2,3	
	Examinati	CLO 1,2,3				
Required/recommended reading and online materials	S.J. Leon: G. James, C. Rorres	Linear Algebra with et al.: Modern Engli and H. Anton: Applic	ts Applications (Addison-Wesley, 20° Applications (Pearson Education, 20 neering Mathematics (Pearson Educa- cations of Linear Algebra (Wiley, 198- ering Mathematics (Wiley, 2006, 9th e	006, 7th ed.) ation, 2008, 4th ed.) 4, 3rd ed.)		
Course Website		dle.hku.hk/	•			
Additional Course Information	There will Students a	be no 'make-up' for are advised not to ta se is offered by the D	a missed quiz or assignment under n ke MATH1851 and MATH1853 toget Department of Mathematics and the F	her in the same semester.		
	http://hkun	nath.hku.hk/~math/T	imetable/timetable2122_S1.pdf imetable/timetable2122_S2.pdf			

MATH2012	Fundamental concepts of mathematics (6 credits)	Academic Year 2021
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Offering Department	Mathemati	cs		Quota				
Course Co-ordinator	Dr Y M Ch	an, Mathematics (ymch	an @maths.hku.hk)	' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' '				
Teachers Involved	(Dr Y M Ch	nan,Mathematics)						
Course Objectives	proofs. Su	uch concepts and me	ckground on fundamental conce thods are important for subs taken concurrently with other Le	equent studies in all highe				
Course Contents & Topics	- Mathema - Relations - Finite and - Natural no - Real num - Examples	- Statement calculus.  - Mathematical proofs.  - Relations and functions.  - Finite and infinite sets.  - Natural numbers and mathematical induction.  - Real numbers and the limits of sequences.  - Examples of groups.						
Course Learning			course, students should be able					
Outcomes	CLO 2 cor CLO 3 app ma CLO 4 der CLO 5 und	nstruct the truth table of ply different proof stra athematical statement monstrate the basic pro	tegies (e.g. proof by contradic perties of equivalence relations of limits of sequences of real nu	ction and mathematical indu	ction) in proving a			
Pre-requisites			or (MATH1851 and MATH1853	3).				
(and Co-requisites and Impermissible combinations)	Students v	vith good grades in HK ng interests in math ma	(DSE Math Module 1 or Math I ay also apply for taking this co rse Selection Advisors).	, Module 2 (or other equivaler				
Offer in 2021 - 2022		sem 2nd sem Offer		Examination	Dec May			
Grade Descriptors (A+ to F)	B C D Fail	applications through correct and being able to carry out. Demonstrate a good under applications through correct theorems or their application Demonstrate an acceptable but with some inadequaci presentation or a number of Demonstrate some underst substantial inadequacies in with substantial computation	anding of key concepts and ideas by b applying the theorems through incorrect al errors. equate understanding by not being able	antly presenting correct logical reast d with some innovative approaches y being able to identify the appropriate in an adequacies in arguments, is computational errors. eas by being able to correctly ident incorrectly analysing problems we eing able to correctly identify approaches to correctly identify approaches with poor arguments.	oning and argumentation to solving problems. riate theorems and their dentifying the appropriate ify appropriate theorems, with poor argument and priate theorems, but with gument or presentation or			
Communication- intensive Course	N							
Course Type	Lecture-ba	sed course						
Course Teaching	Activities		Details		No. of Hours			
& Learning Activities	Lectures				36			
	Tutorials	0 - 15 - 4 - 4			12			
	Reading /	Self study			100			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignme		Tutorials and Assignments	10	CLO 1,2,3,4,5,6			
	Examination	on		50	CLO 1,2,3,4,5,6			
	Test			40	CLO 1,2,3,4,5,6			
Required/recommended reading and online materials		trand, Albert D. Polime 2012, Third Edition)	eni, Ping Zhang: Mathematical	Proofs: A Transition to Adv	anced Mathematics			
Course Website	http://mood							
Additional Course Information		nath.hku.hk/~math/Time	etable/timetable2122_S1.pdf etable/timetable2122_S2.pdf					

MATH2014	Multivar	able calculus and linear algeb	ra (6 credits)	Academic Year	2021				
Offering Department	Mathema	cs		Quota					
Course Co-ordinator	Dr H Y Zh	ang, Mathematics (hyzhang@maths.h	nku.hk)						
Teachers Involved	(Dr H Y Z	ang,Mathematics)							
Course Objectives		To provide students with a solid foundation in calculus of several variables and linear algebra, which they will need in the study of mathematics related subjects.							
Course Contents & Topics	interpreta - Partial I Taylor's fo - Multiple - Matrix A - Vector S basis and - Eigenva - Numerio Trapezoio	erivatives: Functions of several varia mula. Integrals: Double and triple integrals, spebra: Matrix addition and multiplication paces: The Euclidean spaces as verdimension. It is and Eigenvectors: Diagonalization and Methods: Bisection method and Neal rule for numerical integration.	bles, partial derivatives, extremesubstitution in multiple integrals. on, system of linear equations as otor spaces, its subspaces, span and computing powers. ewton's method for finding roots	e values and Lagi	range multipliers,  n. ar independence,				
Course Learning		sful completion of this course, studen							
Outcomes	CLO 1	understand the geometric meaning of	•	s					
	CLO 2 optimize multivariate objective functions (with/without constraints)								

Information			imetable/timetable2122_S1.pdf imetable/timetable2122_S2.pdf			
Additional Course	Timetable					
Course Website	http://mod	odle.hku.hk/				
Required/recommended reading and online materials	TBC					
	Test		3 tests	45	CLO 1,2,3,4,5	
	Examina	tion		50	CLO 1,2,3,4,5	
	Assignments		assignments, tutorials, participation, etc	5	CLO 1,2,3,4,5	
Assessment Methods and Weighting	Methods	3	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
		/ Self study			100	
	Tutorials				12	
& Learning Activities	Lectures				36	
Course Teaching	Activities		Details		No. of Hours	
Course Type	Lecture-b	ased course				
Communication- ntensive Course	N					
	Fail	being able to complete		ю испиту арргорнате теогеттѕ	or their applications, or no	
	Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analyzing problems with poor argument or presentation of with substantial computational errors.  Fail  Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial computational errors.  Fail					
	С	but with some inaded presentation or a numb	table understanding of key concepts and ide quacies in applying the theorems through er of minor computational errors.	incorrectly analyzing problems	with poor argument and	
	В	applications through co	nderstanding of key concepts and ideas by prectly analyzing problems, but with some mations and presentation or with some minor controls.	inor inadequacies in arguments, omputational errors.	identifying the appropriate	
Grade Descriptors (A+ to F)	Α	applications through co	ent understanding of key concepts and ideas rrectly analyzing problems, clearly and elega out computations carefully and correctly, and	ntly presenting correct logical rea	asoning and argumentatio	
Offer in 2021 - 2022			ffer in 2022 - 2023 : Y	Examinatio		
and Co-requisites and Impermissible combinations)	Not for s		ssed MATH2822 or [(MATH2101 or	MATH2102) and MATH2	211], or have alread	
Pre-requisites			1851 and MATH1853).	ie praetieur prezieirie		
	CLO 4		alue problems and apply the theory			
	CLO 3		ver curvilinear regions in space cept of vector spaces, basis, dimens	ion		

MATH2101	Linear a	algebra I (6 cre	∌dits)			Academic Year	2021	
Offering Department	Mathema	tics				Quota		
Course Co-ordinator	Dr T W C	hing (1st sem); D	r K H Law (2nd	sem), Mathem	atics (Imtching@math	s.hku.hk; lawkaho (	@conne	ect.hku.hk
Teachers Involved	`	aw,Mathematics Ching,Mathematic	,	<u>,                                      </u>	· .			
Course Objectives	This is a first university level course on linear algebra, which aims at introducing to students the basic concept o linear structure through many concrete examples in the Euclidean spaces. The course also enriches students exposure to mathematical rigor and prepares them for studying more advanced mathematical courses.							
Course Contents & Topics	equations - System elemental - Vector vectors, li - Linear T linear trar - Eigenva	s as a matrix eques of Linear Eques of Linear Eques of Matrices, matrices, matrices: Coordinations: Instructions:	ation. puations: Gauss ix inversion. nate system in nce, basis, dime Definition and o envalues and e	s-Jordan eliming R^n, the Euclension, applications applications applications of lining igenvectors, dispenses and the second second in the second sec	ear transformations in agonalization of matric	w operations, rov or spaces, its sub R^2 and R^3, stal	v eche	elon form, s, span o
Course Learning	On succe	ssful completion	of this course,	students should	l be able to:			
Outcomes	CLO 1 handle matrix operations and use them in some practical problems CLO 2 solve systems of linear equations by Gauss-Jordan elimination and also compute inverses of square matrices							
	CLO 3 understand the concept of vector spaces, basis, dimension, and linear transformations and compute the matrix representations of some linear transformations							
	CLO 4 solve some simple eigenvalue problems and apply the theory to some practical problems							
	CLO 5 solve some practical problems involving the least square concept							
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in M	1ATH1013 or MA	TH1821 or (MA	TH1851 and M	ATH1853)			
Offer in 2021 - 2022	Y 1st	sem 2nd sem	Offer in 2022	- 2023 : Y		Examination	Dec	May
Grade Descriptors (A+ to F)	A Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.							
	B Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.							
	Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.							

	D	substantial inadequacie with substantial comput		igh incorrectly and	alysing problems with poor arg	gument or presentation or		
	Fail	Demonstrate poor and being able to complete	e poor and inadequate understanding by not being able to identify appropriate theorems or their applications, of complete the solution.					
Communication- intensive Course	N	N .						
Course Type	Lecture-ba	ased course						
Course Teaching	Activities	3	Details			No. of Hours		
& Learning Activities	Lectures					36		
	Tutorials					12		
	Reading / Self study		Students are expected to watch videos online before classes.			100		
Assessment Methods and Weighting	Methods		Details		Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments		Tutorials, assignr participation, etc.	ments,	10	CLO 1,2,3,4,5		
	Examinat	ion			50	CLO 1,2,3,4,5		
	Test				40	CLO 1,2,3,4,5		
Required/recommended reading and online materials	Spence, Ir	nsel & Friedberg: Ele	ementary Linear Algebra	A Matrix Appı	roach (Pearson, 2014)			
Course Website	http://moo	dle.hku.hk/						
Additional Course Information		nath.hku.hk/∼math/ገ	imetable/timetable2122_S imetable/timetable2122_S					

MATH2102	Linear a	algebra II (6 cred	lits)	4	Academic Year	2021		
Offering Department	Mathema	tics	•	(	Quota			
Course Co-ordinator	Dr T W C	hing, Mathematics	(Imtching@maths.hku.hk)					
Teachers Involved		Ching, Mathematics)						
Course Objectives	This is a	follow-up of the co	ourse Linear Algebra I. It aims	at introducing the ge	eneral concept	of vector spaces		
	students' different s	future study in ma subject areas.	er product spaces, etc. The output athematics and other discipline	es. Many examples o	of applications v	will be drawn or		
Course Contents & Topics	<ol> <li>Linear determina</li> <li>Linear subspace</li> <li>Inner p</li> <li>Linear diagonaliz</li> </ol>	1. Vector spaces: definition of field, subspaces/quotient spaces, direct sum, existence of basis, dual space 2. Linear transformations: kernel and image, isomorphisms, matrix representations of linear transformations, determinant 3. Linear operator: eigenvalues and eigenspaces, algebraic/geometric multiplicity, diagonalizability, invariant subspaces, cyclic subspaces, Cayley-Hamilton theorem, Jordan canonical form 4. Inner product space: Inner product, orthonormal basis, orthogonal complement and projection 5. Linear operators on inner product space: adjoints of operators, orthogonal/unitary operators, orthogonal/unitary diagonalization of self-adjoint/normal operators, symmetric bilinear form and quadratic form 6. Additional selected topics up to the instructor						
Course Learning			this course, students should be	able to:				
Outcomes		•	structures and apply relevant k		actical problems			
o a too moo			n of subspaces and compute ba		iotioai probicino			
			e-free nature of linear transfo		elate the calcu	lations of linear		
			at of matrices by choosing parti		telate the baloa	nations of infoar		
			, , , , , , , , , , , , , , , , , , , ,		problem of diag	nonalization		
	CLO 4 be able to solve eigenvalue problem for linear operators and apply it to the problem of diagonalization  CLO 5 understand the notions of inner product space and adjoints of operators. Be able to do calculation involving properties of adjoints							
Pre-requisites			H1821 and MATH2822)					
(and Co-requisites								
•								
combinations)	Y 2nd	d sem Offer in 202	22 - 2023 : Y	E	Examination	May		
combinations) Offer in 2021 - 2022	Α	Demonstrate an exce applications through of and being able to carr	ellent understanding of key concepts ar correctly analysing problems, clearly a ry out computations carefully and corre	nd ideas by being able to id nd elegantly presenting cor ctly, and with some innovati	entify the appropriated rect logical reasoning ve approaches to so	te theorems and theing and argumentation oliving problems.		
and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)		Demonstrate an exce applications through of and being able to car Demonstrate a good applications through of theorems or their app	ellent understanding of key concepts ar correctly analysing problems, clearly a ry out computations carefully and corre understanding of key concepts and i correctly analysing problems, but with lications and presentation or with some	nd ideas by being able to id nd elegantly presenting cor ctty, and with some innovati deas by being able to ide some minor inadequacies minor computational errors	entify the appropriated togical reasoning very approaches to so notify the appropriate in arguments, identify.	te theorems and thei ng and argumentation olving problems. theorems and thei ifying the appropriate		
combinations) Offer in 2021 - 2022 Grade Descriptors	Α	Demonstrate an exce applications through of and being able to carr Demonstrate a good applications through theorems or their app Demonstrate an acce but with some inade presentation or a num	ellent understanding of key concepts are correctly analysing problems, clearly at yout computations carefully and correctly understanding of key concepts and icorrectly analysing problems, but with lications and presentation or with some epitable understanding of key concepts equacies in applying the theorems of the proof of the	nd ideas by being able to id nd elegantly presenting cor- ctly, and with some innovati- deas by being able to ide some minor inadequacies minor computational errors and ideas by being able to through incorrectly analysi	entify the appropriarect logical reasonir ve approaches to sontify the appropriate in arguments, identify. The correctly identify and problems with	te theorems and theing and argumentation olving problems. e theorems and their lifying the appropriate appropriate theorems poor argument and		
combinations) Offer in 2021 - 2022 Grade Descriptors	В	Demonstrate an exce applications through of and being able to car Demonstrate a good applications through theorems or their app Demonstrate an acce but with some inade presentation or a num Demonstrate some un substantial inadequac with substantial comp	ellent understanding of key concepts are correctly analysing problems, clearly a ry cond computations carefully and correctly analysing of key concepts and icorrectly analysing problems, but with lications and presentation or with some petable understanding of key concepts petable understanding of key concepts in applying the theorems in the of minor computational errors.  Inderstanding of key concepts and idecies in applying the theorems through i untational errors.	nd ideas by being able to id nd elegantly presenting cor control of the control of the deas by being able to ide some minor inadequacies minor computational errors and ideas by being able to through incorrectly analysi as by being able to correct incorrectly analysing probler	entify the appropriar rect logical reasonir ve approaches to so tify the appropriate in arguments, idents. o correctly identify a ng problems with y identify appropriar ms with poor arguments.	te theorems and their g and argumentation blving problems. It theorems and their ifying the appropriate theorems poor argument and te theorems, but with ent or presentation o		
combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)	A B C D Fail	Demonstrate an exce applications through of and being able to car Demonstrate a good applications through theorems or their app Demonstrate an acce but with some inade presentation or a num Demonstrate some un substantial inadequac with substantial comp	ellent understanding of key concepts are correctly analysing problems, clearly at yout computations carefully and corre understanding of key concepts and is correctly analysing problems, but with lications and presentation or with some epitable understanding of key concepts equacies in applying the theorems in the of minor computational errors. Inderstanding of key concepts and idea ies in applying the theorems through inutational errors.  It is a proving the theorems through inutational errors.	nd ideas by being able to id nd elegantly presenting cor control of the control of the deas by being able to ide some minor inadequacies minor computational errors and ideas by being able to through incorrectly analysi as by being able to correct incorrectly analysing probler	entify the appropriar rect logical reasonir ve approaches to so tify the appropriate in arguments, idents. o correctly identify a ng problems with y identify appropriar ms with poor arguments.	te theorems and their g and argumentation blving problems. It theorems and their ifying the appropriate appropriate theorems poor argument and te theorems, but with ent or presentation o		
Combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)  Communication- intensive Course	A B C D Fail	Demonstrate an exce applications through of and being able to can Demonstrate a good applications through of theorems or their app Demonstrate an acce but with some inade presentation or a num Demonstrate some un substantial inadequace with substantial comp Demonstrate poor an being able to complet	ellent understanding of key concepts are correctly analysing problems, clearly at yout computations carefully and corre understanding of key concepts and is correctly analysing problems, but with lications and presentation or with some epitable understanding of key concepts equacies in applying the theorems in the of minor computational errors. Inderstanding of key concepts and idea ies in applying the theorems through inutational errors.  It is a proving the theorems through inutational errors.	nd ideas by being able to id nd elegantly presenting cor control of the control of the deas by being able to ide some minor inadequacies minor computational errors and ideas by being able to through incorrectly analysi as by being able to correct incorrectly analysing probler	entify the appropriar rect logical reasonir ve approaches to so tify the appropriate in arguments, idents. o correctly identify a ng problems with y identify appropriar ms with poor arguments.	te theorems and their g and argumentation blving problems. It theorems and their ifying the appropriate appropriate theorems poor argument and te theorems, but with ent or presentation o		
Combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)  Communication- ntensive Course Course Type	A B C D Fail N Lecture-b	Demonstrate an exce applications through of and being able to can Demonstrate a good applications through theorems or their app Demonstrate an acce but with some inade presentation or a num Demonstrate some un usubstantial inadequac with substantial comp Demonstrate poor an being able to complet	ellent understanding of key concepts ar correctly analysing problems, clearly ar y out computations carefully and corre understanding of key concepts and i correctly analysing problems, but with ilications and presentation or with some ptable understanding of key concepts equacies in applying the theorems in their of minor computational errors. Inderstanding of key concepts and idea cies in applying the theorems through i iutational errors. d inadequate understanding by not be te the solution.	nd ideas by being able to id nd elegantly presenting cor control of the control of the deas by being able to ide some minor inadequacies minor computational errors and ideas by being able to through incorrectly analysi as by being able to correct incorrectly analysing probler	entify the appropriar rect logical reasonir ve approaches to so tify the appropriate in arguments, idents. o correctly identify a ng problems with y identify appropriar ms with poor arguments.	te theorems and their g and argumentation biving problems. In the theorems and their ifying the appropriate appropriate theorems poor argument and te theorems, but with ent or presentation o ciri applications, or no		
Combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)  Communication- ntensive Course Course Type Course Teaching	A B C D Fail N Lecture-b Activities	Demonstrate an exce applications through of and being able to can Demonstrate a good applications through theorems or their app Demonstrate an acce but with some inadepresentation or a num Demonstrate some us substantial inadequac with substantial comp Demonstrate poor an being able to complet the sased course	ellent understanding of key concepts are correctly analysing problems, clearly at yout computations carefully and corre understanding of key concepts and is correctly analysing problems, but with lications and presentation or with some epitable understanding of key concepts equacies in applying the theorems in the of minor computational errors. Inderstanding of key concepts and idea ies in applying the theorems through inutational errors.  It is a proving the theorems through inutational errors.	nd ideas by being able to id nd elegantly presenting cor control of the control of the deas by being able to ide some minor inadequacies minor computational errors and ideas by being able to through incorrectly analysi as by being able to correct incorrectly analysing probler	entify the appropriar rect logical reasonir ve approaches to so tify the appropriate in arguments, idents. o correctly identify a ng problems with y identify appropriar ms with poor arguments.	te theorems and their grand argumentation by hing problems. The theorems and their ifying the appropriate appropriate theorems poor argument and te theorems, but with ent or presentation o price applications, or no incomplete theorems.		
Communication- ntensive Course Course Type Course Teaching	A B C D Fail N Lecture-b Activitie Lectures	Demonstrate an exce applications through of and being able to can be proposed applications through theorems or their app Demonstrate an accept with some inadepresentation or a num Demonstrate some unsubstantial inadequace with substantial comp Demonstrate poor an being able to complet the sased course	ellent understanding of key concepts ar correctly analysing problems, clearly ar y out computations carefully and corre understanding of key concepts and i correctly analysing problems, but with ilications and presentation or with some ptable understanding of key concepts equacies in applying the theorems in their of minor computational errors. Inderstanding of key concepts and idea cies in applying the theorems through i iutational errors. d inadequate understanding by not be te the solution.	nd ideas by being able to id nd elegantly presenting cor control of the control of the deas by being able to ide some minor inadequacies minor computational errors and ideas by being able to through incorrectly analysi as by being able to correct incorrectly analysing probler	entify the appropriar rect logical reasonir ve approaches to so tify the appropriate in arguments, idents. o correctly identify a ng problems with y identify appropriar ms with poor arguments.	te theorems and their and argumentation by hing problems. The theorems and their ifying the appropriate appropriate theorems poor argument and te theorems, but with tent or presentation or the applications, or not applications, or not be theorems.		
Combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)  Communication- ntensive Course Course Type Course Teaching	A B C D Fail N Lecture-b Activitie Lectures Tutorials	Demonstrate an exce applications through and being able to carn Demonstrate a good applications through theorems or their app Demonstrate an accept with some inadepresentation or a num Demonstrate some un substantial inadequac with substantial comp Demonstrate poor an being able to complet passed course	ellent understanding of key concepts ar correctly analysing problems, clearly ar y out computations carefully and corre understanding of key concepts and i correctly analysing problems, but with ilications and presentation or with some ptable understanding of key concepts equacies in applying the theorems in their of minor computational errors. Inderstanding of key concepts and idea cies in applying the theorems through i iutational errors. d inadequate understanding by not be te the solution.	nd ideas by being able to id nd elegantly presenting cor control of the control of the deas by being able to ide some minor inadequacies minor computational errors and ideas by being able to through incorrectly analysi as by being able to correct incorrectly analysing probler	entify the appropriar rect logical reasonir ve approaches to so tify the appropriate in arguments, idents. o correctly identify a ng problems with y identify appropriar ms with poor arguments.	te theorems and their and argumentation belowing problems. The theorems and their ifying the appropriate appropriate theorems poor argument and te theorems, but with the theorems, but with the theorems, but with the applications, or not applications, or not applications, or not applications, or not applications, or not applications, and the applications are applications, and the applications are applications.		
combinations) Offer in 2021 - 2022 Grade Descriptors	A B C D Fail N Lecture-b Activitie Lectures Tutorials	Demonstrate an exce applications through and being able to carn Demonstrate a good applications through theorems or their app Demonstrate an acceptut with some inadepresentation or a num Demonstrate some usubstantial inadequac with substantial comp Demonstrate poor an being able to complet passed course \$\$\$	ellent understanding of key concepts ar correctly analysing problems, clearly ar y out computations carefully and corre understanding of key concepts and i correctly analysing problems, but with ilications and presentation or with some ptable understanding of key concepts equacies in applying the theorems in their of minor computational errors. Inderstanding of key concepts and idea cies in applying the theorems through i iutational errors. d inadequate understanding by not be te the solution.	nd ideas by being able to id all elegantly presenting cor ctly, and with some innovation deas by being able to ide some minor inadequacies in minor computational errors and ideas by being able to through incorrectly analysis as by being able to correctly analysing problem in able to incorrectly analysing problem in gable to identify appropring able to identify app	entify the appropriar rect logical reasonir ve approaches to so tify the appropriate in arguments, idents. o correctly identify a ng problems with y identify appropriar ms with poor arguments.	te theorems and their g and argumentation blving problems. The theorems and their ifying the appropriate appropriate theorems poor argument and te theorems, but with tent or presentation out if applications, or no the theorems and the theorems argument and the theorems argument and the theorems argument and the theorems, but with tent or presentation out if applications, or no the theorems are the theorems are the theorems are the theorems and the theorems are		

	Assignments		10	CLO 1,2,3,4,5			
	Examination		50	CLO 1,2,3,4,5			
	Test		40	CLO 1,2,3,4,5			
Required/recommended reading and online materials	S. Friedberg, A. Insel, L. Spence: L	Linear algebra (Pearson, 4th edition	)				
Course Website	http://moodle.hku.hk/						
Additional Course	Timetable:	Fimetable:					
Information	http://hkumath.hku.hk/~math/Timet	table/timetable2122_S2.pdf					

MATH2211	Multivari	able calculus (6 cre	edits)	Academic Ye	ar 2021		
Offering Department	Mathemati	•	•	Quota			
Course Co-ordinator	Dr T W Ch	ing, Mathematics (Imtcl	hing@maths.hku.hk)				
Teachers Involved	(Dr T W Cl	ning,Mathematics)	· ·				
Course Objectives	practical practical practical student calculus in	Students of this course will learn the theory of multivariable calculus and learn how to apply the theory to solve practical problems. This is a required course for Mathematics and Mathematics/Physics Majors, and is suitable for all students in Science, Engineering, Economics and Finance, and other students who will use multivariable calculus in their areas of study. This is also a required course for all Minors offered by the Department of Mathematics, and is a pre-requisite of many advanced level mathematics courses.					
Course Contents & Topics	- Vectors: and spheri - Differentii - Vector-va operator. - Maxima multipliers; - Multiple ii - Line integ	Vectors: vectors in 2-, 3-, and n-dimensions; dot product and cross product; lines and planes; polar, cylindrical, nd spherical coordinates.  Differentiation in several variables: limits and derivatives; the chain rule; directional derivatives and gradients.  Vector-valued functions: parametrized curves; arc-length; vector fields; gradient, divergence, curl, and the del perator.  Maxima and minima: differentials and Taylor's Theorem of several variables; extrema of functions; Lagrange nultipliers; applications of extrema.  Multiple integration: double and triple integrals; change of variables; applications.  Line integrals: scalar and vector line integrals; Green's Theorem; conservative vector fields.  Surface integrals and vector analysis: parametrized surfaces; surface integrals; Stokes' and Gauss' Theorems.					
Course Learning			course, students should be ab				
Outcomes	CLO 2 eva CLO 3 ap	aluate partial derivatives	s and multiple integrals; comp	is of functions in several real va oute line integrals and surface in s, such as constrained optimiz of multivariable functions	tegrals		
Pre-requisites	Pass in MA	ATH1013 or MATH1821	or (MATH1851 and MATH18	353)			
(and Co-requisites and Impermissible combinations)			,	,			
Offer in 2021 - 2022 Grade Descriptors	Y 1st s		in 2022 - 2023 : Y	Examination	Dec May		
(A+ to F)	B C D	applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the approximate theorems or their applications and presentation or with some minor computational errors.  Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate they but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument presentation or a number of minor computational errors.  Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, by substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presental with substantial computational errors.					
Communication-	N	being able to complete the s	solution.				
intensive Course	'						
Course Type	Lecture-ba	sed course					
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures				36		
	Tutorials				12		
	Reading /	Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments			10	CLO 1,2,3		
	Examination			50	CLO 1,2,3		
Required/recommended reading and online materials	Test Susan J. C	Colley: Vector Calculus (	(Pearson, 2011, 4th edition)	40	CLO 1,2,3		
Course Website	http://mood	dle.hku.hk/					
Additional Course Information	Students a Timetable: http://hkum	ire assumed to have manath.hku.hk/~math/Time	astered calculus of one-variab etable/timetable2122_S1.pdf etable/timetable2122_S2.pdf	le prior to taking this course.			

MATH2241	Introduction to mathematical analysis (6 credits)  Academic Year   2021						
Offering Department	Mathematics	Quota					
Course Co-ordinator	Dr T W Ching (1st sem); Dr Y M Chan (2nd sem), Mathematics (Imtching@math	Dr T W Ching (1st sem); Dr Y M Chan (2nd sem), Mathematics (Imtching @maths.hku.hk; ymchan@maths.hku.hk)					
Teachers Involved	(Dr T W Ching, Mathematics)						
	(Dr Y M Chan, Mathematics)						
Course Objectives	To introduce students to the basic ideas and techniques of mathematical analysis	S.					

Course Contents & Topics	<ul> <li>The real number system: the real numbers as an ordered field, supremum and infimum, the completeness axiom, denseness of the rational numbers.</li> <li>Sequences and series of real numbers: limits of sequences, properties of convergent sequences, monotone sequences and Cauchy sequences, subsequences, series, tests of convergence for series.</li> <li>Continuity of real-valued functions: properties of continuous functions, the extreme value theorem, the intermediate value theorem, uniform continuity, limits of functions.</li> <li>Differentiation: properties of differentiable functions, the mean value theorem, Taylor's theorem and its applications.</li> <li>Integration: construction of the Riemann integral using Darboux sums and Riemann sums, the fundamental theorem of calculus.</li> </ul>					
Course Learning			course, students should be able to:			
Outcomes	CLO 1 co	mprehend and use abst	ract mathematical arguments such	n as the epsilon-delta argui	ment	
		monstrate convergence quences/series	e or non-convergence of a sequ	uence/series using proper	ties of convergent	
			erties of continuous functions su	ich as the extreme value	theorem and the	
		ermediate value theorer		ion do trio oxtromo value	and the	
	CLO 4 elu		erties of differentiable functions	such as the mean value	e theorem, and to	
			of the Riemann integral and its rel	ation to differentiation		
Pre-requisites			1 and MATH1853) or MATH2822.			
(and Co-requisites			ed to have taken MATH2012 if the	y wish to take this course.		
and Impermissible						
combinations)						
Offer in 2021 - 2022	Y 1st	sem 2nd sem Offer	in 2022 - 2023 : Y	Examination	Dec May	
Grade Descriptors (A+ to F)	Demonstrate a thorough mastery of the mathematical notions and proof techniques taught in the course by being able to hand abstract mathematical arguments, to apply appropriate theorems correctly, and to make use of those proof techniques in nov situations. Ability to present solutions clearly and logically, and the use of innovative ideas in solving problems are expected.					
	B Demonstrate a substantial command of the mathematical notions and proof techniques taught in the course by being able to handle abstract mathematical arguments, to apply appropriate theorems correctly, and, with guidance, to make use of those proof techniques in novel situations. Ability to present solutions clearly and logically, and evidence of innovative ideas in solving problems are expected.					
	С					
	D	0 ,				
	Pail Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems for applications, or not being able to apply the theorems correctly.					
Communication- intensive Course	N					
Course Type	Lecture-ba	sed course				
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures			36		
	Tutorials			12		
	Reading /	Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	nts	Tutorials and Assignments	10	CLO 1,2,3,4,5	
	Examinati		Ţ	50	CLO 1,2,3,4,5	
	Test			40	CLO 1,2,3,4,5	
Required/recommended reading and online materials			ert: Introduction to Real Analysis ( llysis: The Theory of Calculus (Spr			
Course Website	http://mood	dle hku hk/				
Additional Course	Timetable:					
Information	http://hkum	nath.hku.hk/~math/Time	etable/timetable2122_S1.pdf etable/timetable2122_S2.pdf			

MATH2822	Mathematical methods for actuarial science II (6 credits)  Academic Year 2021					
Offering Department	Mathen	natics	Quota			
Course Co-ordinator	Dr T W	Ching, Mathematics (Imtching@maths.hku.hk)				
Teachers Involved		V Ching, Mathematics)				
Course Objectives	This course is the second of the two mathematics courses designed to provide actuarial science students with a solid background of calculus of one and several variables and an introduction to linear algebra. The course focuses on multivariable calculus and linear algebra. It aims at students with MATH1821. It can be followed by other 2000 or 3000 level mathematics courses.					
Course Contents & Topics	- Gradie - Taylor - Maxim - Doubl - Matric - Vector	- Functions of several variables; partial differentiation Gradients and directional derivatives Taylor approximation Maxima and minima; Lagrange multipliers Double and triple integrals, areas and volumes Matrices, systems of linear equations, determinants Vector spaces and subspaces Eigenvalues and eigenvectors, diagonalization of matrices.				
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 understand and recognize various topics in linear algebra such as the basic arithmetic of matrices, determinants, systems of linear equations, eigenvalues and eigenvectors, diagonalizable matrices, basis and dimension, and the rank-nullity theorem					
	CLO 2 understand and recognize various topics in functions of several variables including partial differentiation, the Hessian test for local extrema, vector-valued functions, Jacobians, the method of Lagrange multipliers, double/triple integrals and the change of variable formula					

Pre-requisites (and Co-requisites	Pass in MATH1821. For BSc/ActuarSc) students only.					
and Impermissible combinations)		,	,			
Offer in 2021 - 2022	Y 2r	nd sem Offer in 202	2 - 2023 : Y	Examination	May	
Grade Descriptors (A+ to F)	A	applications through c	orrectly analysing problems, clearly out computations carefully and cor	and ideas by being able to identify the appro and elegantly presenting correct logical reas rectly, and with some innovative approaches	coning and argumentation to solving problems.	
	В	Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.				
	С	but with some inade		ots and ideas by being able to correctly ident to through incorrectly analysing problems w		
	D		es in applying the theorems through	leas by being able to correctly identify appron n incorrectly analysing problems with poor arg		
	Fail					
Communication- intensive Course	N					
Course Type	Lecture-	based course				
Course Teaching	Activitie	es	Details	Details		
& Learning Activities	Lectures	S			36	
	Tutorials	S			12	
	Reading	g / Self study			100	
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignn	nents		10	CLO 1,2	
	Examina	ation		50	CLO 1,2	
	Test		2 tests	40	CLO 1,2	
Required/recommended reading and online materials	edition)		sed by Maurice D. Weir and Linear Algebra (Url: www.nur	d Joel Hass: Thomas' Calculus (Adnosertheory.org/book/)	ldison Wesley, 12th	
Course Website	http://mc	oodle.hku.hk/	<u>-</u>			
Additional Course Information	Timetab		Timetable/timetable2122 S2	.pdf		

MATH3001	Develo	pment of mathematic	al ideas (6 credits)	Academic Year	2021		
Offering Department	Mathema	atics		Quota			
Course Co-ordinator	TBC, Ma						
Teachers Involved							
Course Objectives	a deepe	To acquaint the students with the origin and growth of basic mathematical concepts. To assist the students to gain a deeper insight and broader view of mathematics as a discipline and human endeavour. To provide the students with an opportunity to write on and talk about mathematics, and to engage in independent study.					
Course Contents & Topics	students	- Selected topics in the development of mathematics from ancient to modern times depending on interest of the students and the lecturer, with attention paid to the evolvement of mathematical ideas and the process of mathematical thinking and problem solving.					
Course Learning	On succ	essful completion of this c	ourse, students should be able to:				
Outcomes	CLO 1 ι	understand and describe tl	he origin and development of basi	c mathematical concepts			
	r	mathematics as both an ac	e the intellectual and the socio-cu cademic discipline and a human e	ndeavour	, , ,		
			bout the development of various i				
	CLO 4 e	engage in independent stu	dy on a topic about the history or	development of mathematics	:		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in I	Pass in MATH2101, MATH2102, MATH2211 and MATH2241					
Offer in 2021 - 2022	N O	ffer in 2022 - 2023 : N		Examination			
Grade Descriptors (A+ to F)	A	Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and logical thir original thought. Critical use of information from sources to draw appropriate and insightful conclusions. contribute substantially and fruitfully to class discussions. Apply highly effective organizational and presen			Actively engage in and		
	В	Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Co information from sources to draw appropriate conclusions. Good participation in class discussions with gen contributions. Apply effective organizational and presentational skills.			inking. Correct use of		
	С	Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Mostly correct but some erroneous use of information from sources to draw appropriate conclusions. Make some but not substantial fruitful contributions to class discussions. Apply moderately effective organizational and presentational skills.					
	D	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Limited ability to use information from sources to draw appropriate conclusions. Contribute only in a limited way to fruitful and meaningful class discussions. Apply limited or barely effective organizational and presentational skills.					
	Fail						
	N	·					
	Lecture-based course						
ntensive Course	Lecture-	based course					
ntensive Course Course Type	Lecture-l		Details		No. of Hours		
ntensive Course Course Type Course Teaching		es	Details		No. of Hours		
intensive Course Course Type Course Teaching	Activitie	<b>es</b> S	Details				
Communication- intensive Course Course Type Course Teaching & Learning Activities	Activitie Lectures Tutorials	<b>es</b> S	Details		36		

and Weighting			course grade (%)	Methods to CLO Mapping
	Examination		50	
	Test		50	
Required/recommended reading and online materials	To be decided by the course instru H. Eves and C.V. Newsom: An Int Reinhart and Winston, 1958; 1990, G. Polya: How to Solve It (Princeto R. Laubenbacher and D. Pengelley R. Calinger (ed.): Classic of Mathe C. Boyer: A History of Mathematics V. Katz: A History of Mathematics (ed.):	troduction to the Foundations and lag and section) on University Press, 1971, 2nd edition or Mathematical Expeditions (Spring matics (Prentice Hall, preprinted 19 sections) (Wiley, 1968; 1989, 2nd edition (we have a sec	on) ger-Verlag, 1999) 995)	f Mathematics (Holt,

MATH3002	Mathematics seminar (6 credits)		Academic Yea	r 2021				
Offering Department	Mathem		•	Quota	12			
Course Co-ordinator	Prof T V	V Ng; Dr C Y Hui, Math	ematics (ntw@maths.hku.hl	k; chhui@maths.hku.hk)	·			
Teachers Involved		(Dr C Y Hui,Mathematics) (Prof T W Ng,Mathematics)						
Course Objectives	mathem make po their pre	This is a seminar style course intended for those who have very strong interests and good ability in mathematics. Students will be given book chapters and elementary research articles for private study and ther make presentations in front of the whole class. Individual meetings with the instructors will be arranged prior to their presentations. Active participation in all the discussions is expected. The aim of the course is to let students learn how to initiate self/independent study in mathematics.						
Course Contents & Topics	Topics of	chosen by the instructo	rs, including chapters from b	oooks and elementary research article	S.			
Course Learning	On succ	essful completion of th	is course, students should b	e able to:				
Outcomes	CLO 1	CLO 1 Initiate private independent study on some interesting mathematical topics						
Pre-requisites (and Co-requisites and Impermissible combinations)		MATH2012, MATH210 to approval by the Dep	i1, MATH2211 and MATH22 partment.	41				
Offer in 2021 - 2022	Y 2	nd sem Offer in 2022	- 2023 : Y	Examination	No Exam			
Grade Descriptors (A+ to F)	A Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking, with evidence of original thought. Actively engage in and contribute substantially and fruitfully to class discussions. Apply highly effective organizational and presentational skills.							
	B Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Good participation in class discussions with generally good contributions. Apply effective organizational and presentational skills.							
	C Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Make some but not substantial fruitful contributions to class discussions. Apply moderately effective organizational and presentational skills.							
	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Contribute only in a limited way to fruitful and meaningful class discussions. Apply limited or barely effective organizational and presentational skills.							
	Fail  Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Make little or no meaningful contributions to class discussions. Organization and presentational skills are minimally effective or ineffective.							
Communication- intensive Course	N							
Course Type	Project-	based course						
Course Teaching	Activiti	es	Details		No. of Hours			
& Learning Activities	Meeting with supervisor		meeting of the whole class for up to three hours each teaching week		36			
	Reading	g / Self study	individual meetings with	n the instructors	72			
Assessment Methods and Weighting	Method	ls	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
		esentation		50	CLO 1			
	Resear	ch report		50	CLO 1			
Course Website	http://mo	oodle.hku.hk/						
Additional Course Information	(ií) This Timetab	course is not a capstor le:		course are recommended to take MAT	H4910.			

MATH3301	Algebra I (6 credits)	Academic Year	2021				
Offering Department	Mathematics	Quota					
Course Co-ordinator	Prof Y K Lau, Mathematics (yklau@maths.hku.hk)						
Teachers Involved	(Prof Y K Lau, Mathematics)						
Course Objectives	This course aims to present those fundamental topics and techniques of algebra that are finding wide applications in mathematics and the applied sciences. It is complete in itself, and may also be followed by MATH4302 Algebra II and MATH7502 Topics in Applied Discrete Mathematics.						
Course Contents & Topics	homomorphisms, direct product of groups, group actions.	<ul> <li>Groups: examples of groups, subgroups, cosets, Lagrange theorem, quotient groups, normal subgroups, group homomorphisms, direct product of groups, group actions.</li> <li>Rings: examples of rings, integral domains, ideals, fields of fractions, principal ideal domains, unique factorization domains.</li> <li>Fields: definition and examples of fields.</li> </ul>					
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 write down the precise definitions of the basic concepts in the "Course Contents"  CLO 2 give examples for each of the concepts in the "Course Contents"  CLO 3 understand basic properties of groups, rings, and fields						

Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in M	Pass in MATH2101						
Offer in 2021 - 2022	Y 1st	1st sem Offer in 2022 - 2023 : Y Examination Dec						
Grade Descriptors (A+ to F)	A	A Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.						
	В	Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.						
	С	but with some inadequace presentation or a number o	e understanding of key concepts and idea ies in applying the theorems through in f minor computational errors.	ncorrectly analysing problems wi	ith poor argument and			
	D		tanding of key concepts and ideas by beir applying the theorems through incorrectly nal errors.					
	Fail	Demonstrate poor and inaction being able to complete the	dequate understanding by not being able to solution.	identify appropriate theorems or	their applications, or not			
Communication- intensive Course	N							
Course Type	Lecture-ba	ased course						
Course Teaching	Activities	S	Details	No. of Hours				
& Learning Activities	Lectures			36				
	Tutorials				12			
	Reading /	/ Self study			100			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignme	ents	Take-home and/or in tutorials	10	CLO 1,2,3			
	Examinat	tion		50	CLO 1,2,3			
	Test			40	CLO 1,2,3			
		To be decided by the course instructor.  S. Lang: Undergraduate Algebra (Springer, 2004)  J.B. Fraleigh: A First Course in Abstract Algebra (Addison-Wesley, 1989, 4th edition)  N. Herstein: Abstract Algebra (Prentice-Hall, 1996)  T.W. Hungerford: Abstract Algebra: An Introduction (Saunders College Publishing, 1990, 2nd edition)						
Required/recommended reading and online materials	S. Lang: U J.B. Frale I.N. Herste	Jndergraduate Algebra igh: A First Course in Al ein: Abstract Algebra (P	(Springer, 2004) ostract Algebra (Addison-Wesley, ' rentice-Hall, 1996)	,	dition)			
reading and	S. Lang: U J.B. Fralei I.N. Herste T.W. Hung	Jndergraduate Algebra igh: A First Course in Al ein: Abstract Algebra (P	(Springer, 2004) ostract Algebra (Addison-Wesley, ' rentice-Hall, 1996)	,	dition)			
reading and online materials	S. Lang: U J.B. Fralei I.N. Herste T.W. Hung	Jndergraduate Algebra igh: A First Course in Al ein: Abstract Algebra (P gerford: Abstract Algebr dle.hku.hk/	(Springer, 2004) ostract Algebra (Addison-Wesley, ' rentice-Hall, 1996)	,	dition)			

MATH3303	Matrix tl	neory and its applications (6 credits)	Academic Year	2021			
Offering Department	Mathemat	ics	Quota				
Course Co-ordinator	Dr Y M Ch	nan, Mathematics (ymchan@maths.hku.hk)					
Teachers Involved	(Dr M Hua	ang,Mathematics)					
Course Objectives	and comb and socia to various	trix theory has a close connection with other mathematical subjects such as linear algebra, functional analysis d combinatorics. It also plays an important role in the development of many subjects in science, engineering d social sciences. In this course, students will be taught the fundamentals of matrix analysis and its application various kinds of practical problems. Mathematical software may be used in the course, so that students car rn how to use the computer to solve matrix problems.					
Course Contents & Topics	- Orthogo application Schur's to eigenvalue - Singular	<ul> <li>Eigenvalues and eigenvectors: similarities, applications on difference equations and differential equations.</li> <li>Orthogonality: inner products and the induced norms, orthogonality of null spaces and column spaces, applications to over- or under-determined systems, least squares fit. Unitary, normal, and hermitian matrices: Schur's triangularization theorem. Variational description of eigenvalues: applications in optimization and in eigenvalue estimation.</li> <li>Singular value decomposition: polar decomposition, pseudo inverse, spectral norm of matrices, interlacing inequalities for singular values. Jordan form and applications.</li> </ul>					
Course Learning	On succes	ssful completion of this course, students should be able to:					
Outcomes	CLO 1 have a good understanding on matrices, determinants, linear transformations, eigenval eigenvectors  CLO 2 understand the concept of similar matrices and the eigenvalue decomposition  CLO 3 understand the concept of orthogonality  CLO 4 understand the concept of unitary, normal, and Hermitian matrices  CLO 5 find the singular value decomposition of a matrix and apply the theory of singular values to si decomposition, pseudo inverse and spectral norm of matrices  CLO 6 understand the concept of the Jordan blocks, Jordan matrices and the Jordan canonical form of a						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in M	ATH2101 and MATH2102					
Offer in 2021 - 2022	N Off	er in 2022 - 2023 : N	Examination				
Grade Descriptors (A+ to F)	A	Demonstrate an excellent understanding of key concepts and ideas by being ab applications through correctly analysing problems, clearly and elegantly presentiand being able to carry out computations carefully and correctly, and with some in	ing correct logical reasoning	g and argumentation			
	В						
	С	Demonstrate an acceptable understanding of key concepts and ideas by being but with some inadequacies in applying the theorems through incorrectly presentation or a number of minor computational errors.					
	D	Demonstrate some understanding of key concepts and ideas by being able to a substantial inadequacies in applying the theorems through incorrectly analysing with substantial computational errors.					
	Fail	Demonstrate poor and inadequate understanding by not being able to identify a being able to complete the solution.	ppropriate theorems or the	ir applications, or not			

Communication- intensive Course	N				
Course Type	Lecture-based course				
Course Teaching	Activities	Details		No. of Hours	
& Learning Activities	Lectures			36	
	Tutorials			12	
	Reading / Self study			100	
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Examination		50	CLO 1,2,3,4,5,6	
	Test		50	CLO 1,2,3,4,5,6	
Required/recommended reading and online materials	Jack L. Goldberg: Matrix Theory with Applications (McGraw-Hill, 1991) Steven J. Leon: Linear Algebra with Applications (Macmillan, 1994, 4th edition) Chris Rorres & Howard Anton: Applications of Linear Algebra (Wiley, 1984, 3rd edition) Roger A. Horn & Charles R. Johnson: Matrix Analysis (Cambridge University Press, 1987) The Mathworks, Inc.: The Student Edition of Matlab (Version 4 for Microsoft Windows) (Prentice - Hall, 1995)				
Course Website	http://moodle.hku.hk/				
Additional Course	Timetable:				
Information	http://hkumath.hku.hk/~math/Time	etable/timetable2021_S2	2.pdf		

MATH3304	Introduc	tion to number t	heory (6 credits)	Academic Yea	r 2021	
Offering Department	Mathemat			Quota		
Course Co-ordinator	Dr B Kane	, Mathematics (bkai	ne@maths.hku.hk)	·	'	
Teachers Involved	(Dr B Kane,Mathematics)					
Course Objectives	To provide students with basic concepts about numbers, their properties and basic knowledge on the arithmetic of					
	interplay b	etween the multiplic further properties concerning them.	nbers are the building blocks of all cative and additive properties of prime and the distribution of the prime n Important applications of number	e numbers is particularly inter umbers, and some of the l	esting. The course ongstanding open	
Course Contents	-The cours	se will begin with s	ome basic notions in number theory	, including divisibility, greates	st common divisor	
& Topics	remainder reciprocity - Many we be explain - Dependi	theorem, solutions law. ell-known open prob led. Some current re ng on the time avai	nces, etc. It will then be followed by so of linear and polynomial congruence lems will be introduced. Application of the search on the prime numbers will be lable, the course will cover a selection of the search on diophantine approach.	ces, Fermat's Little theorem, of number theory to public ke discussed. on of further topics, such as	and the quadratic y cryptography wil the prime number	
Course Learning		•	nis course, students should be able to		,	
Outcomes		olve a system of line				
	CLO 2 so	olve polynomial con	gruences			
	CLO 3 de	etermine the solubili	ty of quadratic congruences by comp	utation of the Legendre symb	ol	
			ce of primitive roots and use them in	solving some exponential con	ngruences	
	CLO 5 understand the prime number theorem					
Pre-requisites		nderstanding some l ATH2101 and MATH	longstanding problems in number the	ory		
(and Co-requisites and Impermissible combinations)						
Offer in 2021 - 2022		sem Offer in 2022		Examination	May	
Grade Descriptors (A+ to F)	В	theorems and their apreasoning and argument Demonstrate a good u	gh and coherent understanding of key conc oplications through correctly analysing numb thation and being able to carry out computatior understanding of key concepts and ideas by	per theoretic problems, clearly pre ns carefully and correctly. being able to identify the appropria	senting correct logical ate theorems and their	
	С	applications through correctly analysing number theoretic problems, but with some minor errors/inadequacies in arguments and being able to present coherent logical reasoning and carry out computations carefully without major errors.  Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems,				
		but with some inadequacies in applying the theorems through incorrectly analysing problems with weak and fragmentary argument and presentation, or with moderate computational errors.				
	D	Demonstrate some superficial understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation, or with substantial computational errors.				
	Fail		I inadequate understanding of the key conc cations, or not being able to complete the solut		to identify appropriate	
Communication- intensive Course	N	Theorems of their applications	autoris, or not being able to complete the soluti	ion.		
Course Type	Lecture-ba	ased course				
Course Teaching	Activities	<b>S</b>	Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials				12	
	Reading /	Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents	Tutorials and Assignments	10	CLO 1,2,3,4,5,6	
	Examinat	ion		50 40	CLO 1,2,3,4,5,6	
	Test			40	CLO 1,2,3,4,5,6	

Course Website	http://moodle.hku.hk/
Additional Course	MATH3301 recommended but not required.
Information	Timetable:
	http://hkumath.hku.hk/~math/Timetable/timetable2122_S2.pdf

MATH3401	Analysis	s I (6 credits)		Ac	cademic Year	2021
Offering Department	Mathemat	ics		Qı	uota	
Course Co-ordinator	Prof M K P Ng, Mathematics (mng@maths.hku.hk)					
Teachers Involved	(Prof M K	P Ng, Mathematics	5)			
Course Objectives	This course extends to more general situations some basic results covered in Calculus and introduces some fundamental concepts which are essential for advanced studies in mathematical analysis.					
Course Contents & Topics	completer		onnectedness; pathwise	ness; interior; closure; derive connectedness; uniform co	,	•
Course Learning			this course, students sho	uld be able to:		
Outcomes			dge and understanding on identify objects that are	of the basic features of mather topological equivalent)	ematical analys	sis and point set
				matical analysis to analyze a specific function is uniformly		rel situations in a
				ovative examples and soluti curate mathematical statemen		andard problems
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in M	ATH2211				
Offer in 2021 - 2022	Y 1st	sem Offer in 202	22 - 2023 : Y	Ex	xamination	Dec
Grade Descriptors (A+ to F)	A Demonstrate a thorough understanding of all concepts and ideas by being able to draw complex connections among various concepts and apply the theorems through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation, and with some innovative approaches to solving problems.					
	B Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, reasoning, identifying the appropriate theorems, applications, or presentation.					
	Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with acceptable argument and presentation.					
	D Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation.					
	Fail Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not being able to complete the solution.					
Communication- intensive Course	N					
Course Type	Lecture-ba	ased course				
Course Teaching	Activities	3	Details			No. of Hours
& Learning Activities	Lectures					36
	Tutorials					12
	Reading /	Self study				100
Assessment Methods and Weighting	Methods	·	Details	Weightin course g	rade (%)	Assessment Methods to CLO Mapping
	Examinat	ion		5		CLO 1,2,3
	Test			5	0	CLO 1,2,3
Required/recommended reading and online materials		Nathematical Analy nciples of Mathema		·	·	
online malenais						
Course Website	http://moo	dle.hku.hk/				

MATH3403	Functi	ons of a complex variable (6 credits)		Academic Year	2021	
Offering Department	Mathen	atics		Quota		
Course Co-ordinator	Dr K K	Vong, Mathematics (kkwong@maths.hku.hk)				
Teachers Involved	(Dr K K	Wong,Mathematics)				
Course Objectives	physics function	urse is indispensable for studies in higher In this course, the students are introduces and are shown how to look at analyticity fro problems without losing sight of the geometric	ed to the fundamental commental commended in the comment of the comments of th	ncepts and prope	erties of analytic	
Course Contents & Topics	- Analyt - The C - Cauch - Taylor - Laure - Zeros	ex number system. c functions and elementary functions. auchy-Riemann equations. y's theorem and its applications. s series. t's series. singularities and poles. esidue Theorem and its applications.				
Course Learning	On successful completion of this course, students should be able to:					
Outcomes		CLO 1 recognize the theory of functions of a complex variable as a rigorous and foundational subject in mathematics				
	CLO 2 grasp the techniques from Cauchy-Riemann equations, power series expansion and Cauchy integral formulas to study analytic functions from different perspectives					
	CLO 3 compute contour integrals by calculating residues					

		apply such techniques to eal line	determine improper in	ntegrals such as those	for certain ratio	nal functions on the
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in MATH2211 and MATH2241					
Offer in 2021 - 2022	Y 2n	d sem Offer in 2022 - 2	2023 : Y		Examination	May
Grade Descriptors (A+ to F)	A	applications through correct	tly analysing problems, clea	ots and ideas by being able to orly and elegantly presenting correctly, and with some inno	correct logical reas	oning and argumentation
	В	applications through correc	tly analysing problems, but	and ideas by being able to with some minor inadequaci some minor computational en	es in arguments, ic	
	С	Demonstrate an acceptable but with some inadequaci presentation or a number of	ies in applying the theore	cepts and ideas by being abl ms through incorrectly ana	e to correctly identi lysing problems w	ify appropriate theorems, ith poor argument and
	D					
	Fail  Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not being able to complete the solution.					
Communication- intensive Course	N					
Course Type	Lecture-l	pased course				
Course Teaching	Activitie	es	Details			No. of Hours
& Learning Activities	Lectures	3				36
	Tutorials					12
	Reading / Self study				100	
Assessment Methods and Weighting	Method	S	Details		hting in final se grade (%)	Assessment Methods to CLO Mapping
	Examina	ation			50	CLO 1,2,3,4
	Test				50	CLO 1,2,3,4
Required/recommended reading and		and W.P. Novinger: Con D.J. Newman: Complex			s (Springer-Ver	lag)
online materials	K. Kodai	L.V. Ahlfors: Complex Analysis (McGraw-Hill, 3rd edition) K. Kodaira: Introduction to Complex Analysis (Cambridge) J.P. Gilman, I. Kra and R.E. Rodriguez: Complex Analysis: In the spirit of Lipman Bers (Springer-Verlag)				
Course Website		odle.hku.hk/				
Additional Course	Timetabl					
Information	http://hku	umath.hku.hk/~math/Time	etable/timetable2122_	S2.pdf		

MATH3405	Differe	ntial equations (6 credits)	Academic Year	2021		
Offering Department	Mathema	atics	Quota			
Course Co-ordinator	Dr H Y Z	hang, Mathematics (hyzhang@maths.hku.hk)				
Teachers Involved	(Dr H Y Z	Zhang,Mathematics)				
Course Objectives	importan	The standard topics in the wide field of ordinary differential equations (ODEs) included in this course are c importance to students of sciences and engineering. Our emphasis is on principles rather than routine calculation and our approach is a compromise between diversity and depth.				
Course Contents & Topics	- Existen - Second - Power s - Linear s - Qualitat	of elementary differential equations. ce and uniqueness theorems. order differential equations, Wronskian, variation of paramete series method, Legendre polynomials, Bessel functions. systems, autonomous systems. tive properties of solutions. blace transform.	rs.			
Course Learning	On succe	essful completion of this course, students should be able to:				
Outcomes		olve simple first order and second order (linear or nonlinea auxiliary equations, variation of parameters, Laplace transform,		niques, including		
	CLO 2 solve systems of first order linear ODEs with constant coefficients, of which the number of equations and the number of unknown functions are no more than three					
	CLO 3 discuss qualitatively the solutions of nonlinear ODEs or systems of nonlinear ODEs by studying their linear approximations or their phase diagrams					
	CLO 4 apply the theory of differential equations to study quantitatively/qualitatively problems arising from physical and life sciences					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in (	MATH2101 and MATH2211) or MATH2014 or (MATH1821 an	d MATH2822)			
Offer in 2021 - 2022	Y 2n	d sem Offer in 2022 - 2023 : Y	Examination	Mav		
Grade Descriptors (A+ to F)	Α	Demonstrate an excellent understanding of key concepts and ideas by be applications through correctly analysing problems, clearly and elegantly p and being able to carry out computations carefully and correctly, and with	resenting correct logical reasonir	ng and argumentation		
	В					
	Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.					
	D	Demonstrate some understanding of key concepts and ideas by being all substantial inadequacies in applying the theorems through incorrectly anal with substantial computational errors.				
	Fail	Demonstrate poor and inadequate understanding by not being able to ide being able to complete the solution.	ntify appropriate theorems or the	ir applications, or not		
Communication-	N					

intensive Course				
Course Type	Lecture-based course			
Course Teaching	Activities	Details		No. of Hours
& Learning Activities	Lectures			36
	Tutorials			12
	Reading / Self study			100
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments		10	CLO 1,2,3,4
	Examination		50	CLO 1,2,3,4
	Test		40	CLO 1,2,3,4
Required/recommended reading and online materials	http://aimath.org/textbooks/ap R. Nagle, E. Saff and A. Snid 6th edition)	proved-textbooks/trench-de er: Fundamentals of Differe a: Elementary Differential E	ential Equations and Boundary Value equations and Boundary Value Proble	Problems (Pearson,
Course Website	http://moodle.hku.hk/	,	. , ,	
Additional Course	Timetable:			
Information	http://hkumath.hku.hk/~math/1	Fimetable/timetable2122 S2	2.pdf	

MATH3408		ational methods and differenti ions (6 credits)	al equations with	Academ	ic Year	2021
Offering Department	Mathema	ics		Quota		
Course Co-ordinator	Prof W K	Ching, Mathematics (wching@hku.hk	()			
eachers Involved	(Prof W K Ching, Mathematics)					
Course Objectives		se covers topics in the fields of diffe				
		of importance to sciences students.	The emphasis is praction	cal applications of ba	asic prin	ciples.
Course Contents	- Solution of linear difference equations.					
& Topics		atical modelling and dynamical system	ms.			
		al differentiation and integration.	4!			
		rization for solving linear system of e orms and iterative solutions of matrix				
		of nonlinear systems of equations.	equations.			
		ary differential equations and powers	series method			
		al solutions of ordinary and partial dif				
		al solutions of systems of first-order o		ations.		
Course Learning	On succe	ssful completion of this course, stude	nts should be able to:			
Outcomes	CLO 1 co	onstruct and implement numerical me	ethods for numerical int	tegration and differe	ntiation,	and the solutio
	O	linear and nonlinear system of equat	ions			
		xplain mathematical ideas of numeric		matical modelling in	solving	linear difference
		quations, ordinary and partial differen				
		onstruct one-step and linear multiste				
		dinary differential equations and sys	stems of such equatio	ns and analyze the	ir stabili	ty and accurac
	properties					
	CLO 4 construct finite difference methods for the numerical solution of partial differential equations and analyze					
				o. partial amoranti	•	
	th	eir stability and accuracy properties		•		ro nackagaa lik
	CLO 5 in	eir stability and accuracy properties plement numerical methods for solv		•		re packages lik
Pro-ronuisitos	CLO 5 in	eir stability and accuracy properties oplement numerical methods for solv ATLAB	ing initial and boundar	y value problems b		re packages lik
-	CLO 5 in	eir stability and accuracy properties plement numerical methods for solv	ing initial and boundar	y value problems b		re packages lik
and Co-requisites	CLO 5 in	eir stability and accuracy properties oplement numerical methods for solv ATLAB	ing initial and boundar	y value problems b		re packages lik
and Co-requisites and Impermissible	CLO 5 in	eir stability and accuracy properties oplement numerical methods for solv ATLAB	ing initial and boundar	y value problems b		re packages lik
and Co-requisites and Impermissible combinations)	CLO 5 in N	eir stability and accuracy properties oplement numerical methods for solv ATLAB	ing initial and boundar	y value problems b	y softwa	re packages lik
and Co-requisites and Impermissible combinations) Offer in 2021 - 2022	CLO 5 in N	eir stability and accuracy properties aplement numerical methods for solv ATLAB MATH2101 and MATH2211) or MATH is sem Offer in 2022 - 2023 : Y Demonstrate an excellent understanding of	ing initial and boundar I2014 or (MATH1821 a	y value problems by nd MATH2822)  Examina by being able to identify	y softwa	May
and Co-requisites and Impermissible combinations) Offer in 2021 - 2022	Pass in (I	eir stability and accuracy properties aplement numerical methods for solv ATLAB MATH2101 and MATH2211) or MATH  I sem Offer in 2022 - 2023 : Y Demonstrate an excellent understanding of computational methods and their application	ing initial and boundar  12014 or (MATH1821 a  15 key concepts and ideas bons through correctly analys	y value problems by nd MATH2822)  Examina by being able to identify sing problems, clearly ar	y softwa  ation the approad elegant	May priate theorems an
Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)	Pass in (I	eir stability and accuracy properties aplement numerical methods for solv ATLAB MATH2101 and MATH2211) or MATH is sem Offer in 2022 - 2023 : Y Demonstrate an excellent understanding of	ing initial and boundar  12014 or (MATH1821 a  15 key concepts and ideas bons through correctly analys	y value problems by nd MATH2822)  Examina by being able to identify sing problems, clearly ar	y softwa  ation the approad elegant	May priate theorems an
and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Pass in (I	eir stability and accuracy properties aplement numerical methods for solv ATLAB MATH2101 and MATH2211) or MATH  I sem Offer in 2022 - 2023 : Y  Demonstrate an excellent understanding of computational methods and their application logical reasoning and argumentation and be approaches to solving problems.  Demonstrate a good understanding of ke	ing initial and boundar I2014 or (MATH1821 a  If key concepts and ideas boos through correctly analyseing able to carry out computery concepts and ideas by	y value problems by nd MATH2822)  Examina by being able to identify ing problems, clearly artations carefully and corr being able to identify the second corrections.	y softwa ation the appro- id elegant ectly, and he appropri	May priate theorems an ly presenting corre- with some innovative
and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Pass in (I	eir stability and accuracy properties aplement numerical methods for solv ATLAB MATH2101 and MATH2211) or MATH  I sem Offer in 2022 - 2023 : Y  Demonstrate an excellent understanding of computational methods and their application in the computation and be approaches to solving problems.  Demonstrate a good understanding of ke computational methods and their application in the computational methods and their applicational methods and their app	ing initial and boundar  12014 or (MATH1821 a  If key concepts and ideas bons through correctly analyseing able to carry out computery concepts and ideas by ons through correctly analyses	y value problems by nd MATH2822)  Examina by being able to identify ing problems, clearly artations carefully and corrubeing able to identify trising problems, but with	y softwa ation the approde elegant ectly, and the approprisone m	May priate theorems are ly presenting correwith some innovation or inadequacies
and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Pass in (I	eir stability and accuracy properties aplement numerical methods for solv ATLAB MATH2101 and MATH2211) or MATH  I sem Offer in 2022 - 2023 : Y  Demonstrate an excellent understanding of computational methods and their application logical reasoning and argumentation and be approaches to solving problems.  Demonstrate a good understanding of ke	ing initial and boundar  12014 or (MATH1821 a  If key concepts and ideas bons through correctly analyseing able to carry out computery concepts and ideas by ons through correctly analyses	y value problems by nd MATH2822)  Examina by being able to identify ing problems, clearly artations carefully and corrubeing able to identify trising problems, but with	y softwa ation the approde elegant ectly, and the approprisone m	May priate theorems are ly presenting correwith some innovation or inadequacies
and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Pass in (I	eir stability and accuracy properties aplement numerical methods for solv ATLAB MATH2101 and MATH2211) or MATH  I sem Offer in 2022 - 2023 : Y  Demonstrate an excellent understanding of computational methods and their application (logical reasoning and argumentation and be approaches to solving problems.  Demonstrate a good understanding of ke computational methods and their application arguments, identifying the appropriate theorem winor computational errors.  Demonstrate an acceptable understanding	ing initial and boundar I2014 or (MATH1821 a If key concepts and ideas b Ins through correctly analyseing able to carry out compute It concepts and ideas by	y value problems by nd MATH2822)  Examina by being able to identify sing problems, clearly ar tations carefully and corr being able to identify to sing problems, but with hods or their applications by being able to correctly	y softwar  ation the appropriate elegant ectly, and he appropriate and preserve in and preserve y identify a	May priate theorems are ly presenting correwith some innovative oriate theorems and inor inadequacies in entation or with some appropriate theorem.
and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Pass in (I)  Y 2nd  B	eir stability and accuracy properties aplement numerical methods for solv ATLAB MATH2101 and MATH2211) or MATH  I sem Offer in 2022 - 2023 : Y  Demonstrate an excellent understanding of computational methods and their applicatif logical reasoning and argumentation and be approaches to solving problems.  Demonstrate a good understanding of ke computational methods and their application arguments, identifying the appropriate theor minor computational errors.  Demonstrate an acceptable understanding and computational methods, but with some	ing initial and boundar  12014 or (MATH1821 a  If key concepts and ideas bous through correctly analyseing able to carry out computer on through correctly analysems and computational method for the concepts and ideas be inadequacies in applying the concepts and ideas the concepts and ideas the concepts and ideas the concepts and ideas the concepts and ideas in applying the concepts and ideas in a concepts and ideas in a concept the concepts and ideas in a concept the concepts and ideas in a concept the concepts and ideas in a concept the concepts and ideas in a concept the concepts and ideas in a concept the concept the concepts and ideas in a concept the concept th	y value problems by nd MATH2822)  Examina by being able to identify sing problems, clearly ar tations carefully and corr being able to identify to sing problems, but with hods or their applications by being able to correctly	y softwar  ation the appropriate elegant ectly, and he appropriate and preserve in and preserve y identify a	May priate theorems and by presenting correct with some innovative priate theorems and inor inadequacies it is entation or with some appropriate theorems
and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Pass in (I)  Y 2nd  B	eir stability and accuracy properties aplement numerical methods for solv ATLAB MATH2101 and MATH2211) or MATH  I sem Offer in 2022 - 2023 : Y  Demonstrate an excellent understanding of computational methods and their application (logical reasoning and argumentation and be approaches to solving problems.  Demonstrate a good understanding of ke computational methods and their application arguments, identifying the appropriate theorem winor computational errors.  Demonstrate an acceptable understanding	ing initial and boundar al 2014 or (MATH1821 al f key concepts and ideas by ons through correctly analyseing able to carry out computery concepts and ideas by ons through correctly analysems and computational method f key concepts and ideas by one through correctly analysems and computational method in applying the inadequacies in applying in infor computational errors.	y value problems by nd MATH2822)  Examina by being able to identify ing problems, clearly artations carefully and corrupteing able to identify the triangle of the problems, but with hods or their applications by being able to correctly them through incorrectly	ation the approduced elegant electry, and he appropriate and preserve y identify a nallysing	May priate theorems an ly presenting corre- with some innovativa priate theorems an inor inadequacies i entation or with som appropriate theorem I problems with poor
and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Pass in (NA)  Pass in (NA)  Pass in (NA)  Pass in (NA)  Pass in (NA)  Pass in (NA)  Pass in (NA)  Pass in (NA)  Pass in (NA)  Pass in (NA)  Pass in (NA)  Pass in (NA)  Pass in (NA)  Pass in (NA)  Pass in (NA)  Pass in (NA)  Pass in (NA)	eir stability and accuracy properties aplement numerical methods for solv ATLAB MATH2101 and MATH2211) or MATH  I sem Offer in 2022 - 2023 : Y  Demonstrate an excellent understanding of computational methods and their applicatic logical reasoning and argumentation and be approaches to solving problems.  Demonstrate a good understanding of ke computational methods and their applicating arguments, identifying the appropriate theorminor computational errors.  Demonstrate an acceptable understanding and computational methods, but with some argument and presentation or a number of in Demonstrate some understanding of key computational methods, but with substantial methods and their applications are computational methods, but with substantial methods and their applications are provided in the prov	ing initial and boundar in in itial and boundar in itial and it in itial and it in itial and it in itial and it in itial and it in itial and it in itial and it in itial and it in itial and it in itial and it in itial and it in itial and it in itial and it in itial and it in itial and it in itial and it in itial and it in itial and it in itial and it in in it in it in it in it in it in it in it in it in it in it in in it in in it	Examina by being able to identify the sing problems, clearly art attions carefully and corr being able to identify the sing problems, but with hods or their applications by being able to correctly them through incorrectly ing able to correctly iden	y softwar  ation the appropriate elegant ectly, and he appropriate and pressive in and pressive interpretation of the appropriation of	May priate theorems an ly presenting correct with some innovativ oriate theorems an inor inadequacies i entation or with som appropriate theorem g problems with poor
and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Pass in (NA)  Pass in (NA)	eir stability and accuracy properties aplement numerical methods for solv ATLAB MATH2101 and MATH2211) or MATH  I sem Offer in 2022 - 2023 : Y  Demonstrate an excellent understanding of computational methods and their application logical reasoning and argumentation and be approaches to solving problems.  Demonstrate a good understanding of key computational methods and their application arguments, identifying the appropriate theorem in computational errors.  Demonstrate an acceptable understanding and computational methods, but with some argument and presentation or a number of momentarial some understanding of key computational methods, but with substantial argument or presentation or w	ing initial and boundar I2014 or (MATH1821 a I2014	Examina by being able to identify training problems, clearly artations carefully and corrective them through incorrectly them through incorrectly identifying able to correctly identifying able to identify the correctly identifying able to identify the correctly identifying able to identify the correctly identified able to identified able to identify the correctly identified able to identify the corr	y softwar  ation the approduce ectly, and he appropriate and press y identify a analysing	May priate theorems an ly presenting corre with some innovativ priate theorems an inor inadequacies i entation or with som appropriate theorem g problems with poor priate theorems an g problems with poor
and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Pass in (NA)  Pass in (NA)  Pass in (NA)  Pass in (NA)  Pass in (NA)  Pass in (NA)  Pass in (NA)  Pass in (NA)  Pass in (NA)  Pass in (NA)  Pass in (NA)  Pass in (NA)  Pass in (NA)  Pass in (NA)  Pass in (NA)  Pass in (NA)  Pass in (NA)	eir stability and accuracy properties aplement numerical methods for solv ATLAB MATH2101 and MATH2211) or MATH  I sem Offer in 2022 - 2023 : Y  Demonstrate an excellent understanding of computational methods and their applicatic logical reasoning and argumentation and be approaches to solving problems.  Demonstrate a good understanding of ke computational methods and their applicating arguments, identifying the appropriate theorminor computational errors.  Demonstrate an acceptable understanding and computational methods, but with some argument and presentation or a number of in Demonstrate some understanding of key computational methods, but with substantial methods and their applications are computational methods, but with substantial methods and their applications are provided in the prov	ing initial and boundar I2014 or (MATH1821 a I2014 or (MATH1821 a I2014 or (MATH1821 a I2014 or (MATH1821 a I2014 or (MATH1821 a I2014 or (MATH1821 a I2014 or (MATH1821 and I2014 or (MATH1821 a) Idea I2014 or (MATH1821 and I2014	Examina by being able to identify training problems, clearly artations carefully and corrective them through incorrectly them through incorrectly identifying able to correctly identifying able to identify the correctly identifying able to identify the correctly identifying able to identify the correctly identified able to identified able to identify the correctly identified able to identify the corr	y softwar  ation the approduce ectly, and he appropriate and press y identify a analysing	May priate theorems an ly presenting correct with some innovativ priate theorems an inor inadequacies i entation or with som appropriate theorem g problems with poor priate theorems an g problems with poor
and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Pass in (NA)  Pass in (NA)	eir stability and accuracy properties aplement numerical methods for solv ATLAB MATH2101 and MATH2211) or MATH  I sem Offer in 2022 - 2023 : Y  Demonstrate an excellent understanding of computational methods and their application approaches to solving problems.  Demonstrate a good understanding of key computational methods and their applicational methods and their applicational methods and their applicational methods and their applicational arguments, identifying the appropriate theorem incomputational methods, but with some argument and presentation or a number of note that the propositional methods is the solution of the propositional methods and their applicational methods and their application and computational methods and their application of the proposition	ing initial and boundar I2014 or (MATH1821 a I2014 or (MATH1821 a I2014 or (MATH1821 a I2014 or (MATH1821 a I2014 or (MATH1821 a I2014 or (MATH1821 a I2014 or (MATH1821 and I2014 or (MATH1821 a) Idea I2014 or (MATH1821 and I2014	Examina by being able to identify training problems, clearly artations carefully and corrective them through incorrectly them through incorrectly identifying able to correctly identifying able to identify the correctly identifying able to identify the correctly identifying able to identify the correctly identified able to identified able to identify the correctly identified able to identify the corr	y softwar  ation the approduce ectly, and he appropriate and press y identify a analysing	May priate theorems an ly presenting corre with some innovativ priate theorems an inor inadequacies i entation or with som appropriate theorem g problems with poor priate theorems an g problems with poor
and Co-requisites and Impermissible combinations)  Offer in 2021 - 2022  Grade Descriptors (A+ to F)  Communication- ntensive Course Course Type	Pass in (NAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	eir stability and accuracy properties aplement numerical methods for solv ATLAB MATH2101 and MATH2211) or MATH  I sem Offer in 2022 - 2023 : Y  Demonstrate an excellent understanding of computational methods and their application approaches to solving problems.  Demonstrate a good understanding of key computational methods and their applicational methods and their applicational methods and their applicational methods and their applicational arguments, identifying the appropriate theorem incomputational methods, but with some argument and presentation or a number of note that the propositional methods is the solution of the propositional methods and their applicational methods and their application and computational methods and their application of the proposition	ing initial and boundar I2014 or (MATH1821 a I2014 or (MATH1821 a I2014 or (MATH1821 a I2014 or (MATH1821 a I2014 or (MATH1821 a I2014 or (MATH1821 a I2014 or (MATH1821 and I2014 or (MATH1821 a) Idea I2014 or (MATH1821 and I2014	Examina by being able to identify training problems, clearly artations carefully and corrective them through incorrectly them through incorrectly identifying able to correctly identifying able to identify the correctly identifying able to identify the correctly identifying able to identify the correctly identified able to identified able to identify the correctly identified able to identify the corr	y softwar  ation the approduce ectly, and he appropriate and press y identify a analysing	May priate theorems an ly presenting corre with some innovativ priate theorems an inor inadequacies i entation or with som appropriate theorem g problems with poor priate theorems an g problems with poor
and Co-requisites and Impermissible combinations)  Offer in 2021 - 2022  Grade Descriptors (A+ to F)  Communication- ntensive Course Course Type	Pass in (NAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	eir stability and accuracy properties aplement numerical methods for solv ATLAB MATH2101 and MATH2211) or MATH I sem Offer in 2022 - 2023 : Y Demonstrate an excellent understanding of computational methods and their applicatiological reasoning and argumentation and be approaches to solving problems. Demonstrate a good understanding of ke computational methods and their application arguments, identifying the appropriate theor minor computational errors. Demonstrate an acceptable understanding and computational methods, but with some argument and presentation or a number of in Demonstrate some understanding of key computational methods, but with substantial permonstrate poor and inadequate understand or their applications, or not being able to corassed course	ing initial and boundar I2014 or (MATH1821 a I2014 or (MATH1821 a I2014 or (MATH1821 a I2014 or (MATH1821 a I2014 or (MATH1821 a I2014 or (MATH1821 a I2014 or (MATH1821 and I2014 or (MATH1821 a) Idea I2014 or (MATH1821 and I2014	Examina by being able to identify training problems, clearly artations carefully and corrective them through incorrectly them through incorrectly identifying able to correctly identifying able to identify the correctly identifying able to identify the correctly identifying able to identify the correctly identified able to identified able to identify the correctly identified able to identify the corr	y softwar  ation the approduce ectly, and he appropriate and press y identify a analysing	May priate theorems an ly presenting corre with some innovativ priate theorems an inor inadequacies i entation or with som appropriate theorem g problems with poor priate theorems an g problems with poor
and Co-requisites and Impermissible combinations)  Offer in 2021 - 2022  Grade Descriptors (A+ to F)  Communication- intensive Course Course Type Course Teaching	Pass in (Pass  eir stability and accuracy properties aplement numerical methods for solv ATLAB MATH2101 and MATH2211) or MATH I sem Offer in 2022 - 2023 : Y Demonstrate an excellent understanding of computational methods and their applicatiological reasoning and argumentation and be approaches to solving problems. Demonstrate a good understanding of ke computational methods and their application arguments, identifying the appropriate theor minor computational errors. Demonstrate an acceptable understanding and computational methods, but with some argument and presentation or a number of in Demonstrate some understanding of key computational methods, but with substantial permonstrate poor and inadequate understand or their applications, or not being able to corassed course	ing initial and boundar I2014 or (MATH1821 a I2014 or (MATH1821 a I2014 or (MATH1821 a I2014 or (MATH1821 a I2014 or (MATH1821 a I2014 or (MATH1821 a I2014 or (MATH1821 and I2014 or (MATH1821 a) Idea I2014 or (MATH1821 and I2014	Examina by being able to identify training problems, clearly artations carefully and corrective them through incorrectly them through incorrectly identifying able to correctly identifying able to identify the correctly identifying able to identify the correctly identifying able to identify the correctly identified able to identified able to identify the correctly identified able to identify the corr	y softwar  ation the approduce ectly, and he appropriate and press y identify a analysing	May priate theorems an ly presenting corre- with some innovativ oriate theorems an inor inadequacies i entation or with som appropriate theorem groblems with poor priate theorems an groblems with poor problems with poor	
and Co-requisites and Impermissible combinations)  Offer in 2021 - 2022  Grade Descriptors (A+ to F)  Communication- intensive Course Course Type Course Teaching	Pass in (NA) Pass	eir stability and accuracy properties aplement numerical methods for solv ATLAB MATH2101 and MATH2211) or MATH I sem Offer in 2022 - 2023 : Y Demonstrate an excellent understanding of computational methods and their applicatiological reasoning and argumentation and be approaches to solving problems. Demonstrate a good understanding of ke computational methods and their application arguments, identifying the appropriate theor minor computational errors. Demonstrate an acceptable understanding and computational methods, but with some argument and presentation or a number of in Demonstrate some understanding of key computational methods, but with substantial permonstrate poor and inadequate understand or their applications, or not being able to corassed course	ing initial and boundar I2014 or (MATH1821 a I2014 or (MATH1821 a I2014 or (MATH1821 a I2014 or (MATH1821 a I2014 or (MATH1821 a I2014 or (MATH1821 a I2014 or (MATH1821 and I2014 or (MATH1821 a) Idea I2014 or (MATH1821 and I2014	Examina by being able to identify training problems, clearly artations carefully and corrective them through incorrectly them through incorrectly identifying able to correctly identifying able to identify the correctly identifying able to identify the correctly identifying able to identify the correctly identified able to identified able to identify the correctly identified able to identify the corr	y softwar  ation the approduce ectly, and he appropriate and press y identify a analysing	May priate theorems an ly presenting corre with some innovativ priate theorems an inor inadequacies i entation or with som appropriate theorem groblems with poor priate theorems an groblems with poor priate theorems an groblems with poor priate theorems an groblems with poor priate theorems and groblems with poor priate theorems and groblems with poor priate theorems and groblems with poor priate theorems and groblems with poor
and Co-requisites and Impermissible combinations)  Offer in 2021 - 2022  Grade Descriptors (A+ to F)	Pass in (IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	eir stability and accuracy properties aplement numerical methods for solv ATLAB MATH2101 and MATH2211) or MATH I sem Offer in 2022 - 2023 : Y Demonstrate an excellent understanding of computational methods and their applicatiological reasoning and argumentation and be approaches to solving problems. Demonstrate a good understanding of ke computational methods and their application arguments, identifying the appropriate theor minor computational errors. Demonstrate an acceptable understanding and computational methods, but with some argument and presentation or a number of in Demonstrate some understanding of key computational methods, but with substantial permonstrate poor and inadequate understand or their applications, or not being able to corassed course	ing initial and boundar I2014 or (MATH1821 a I2014 or (MATH1821 a I2014 or (MATH1821 a I2014 or (MATH1821 a I2014 or (MATH1821 a I2014 or (MATH1821 a I2014 or (MATH1821 and I2014 or (MATH1821 a) Idea I2014 or (MATH1821 and I2014	Examina by being able to identify training problems, clearly artations carefully and corrective them through incorrectly them through incorrectly identifying able to correctly identifying able to identify the correctly identifying able to identify the correctly identifying able to identify the correctly identified able to identified able to identify the correctly identified able to identify the corr	y softwar  ation the approduce ectly, and he appropriate and press y identify a analysing	May priate theorems an ly presenting correct with some innovativ priate theorems an inor inadequacies i entation or with som appropriate theorem problems with poor priate theorems an problems with poor priate theorems an problems with poor priate theorems an problems with poor priate theorems and problems with poor priate theorems and problems with poor priate theorems and problems with poor priate theorems and problems with poor priate theorems and problems with poor priate theorems and problems with poor priate theorems and problems with poor problems with

	Examination		50	CLO 1,2,3,4,5		
	Test		50	CLO 1,2,3,4,5		
Required/recommended reading and	D.F. Parkhurst: Introduction to Applied Mathematics for Environmental Science (Springer) E.A. Coddington: An Introduction to Ordinary Differential Equations (Prentice-Hall)					
online materials	A. Ralston and P. Rabinowitz: A Fi	rst Course in Numerical Analysis (N	/lcGraw-Hill)			
Course Website	http://moodle.hku.hk/					
Additional Course	Timetable:					
Information	http://hkumath.hku.hk/~math/Timet	table/timetable2122_S2.pdf				

MATH3541	Introduc	ction to topology (6	credits)	Acade	mic Year	2021
Offering Department	Mathemat	ics		Quota		
Course Co-ordinator	Prof J H L	Prof J H Lu, Mathematics (jhlu@maths.hku.hk)				
Teachers Involved	(Prof J H Lu, Mathematics)					
Course Objectives	will empha	This course aims at introducing students to fundamental knowledge in topology and some of its applications. We will emphasize more on building geometric intuition and links between topology and other subjects. It can help brepare students for more advanced Mathematics and Physics courses and future research in Mathematics Physics, Computer Science and Biology.				
Course Contents & Topics	(i) Basic p (ii) Topolo	I be chosen among the oint-set topology: topological groups and orbit simental groups, covering	ogical spaces, product an spaces.	d quotient spaces.		
Course Learning			course, students should b	pe able to:		
Outcomes			ctions in point-set topolog			
			er examples for concepts			
	CLO 3 ur	nderstand basic ideas c	of fundamental groups and	d its application to the surface	classifica	tion problem
Pre-requisites		ATH2101, MATH2102		•		
(and Co-requisites and Impermissible combinations)		,		olled in MATH3301 and MAT	H3401.	
Offer in 2021 - 2022	Y 2nd	sem Offer in 2022 - :	2023 : N	Exami	nation	May
Grade Descriptors (A+ to F)	A Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.					
	B Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.					
	C Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.					
	Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.					
	<b>Fail</b> Demonstrates poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or no being able to complete the solution.					
Communication- intensive Course	N					
Course Type	Lecture-ba	ased course				
Course Teaching	Activities	3	Details			No. of Hours
& Learning Activities	Lectures					
	Tutorials					12
	Reading / Self study					100
Assessment Methods and Weighting	Methods		Details	Weighting in course grade	(%)	Assessment Methods to CLO Mapping
	Assignments			10		CLO 1,2,3
	Examination			50		CLO 1,2,3
	, ,				CLO 1,2,3	
O	Recomme	ecommended reference:				
•	1. James	lames R. Munkres: Topology (Pearson, 2000)				
reading and		R. Munkres: Topology ( mstrong: Basic topolog				
reading and online materials  Course Website	2. M A. Ar					

MATH3600	Discrete mathematics (6 credits)	Academic Year	2021
Offering Department	Mathematics	Quota	
Course Co-ordinator	Dr K H Law, Mathematics (lawkaho@connect.hku.hk)		
Teachers Involved	(Dr K H Law, Mathematics)		
Course Objectives	To introduce students to the basic ideas and techniques of discrete mathematics	S.	
Course Contents & Topics	<ul> <li>Counting: combinations, permutations, pigeonhole principle, inclusion-exc generating functions.</li> <li>Graph theory: paths, circuits, trees, connectivity, planarity, etc.</li> <li>Applications of counting techniques and graph theory.</li> </ul>	lusion, recurrence	e relations, and
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 demonstrate knowledge and understanding of the basic ideas and techr CLO 2 solve various real-world problems by using counting techniques and gra CLO 3 develop their ability to read, comprehend, and create mathematical argu	ph theory	mathematics
Pre-requisites (and Co-requisites and Impermissible	Pass in (MATH1013 and any 1 of Level 2 MATH courses) or (MATH1851 and MATH courses) or MATH2014 or (MATH1821 and MATH2822)	d MATH1853 and	any 1 of level 2

Offer in 2021 - 2022	Y 19	st sem Offer in 2022	- 2023 : Y	Examination	Dec	
Grade Descriptors (A+ to F)	A	A Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.				
	В	Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.				
	С	Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.				
	D		erstanding of key concepts and ideas by be s in applying the theorems through incorrectly ational errors.			
	Fail	Demonstrate poor and being able to complete	inadequate understanding by not being able the solution.	to identify appropriate theorems or	their applications, or no	
Communication- intensive Course	N					
Course Type	Lecture-	based course				
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures			36		
	Tutorials					
	Reading / Self study		Students are expected to wa classes.	100		
Assessment Methods and Weighting	Method	Is	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignments		Tutorials, assignments, participation, etc.	10	CLO 1,2,3	
	Examination			50	CLO 1,2,3	
	Test			40	CLO 1,2,3	
Required/recommended reading and online materials	Richard	Richard A. Brualdi: Introductory Combinatorics (Pearson)				
Course Website	http://mo	oodle.hku.hk/				
Additional Course	Timetab	le:				
nformation	http://hk	umath.hku.hk/~math/T	imetable/timetable2122_S1.pdf			

MATH3601	Numeri	cal analysis (6 cred	lits)	A	cademic Year	2021	
Offering Department	Mathema	atics		Q	luota		
Course Co-ordinator	Dr Z Zha	Dr Z Zhang, Mathematics (zhangzw@maths.hku.hk)					
Teachers Involved	(Dr Z Zha	ang,Mathematics)	·				
Course Objectives	This cou	This course covers both the theoretical and practical aspects of numerical analysis. Emphasis will be on basic					
	principles	s and numerical method	s of solution, using high speed of	omputers.			
Course Contents & Topics	- Polynor - Solutior - Direct a - Numerio	<ul> <li>Different types of errors, condition number, and convergence order.</li> <li>Polynomial interpolation and function approximation.</li> <li>Solution of equations of one variable.</li> <li>Direct and iterative methods for solving linear systems.</li> <li>Numerical differentiation and integration.</li> <li>Simple initial value problems for Ordinary Differential Equations.</li> </ul>					
Course Learning			course, students should be able				
Outcomes	fi CLO 2 a CLO 3 c	CLO 1 construct and implement algorithms to find the zeros of functions, apply the bisection, Newton, Secant a fixed point iteration methods; and construct and implement Newton's method to solve a system nonlinear equations  CLO 2 apply direct and iterative methods for solving linear equation systems  CLO 3 construct interpolation polynomials in Lagrange, Newton, Hermite and spline forms  CLO 4 understand the basic numerical integration and differentiation methods  CLO 5 apply Euler methods and Runge-Kutta methods to solve initial value problems					
	CLO 5 a	pply Euler methods and	Runge-Kutta methods to solve	initial value proble			
	CLO 5 a	ipply Euler methods and ise software package su	l Runge-Kutta methods to solve uch as Scilab or Matlab or Pytho	initial value proble n to solve numeric	al problems		
Pre-requisites (and Co-requisites and Impermissible combinations)	CLO 5 a	ipply Euler methods and ise software package su	Runge-Kutta methods to solve	initial value proble n to solve numeric	al problems		
(and Co-requisites and Impermissible combinations)	CLO 5 a CLO 6 u Pass in (	ipply Euler methods and ise software package su	d Runge-Kutta methods to solve uch as Scilab or Matlab or Pytho 2211) or MATH2014 or (MATH18	initial value proble n to solve numeric 321 and MATH282	al problems	Dec	
(and Co-requisites and Impermissible	CLO 5 a CLO 6 u Pass in (	pply Euler methods and use software package su MATH2101 and MATH2  t sem Offer in 2022 - 2  Demonstrate an exceller theorems/algorithms and to reasoning and argumentat	Runge-Kutta methods to solve ich as Scilab or Matlab or Pytho 2211) or MATH2014 or (MATH18 2023 : Y int understanding of key concepts a their applications through correctly analytion and being able to carry out numerical	initial value proble n to solve numeric 321 and MATH282 Ei and methods by bei sing problems, clearly	cal problems  22)  Examination  ing able to identically and elegantly pres	fy the appropriate enting correct logica	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	CLO 5 a CLO 6 u Pass in (	t sem Offer in 2022 - 2  Demonstrate an exceller theorems/algorithms and treasoning and argumentat approaches to solving prol Demonstrate a good unde and their applications through the company that their applications through the company that th	Runge-Kutta methods to solve ich as Scilab or Matlab or Pytho 2211) or MATH2014 or (MATH18 2023 : Y int understanding of key concepts a their applications through correctly analytion and being able to carry out numerical	initial value proble n to solve numeric 321 and MATH282 and methods by bei ning problems, clearly al procedures carefully by being able to iden with some minor inac	cal problems  22)  Examination  ing able to identify and elegantly pressorand correctly, and attify the appropriate	fy the appropriate enting correct logica with some innovative theorems/algorithms	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	CLO 5 a CLO 6 u Pass in (	t sem Offer in 2022 - 2 Demonstrate an exceller theorems/algorithms and treasoning and argumentat approaches to solving prol Demonstrate a good unde and their applications through a proportiate algorithms or the Demonstrate an acceptal theorems/algorithms, but we solve the solving prologorial algorithms or the proportial algorithms or the proportial and theorems/algorithms, but we solve the so	Runge-Kutta methods to solve ach as Scilab or Matlab or Pythol 2211) or MATH2014 or (MATH18 2023 : Y and understanding of key concepts a their applications through correctly analytion and being able to carry out numerical blems. Perstanding of key concepts and methods ough correctly analysing problems, but	initial value proble n to solve numeric 321 and MATH282 and MATH282 and methods by bei sing problems, clearly al procedures carefully by being able to iden with some minor inac nputational errors. di methods by being theorems/methods thro	examination ing able to identify and elegantly presonant correctly, and tify the appropriate dequacies in argumable to correctly	fy the appropriate enting correct logica with some innovative theorems/algorithms ents, identifying the identify appropriate	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	CLO 5 a CLO 6 u Pass in (	t sem Offer in 2022 - 2  Demonstrate an excelle theorems/algorithms and treasoning and argumentat approaches to solving prol Demonstrate a good unde and their applications threappropriate algorithms of Demonstrate an acceptal theorems/algorithms, but we poor argument and presendents of the promonstrate some und theorems/algorithms, but we poor argument and presendents of the promostrate some und theorems/algorithms, but we poor argument and presendents of the promostrate some und theorems/algorithms, but we poor argument and presendents of the promostrate some und theorems/algorithms, but we poor argument and presendents of the promostrate some und theorems/algorithms, but we poor argument and presendents of the promostrate some und theorems/algorithms, but we poor argument and presendents of the promostrate some und theorems/algorithms, but we poor argument and presendents of the promostrate some und the pr	Runge-Kutta methods to solve uch as Scilab or Matlab or Pythol 2211) or MATH2014 or (MATH18 2023 : Y and understanding of key concepts a their applications through correctly analytion and being able to carry out numerical blems.  In the standing of key concepts and methods ough correctly analysing problems, but their applications or with some minor cor ble understanding of key concepts are with some inadequacies in applying the	initial value proble n to solve numeric 321 and MATH282 and methods by bei sing problems, clearly al procedures carefully by being able to iden with some minor inac nputational errors. di methods by being theorems/methods thro ational errors. ethods by being at the theorems/methods the theorems/methods	examination ing able to identify and elegantly presonant correctly, and thiffy the appropriate dequacies in argumable to correctly ough incorrectly in the correctly in the corr	fy the appropriate enting correct logica with some innovative theorems/algorithms lents, identifying the identify appropriate allysing problems with dentify appropriate appropriate appropriate appropriate appropriate	
and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	CLO 5 a CLO 6 u Pass in (	t sem Offer in 2022 - 2 Demonstrate an exceller theorems/algorithms and treasoning and argumenta approaches to solving prol Demonstrate a good unde and their applications throappropriate algorithms or to Demonstrate an acceptal theorems/algorithms, but whoor argument and presen Demonstrate some und theorems/algorithms, but with poor argument and presen Demonstrate some und theorems/algorithms, but with poor argument and presen Demonstrate poor and in Demonstrate poor and in the solution of	Runge-Kutta methods to solve uch as Scilab or Matlab or Pythologich as Scilab or Matlab or Pythologich as Scilab or Matlab or Pythologich as Scilab or Matlab or (MATH18) and the standing of key concepts a cheir applications through correctly analytion and being able to carry out numerical blems.  In the standing of key concepts and methods ough correctly analysing problems, but their applications or with some minor combe understanding of key concepts and with some inadequacies in applying the station or with a number of minor computerstanding of key concepts and methods of the station or with a number of minor computerstanding of key concepts and methods of the station of	initial value proble n to solve numeric 321 and MATH282 321 and MATH282 322 and methods by bein not problems, clearly al procedures carefully by being able to iden with some minor inac nputational errors. Id methods by being theorems/methods thro ational errors. ethods by being at the theorems/methods onal errors.	examination ing able to identify and elegantly preson and correctly, and hitry the appropriate dequacies in argumals able to correctly and ble to correctly is through incorrectly is	fy the appropriate enting correct logica with some innovative theorems/algorithms ents, identifying the identify appropriate lysing problems with dentify appropriate y analysing problems	
and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)	CLO 5 a CLO 6 u Pass in (	t sem Offer in 2022 - 2 Demonstrate an exceller theorems/algorithms and treasoning and argumenta approaches to solving prol Demonstrate a good unde and their applications throappropriate algorithms or to Demonstrate an acceptal theorems/algorithms, but whoor argument and presen Demonstrate some und theorems/algorithms, but with poor argument and presen Demonstrate some und theorems/algorithms, but with poor argument and presen Demonstrate poor and in Demonstrate poor and in the solution of	Runge-Kutta methods to solve uch as Scilab or Matlab or Pythologich as Scilab or Matlab or Pythologich as Scilab or Matlab or Pythologich as Scilab or Matlab or (MATH18 2011) or MATH2014 or (MATH18 2011) or MATH2014 or (MATH18 2011) or MATH2014 or (MATH18 2011) or MATH2014 or (MATH18 2011) or MATH2014 or Concepts and methods ough correctly analysing problems, but their applications or with some minor corb ble understanding of key concepts and with some inadequacies in applying the attation or with a number of minor computerstanding of key concepts and mith substantial inadequacies in applying resentation or with substantial computatinadequate understanding by not bein	initial value proble n to solve numeric 321 and MATH282 321 and MATH282 322 and methods by bein not problems, clearly al procedures carefully by being able to iden with some minor inac nputational errors. Id methods by being theorems/methods thro ational errors. ethods by being at the theorems/methods onal errors.	examination ing able to identify and elegantly preson and correctly, and hitry the appropriate dequacies in argumals able to correctly and ble to correctly is through incorrectly is	fy the appropriate enting correct logica with some innovative theorems/algorithms ents, identifying the identify appropriate lysing problems with dentify appropriate y analysing problems	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)	CLO 5 a CLO 6 u Pass in (  Y 1s  A  B  C  D  Fail	t sem Offer in 2022 - 2 Demonstrate an exceller theorems/algorithms and treasoning and argumenta approaches to solving prol Demonstrate a good unde and their applications throappropriate algorithms or to Demonstrate an acceptal theorems/algorithms, but whoor argument and presen Demonstrate some und theorems/algorithms, but with poor argument and presen Demonstrate some und theorems/algorithms, but with poor argument and presen Demonstrate poor and in Demonstrate poor and in the solution of	Runge-Kutta methods to solve uch as Scilab or Matlab or Pythologich as Scilab or Matlab or Pythologich as Scilab or Matlab or Pythologich as Scilab or Matlab or (MATH18 2011) or MATH2014 or (MATH18 2011) or MATH2014 or (MATH18 2011) or MATH2014 or (MATH18 2011) or MATH2014 or (MATH18 2011) or MATH2014 or Concepts and methods ough correctly analysing problems, but their applications or with some minor corb ble understanding of key concepts and with some inadequacies in applying the attation or with a number of minor computerstanding of key concepts and mith substantial inadequacies in applying resentation or with substantial computatinadequate understanding by not bein	initial value proble to solve numeric 321 and MATH282 and MATH282 and methods by being all procedures carefully by being able to iden with some minor inacomputational errors. Id methods by being theorems/methods throational errors. ethods by being at the theorems/methods onal errors.	examination ing able to identify and elegantly preson and correctly, and hitry the appropriate dequacies in argumals able to correctly and ble to correctly is through incorrectly is	fy the appropriate enting correct logica with some innovative theorems/algorithms ents, identifying the identify appropriate lysing problems with dentify appropriate y analysing problems	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	CLO 5 a CLO 6 u Pass in (  Y 1s  A  B  C  D  Fail	t sem Offer in 2022 - 2  Demonstrate an exceller theorems/algorithms and treasoning and argumentat approaches to solving prol Demonstrate a good under and their applications threapropriate algorithms or appropriate algorithms, but with poor argument and presendems/algorithms, but with poor argument and presendems/algorithms, but with poor argument and promonstrate some undutheorems/algorithms, but with poor argument and promonstrate poor and in applications, or not being a possed course	Runge-Kutta methods to solve uch as Scilab or Matlab or Pythologich as Scilab or Matlab or Pythologich as Scilab or Matlab or Pythologich as Scilab or Matlab or (MATH18 2011) or MATH2014 or (MATH18 2011) or MATH2014 or (MATH18 2011) or MATH2014 or (MATH18 2011) or MATH2014 or (MATH18 2011) or MATH2014 or Concepts and methods ough correctly analysing problems, but their applications or with some minor corb ble understanding of key concepts and with some inadequacies in applying the attation or with a number of minor computerstanding of key concepts and mith substantial inadequacies in applying resentation or with substantial computatinadequate understanding by not bein	initial value proble to solve numeric 321 and MATH282 and MATH282 and methods by being all procedures carefully by being able to iden with some minor inacomputational errors. Id methods by being theorems/methods throational errors. ethods by being at the theorems/methods onal errors.	cal problems (22)  (xamination ing able to identify and elegantly presized and correctly, and attify the appropriate dequacies in argumable to correctly and incorrectly and incorrectly in the appropriate theorems	fy the appropriate enting correct logica with some innovative theorems/algorithms ents, identifying the identify appropriate lysing problems with dentify appropriate y analysing problems	

	Tutorials			12
	Reading / Self study			100
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Examination		50	CLO 1,2,3,4,5,6
	Test		50	CLO 1,2,3,4,5,6
Required/recommended reading and online materials	Instructor's Lecture Notes A. Ralston and P. Rabinowitz: A Fi K. E. Atkinson: An Introduction to N		,	
Course Website	http://moodle.hku.hk/			
Additional Course	Timetable:			
Information	http://hkumath.hku.hk/~math/Time	table/timetable2122_S1.p	df	

MATH3603	Probabi	lity theory (6 cre	edits)	Academic Ye	ar 2021		
Offering Department	Mathemat	tics		Quota			
Course Co-ordinator	Dr Z Qu, N	Z Qu, Mathematics (zhengqu@maths.hku.hk)					
Teachers Involved		Mathematics)					
Course Objectives	fundamen	ntal principles of pro	will be on probability models and the bbability theory through examples a this course to widely divergent concr	nd to develop the ability of the			
Course Contents & Topics	moment g -Condition variance, -Markov c probabilition	Sasic probability theory: random variable, discrete and continuous probability distributions, expectation, variance, noment generating function, strong law of large numbers, central limit theorem.  Conditional probability theory: conditional probability, Bayes theorem, conditional expectation, conditional pariance, compound random variable, Polya's urn model, Bose-Einstein statistics.  Markov chain theory: concepts of states and transition probability, irreducibility, stationary distribution, limiting robabilities, reversibility, hidden Markov chain, applications in marketing and genetic problems, branching rocess, Markov decision process.  Poisson process and reliability theory: exponential distribution, memoryless property, Poisson process, concepts					
Course Learning			this course, students should be able	to:			
Outcomes			gnize the fundamental principles of p				
	pr	roblems	oofs and computational techniques ge and understanding of various typ	. , , ,	ly them to concrete		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in (M	/IATH2101 and MAT	TH2211) or MATH2014 or (MATH18:	21 and MATH2822)			
Offer in 2021 - 2022	Y 1st	sem Offer in 2022	2 - 2023 : Y	Examination	Dec		
Grade Descriptors (A+ to F)	B C	applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.  B Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.  C Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.					
	with substantial computational errors.  Fail  Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not being able to complete the solution.						
Communication- intensive Course	N	being able to complete	s uto solution.				
Course Type	Lecture-ba	ased course					
Course Teaching	Activities	S	Details		No. of Hours		
& Learning Activities	Lectures				36		
	Tutorials				12		
	Reading /	/ Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents	Coursework assessment	10	CLO 1,2,3		
	Examination			50	CLO 1,2,3		
	Test		Two midterm tests	40	CLO 1,2,3		
Required/recommended reading and online materials	S.M. Ross	s: Introduction to Pro	obability Models (Academic Press, 2	007, 9th ed.)			
	http://moo	odle.hku.hk/					
Course Website	Tittp://iiioo	AIC.TIKU.TIK					
Course Website Additional Course	Timetable						

MATH3901	Operations research I (6 credits)	Academic Year	2021
Offering Department	Mathematics	Quota	
Course Co-ordinator	Dr Z Qu, Mathematics (zhengqu@maths.hku.hk)		
Teachers Involved	(Dr Z Qu,Mathematics)		
Course Objectives	The objective is to provide a fundamental account of the basic results and tech and its related topics in operations research. The topics include the simplex		

	parametri	c programming, decom	position method, cutting plane me	ethods and branch and bound	d.	
	together	there is an equal emphasis on all the three aspects of theories, algorithms and applications. The course serve ogether with the course MATH3943 Network Models in Operations Research, as essential concept an ackground for more advanced studies in operations research.				
Course Contents & Topics	- Duality t - Sensitivi - Ellipsoid	ty analysis and parame	etric linear programming			
Course Learning			course, students should be able	to:		
Outcomes		nderstand the fundame operations research	ntal concept and approach of line	ear programming appropriate	to the further study	
	ex	tensions such as the d	and understanding of the under ual simplex algorithm and the dec		lex method and its	
			e theory of integer programming			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in M	ATH2014 or MATH210	1 or MATH2102			
Offer in 2021 - 2022	Y 1st	sem Offer in 2022 - 2	2023 : Y	Examination	Dec	
Grade Descriptors (A+ to F)	A Demonstrate an excellent understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and to solve problems with some innovative approaches.					
	В	Demonstrate a good understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.				
	Demonstrate an acceptable understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.					
	Demonstrate some understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.					
	<b>Fail</b> Demonstrate poor and inadequate understanding by not being able to identify basic principles, appropriate theorems, algorithms or their applications, or not being able to complete or compute the solution.					
Communication-	N	or area approauerie, or ries	s boiling about to boiling into an earlipate and a			
intensive Course						
Course Type	Lecture-b	ased course				
Course Teaching	Activities	8	Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials				12	
	Reading	/ Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignments		Coursework assessment	10	CLO 1,2,3	
	Examination			50	CLO 1,2,3	
	Test Two midterm tests 40				CLO 1,2,3	
reading and	D. Bertsin	J.P. Ignizio and T.M. Cavalier: Linear Programming (Prentice-Hall International, 1994) D. Bertsimas and J.N. Tsitsiklis: Introduction to Linear Optimization (Athena Scientific, 1997)				
online materials			thematical Programming (Duxbur	y 4/e 2003)		
Course Website	http://mod	odle.hku.hk/				
Additional Course Information	Timetable		etable/timetable2122_S1.pdf			

MATH3904	Introduction to optimization (6 credits)	Academic Year	2021			
Offering Department	Mathematics	Quota				
Course Co-ordinator	Prof W Zang, Mathematics (wzang@maths.hku.hk)	'				
Teachers Involved	(Prof W Zang,Mathematics)					
Course Objectives	This course introduces students to the theory and techniques of studies in operations research, mathematical economics and relative studies in operations.		g them for further			
Course Contents & Topics	<ul> <li>Unconstrained and constrained optimization.</li> <li>Necessary conditions and sufficient conditions for optimality, co</li> <li>Algorithms and numerical examples.</li> </ul>	nvexity, duality.				
Course Learning	On successful completion of this course, students should be able	to:				
Outcomes	CLO 1 demonstrate knowledge and understanding of the basic theory and techniques of optimization					
	CLO 2 solve various optimization problems encountered in practice					
	CLO 3 understand the connection between the purely analytical character of an optimization problem and the behavior of algorithms for solving it					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in (MATH2101 and MATH2211) or MATH2014 or (MATH18	321 and MATH2822)				
Offer in 2021 - 2022	Y 1st sem Offer in 2022 - 2023 : Y	Examination	Dec			
Grade Descriptors (A+ to F)	A Demonstrate an excellent understanding of key concepts and idea applications through correctly analysing problems, clearly and eleand being able to carry out computations carefully and correctly, a	gantly presenting correct logical reasoning	ng and argumentation			
	B Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and thei applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriat theorems or their applications and presentation or with some minor computational errors.					
	C Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.					

	D	substantial inadequad	emonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, ubstantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or preser ith substantial computational errors.				
	Fail	Demonstrate poor an being able to complet		not being able to identify appropriate theorems or	r their applications, or not		
Communication- intensive Course	N						
Course Type	Lecture-	based course					
Course Teaching	Activiti	es	Details		No. of Hours		
& Learning Activities	Lecture	S			36		
	Tutorials				12		
	Reading / Self study				100		
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Examin	ation		50	CLO 1,2,3		
	Test			50	CLO 1,2,3		
Required/recommended reading and online materials	Instructo	or's lecture notes					
Course Website	http://mc	oodle.hku.hk/					
Additional Course	Timetab	le:					
Information	http://hk	umath.hku.hk/~math	/Timetable/timetable2122_	S1.pdf			

MATH3905	Queueing theory and simulation (6 credits)  Academic Ye				cademic Year	2021	
Offering Department	Mathemat	ics	•	C	luota		
Course Co-ordinator	Dr G Han,	Mathematics (gha	an @maths.hku.hk)				
Teachers Involved							
Course Objectives		se introduces stud as a practical tool	dents to the models and the of analysis.	neory of queueing syster	n, as well as	the technique of	
Course Contents & Topics	- Markovia - Simulatio	n queueing netwo	nd Poisson processes, expor rks. Imbedded Markov-chain dels and discrete-event syste arlo (MC) method and Mark	queueing models. ems.	CMC) method.		
Course Learning	On succes	sful completion of	this course, students should	be able to:			
Outcomes	CLO 1 ur	nderstand the term	inology and nomenclature ap	opropriate to queueing the	eory		
	CLO 2 de	emonstrate knowle	dge and understanding of va	rious queueing models			
	CLO 3 fo	rmulate concrete p	problems using queueing the	oretical approaches			
	CLO 4 be	ecome familiar with	fundamental principles of si	mulation and compare dif	ferent simulation	n techniques	
	CLO 5 us	se Monte Carlo me	thod and Markov Chain Mon	ite Carlo method to condu	ct numerical si	mulations	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in (M	IATH2101 and MA	.TH2211) or MATH2014 or (I	MATH1821 and MATH282	?2)		
Offer in 2021 - 2022	N Offe	er in 2022 - 2023 :	Υ	E	xamination		
Grade Descriptors (A+ to F)	A Demonstrate an excellent understanding of key concepts and ideas by being able to identify appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and to solve problems with some innovative approaches.						
	B Demonstrate a good understanding of key concepts and ideas by being able to identify appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.						
	С	Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.					
	D	Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.					
	Fail	Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or no being able to complete the solution.					
Communication-	N						
intensive Course							
Course Type		ased course					
Course Teaching	Activities		Details			No. of Hours 36	
& Learning Activities	Lectures						
	Tutorials					12	
	Reading /	Self study				100	
Assessment Methods and Weighting	Methods		Details		ng in final grade (%)	Assessment Methods to CLO Mapping	
	Examination				50	CLO 1,2,3,4,5	
	1,11						
Required/recommended reading and online materials	R.B. Coop S.M. Ross S.M. Ross	est 50 CLO 1,2,3,4,5 B. Cooper: Introduction to Queueing Theory (Edward Arnold, 1981, 2nd ed.) M. Ross: Introduction to Probability Models (Academic Press, 1993, 7th ed., San Diego, California) M. Ross: A Course in Simulation (Macmillan, 1991)					
O			Methods in Financial Engine	eering (Springer Science	k Business Me	dia, 2004)	
Course Website	nttp://moo	dle.hku.hk/					

MATH3906	Financial calculus (6 credits)	Academic Year	2021
Offering Department	Mathematics	Quota	
Course Co-ordinator	Dr G Li, Mathematics (lotusli@maths.hku.hk)		
Teachers Involved	(Dr G Li,Mathematics)		

Course Objectives		This course gives an elementary treatment for the modeling of financial derivatives, asset pricing and market risks rom an applied mathematician's point of view. Stochastic calculus and solution methods will be introduced.				
Course Contents		An introduction to financial instruments: stocks, bonds, options, forward and future contracts.				
& Topics			, , , , , , , , , , , , , , , , , , ,	ple. Brownian motion, stochastic ca	alculus. Ito's Lemma.	
			pricing partial differential equa		,	
				ions, path dependent options. Bir	nomial tree Models.	
	Discrete N	∕lartingale.				
Course Learning	On succe	On successful completion of this course, students should be able to:				
Outcomes				nterest rates, forwards, futures, stoc	ks, options, and the	
		o-arbitrage-principle emonstrate knowled		dels to find option prices via the risk	-neutral concept	
			0	the Black-Scholes stock price mod		
				ma) to derive Black-Scholes pricin		
				tion to this partial differential equation		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in (N	MATH2101 and MA <sup>-</sup>	TH2211) or MATH2014 or (MA	TH1821 and MATH2822) or STAT2	2601	
Offer in 2021 - 2022	Y 2nd	sem Offer in 202	22 - 2023 : Y	Examination	May	
Grade Descriptors	A			nd ideas by being able to identify the appro	,	
(A+ to F)		applications through of and being able to carr	correctly analysing problems, clearly a y out computations carefully and corre	and elegantly presenting correct logical reas ectly, and with some innovative approaches t	oning and argumentation solving problems.	
	Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.					
	Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.					
	D Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with					
	substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or					
	with substantial computational errors.  Fail Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not					
	· uii	being able to complete			,,,	
Communication-	N					
intensive Course						
Course Type	Lecture-b	ased course				
Course Teaching	Activities	3	Details		No. of Hours	
& Learning Activities	Lectures			36		
	Tutorials				12	
	Reading	/ Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents		20	CLO 1,2,3,4	
	Examination			50	CLO 1,2,3,4	
	Test			30	CLO 1,2,3,4	
Required/recommended	A. Etheric	ae: A Course in Fin	ancial Calculus (Cambridge U	niversity Press)		
reading and				tion to Derivative Pricing (Cambrid	ge University Press,	
online materials	1996)					
	P. Wilmot	t, S. Howison, J. De	ewynne: The Mathematics of F	inancial Derivatives (Cambridge Un	iversity Press, 1995)	
			erivative Securities (South-We	stern College Publishing, 1994)		
Course Website		dle.hku.hk/				
Additional Course	Timetable	-				
Information			/Timetable/timetable2122 S2.	IE		

MATH3911	Game th	neory and strategy (6 credits)  Academic Year	2021				
Offering Department	Mathemat	ics Quota					
Course Co-ordinator	Dr K H La	w, Mathematics (lawkaho@connect.hku.hk)					
Teachers Involved	(Dr K H La	aw,Mathematics)					
Course Objectives		ory is the logical analysis of situations of conflict and cooperation. This course will intro ic ideas and techniques of mathematical game theory in an interdisciplinary context.	duce the student				
Course Contents & Topics	theorem; r	atorial games and Zermelo's Theorem; Prisonner's Dilemma; pure and mixed str mixed Nash equilibria. on to biology: evolutionary stable strategies; games in coalition form; Shapley value. on to politics: Shapley-Shubik power index; core and von Neumann-Morgenstern solution					
Course Learning		ssful completion of this course, students should be able to:					
Outcomes	CLO 1 ur	CLO 1 understand the basic terminology and solution concepts in game theory					
	CLO 2 compute explicitly different solution concepts for some simple cooperative and non-cooperative games						
	CLO 3 apply game theoretical ideas and methods to solve some problems in economics and biology						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in (M	Pass in (MATH2101 and MATH2211) or (MATH1821 and MATH2822)					
Offer in 2021 - 2022	Y 2nd	I sem Offer in 2022 - 2023 : Y Examination	May				
Grade Descriptors (A+ to F)	A Demonstrate an excellent understanding of key concepts and ideas of Game Theory by being able to identify the appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.						
	B Demonstrate a good understanding of key concepts and ideas of Game Theory by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.						
	C Demonstrate an acceptable understanding of key concepts and ideas of Game Theory by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.						
		Demonstrate some understanding of key concepts and ideas of Game Theory by being able to correct	ly identify appropriat				

	D	theorems, but with substant or presentation or with subs	ial inadequacies in applying the theorems th tantial computational errors.	rough incorrectly analysing prob	olems with poor argument		
	Fail	Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not being able to complete the solution.					
Communication- intensive Course	N	N .					
Course Type	Lecture-l	based course					
Course Teaching	Activitie	es	Details		No. of Hours		
& Learning Activities	Lectures	3			36		
	Tutorials	3			12		
	Reading	/ Self study	Students are expected to watch classes.	100			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignm	nents	Tutorials, assignments, project, participation, etc.	25	CLO 1,2,3		
	Examina	ation		50	CLO 1,2,3		
	Test			25	CLO 1,2,3		
Required/recommended reading and online materials	[Referen	[Textbook] L.C. Thomas: Games, Theory and Applications (Dover Publications, 2003) [Reference] Alan D. Taylor and Allison M. Pacelli, Mathematics and Politics: Strategy, Voting, Power, and Proof (Springer-Verlag, 2009)					
Course Website	http://mo	odle.hku.hk/					
Additional Course Information	Timetabl http://hku	= -	etable/timetable2122_S2.pdf				

MATH3943	Network models in o	operations research (6 credits)	Academic Ye	ar 2021			
Offering Department	Mathematics		Quota				
Course Co-ordinator	Dr. K H Law, Mathematic	or. K H Law, Mathematics (lawkaho@connect.hku.hk)					
Teachers Involved	(Dr K H Law, Mathematic	es)					
Course Objectives	operations research. The applications. The course	The objective is to provide a fundamental account of the basic results and techniques of network models in operations research. There is an equal emphasis on all three aspects of understanding, algorithms and applications. The course serves, together with a course on linear programming, to provide essential concept and background for more advanced studies in operations research.					
Course Contents & Topics	<ul> <li>Trees, matchings and p</li> <li>Network models of tran</li> <li>Ford-Fulkerson network</li> </ul>	<ul> <li>Graphs and algorithms.</li> <li>Trees, matchings and paths.</li> <li>Network models of transportation and assignment problems.</li> <li>Ford-Fulkerson network flow theory and computation for maximum flow and minimum cost flow algorithms.</li> <li>Applications to combinatorial optimization problems such as allocation, location and sequencing.</li> </ul>					
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	further study of o	fundamental concept and approach of goperations research	•				
	algorithms and the	wledge and understanding of the underlyineir extensions heory of network flows and the duality asp					
Pre-requisites		MATH2211) or MATH2014.	Coto iii Suori metrious Of now	Computations			
(and Co-requisites and Impermissible combinations)	1 ass in (MATTIZ TOT and	WAT12211) 61 WAT12014.					
Offer in 2021 - 2022	Y 1st sem Offer in	2022 - 2023 : N	Examination	Dec			
Grade Descriptors (A+ to F)	A Demonstrate an excellent understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and to solve problems with some innovative approaches.						
	B Demonstrate a good understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.  C Demonstrate an acceptable understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications but with some inadequacies in applying the theorems through incorrectly analysing						
	problems with poor argument and presentation or a number of minor computational errors.  Demonstrate some understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications but with substantial inadequacies in applying the theorems through incorrectly analysing						
	problems with poor argument or presentation or with substantial computational errors.  Fail  Demonstrate poor and inadequate understanding by not being able to identify basic principles, appropriate theorems, algorithms or their applications, or not being able to complete or compute the solution.						
Communication- ntensive Course	N	one, or not boing able to complete or compare and co	adon.				
Course Type	Lecture-based course			No. of Hours			
Course Teaching	Activities	Details	Details				
Learning Activities	Lectures			36 12			
	Tutorials						
	Reading / Self study	Students are expected to wa classes.		100			
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignments	Tutorials, assignments, participation, etc.	10	CLO 1,2,3			
	Examination		50 40	CLO 1,2,3 CLO 1,2,3			

reading and online materials	
Course Website	http://moodle.hku.hk/
Additional Course	Timetable:
Information	http://hkumath.hku.hk/~math/Timetable/timetable2122_S1.pdf

MATH3999	Directe	d studies in mather	matics (6 credits)	Academic Y	ear 2021			
Offering Department	Mathema	itics		Quota				
Course Co-ordinator	Prof X Yu	ıan, Mathematics <i>(xmyı</i>	uan @hku.hk)					
Teachers Involved	(All teach	(All teaching staff,Mathematics)						
Course Objectives	This cour studies.	This course is designed for students who would like to have early experiences on research related independent studies.						
Course Contents & Topics	student r		t will be determined by consultation nding and get the approval from b					
Course Learning	On succe	On successful completion of this course, students should be able to:						
Outcomes			topic that is not available in the reg					
			matical theories are applied and/or	r extended in problem-solvi	ng			
			ect writing and oral presentation					
Pre-requisites (and Co-requisites and Impermissible combinations)	only. The Pass in MATH4X	earliest that a student i at least 24 credits of	athematics / Mathematics (Intensivits allowed to take this capstone contradict advanced level disciplinary contradict (Intensit Mathematics) (Intensit is allowed to the Mathematics) (Intensit is allowed to the Mathematics) (Intensit is allowed to the Mathematics) (Intensit is allowed to the Mathematics) (Intensit is allowed to the Mathematics) (Intensit is allowed to the Mathematics) (Intensit is allowed to the Mathematics) (Intensit is allowed to the Mathematics) (Intensit is allowed to the Mathematics) (Intensit is allowed to the Mathematics) (Intensit is allowed to take this capstone contradict is allowed to take the capstone contradict is allowed to take the capstone contradict is allowed to take the capstone contradict is allowed to take the capstone ca	urse is their year 3 study. e/elective mathematics co	ourses (MATH3XXX)			
Offer in 2021 - 2022	Y 1st	t sem 2nd sem Offe	r in 2022 - 2023 : Y	Examination	No Exam			
Grade Descriptors (A+ to F)	Α	original thought. Insightful	asp of the subject. Show strong analytical luse and critical evaluation of information use of data and results to draw appro tational skills	drawn from a broad range of hi	gh quality sources and to			
	В	Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Critical use of relevant information from sources, showing ability to make meaningful comparisons between different secondary interpretations and to reference aptly. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.						
	С	Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Use of relevant information from sources, showing ability to make comparisons between different interpretations and to reference aptly. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.						
	D	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Demonstrate use and reference of several sources, but mainly through summary rather than analysis and comparison. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.						
	Fail	Demonstrate evidence of analytical and critical abili	little or no grasp of the knowledge and ities, logical and coherent thinking. Limited results and/or unable to draw appropria	understanding of the subject. Evid use of secondary sources and	no critical comparison of			
Communication- intensive Course	N							
Course Type	Project-b	ased course						
Course Teaching	Activitie		Details		No. of Hours			
& Learning Activities	Reading	/ Self study	independent work & to attend meetings & seminars		120			
Assessment Methods and Weighting	Methods	5	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Dissertat	tion	Written report plus oral presentation	100	CLO 1,2,3			
Additional Course Information	students application	who have declared Mon results will be annour report must be submitt	on procedure are released by em lajor in Mathematics/Mathematics nced in late July or early August. Fr ed by the end of the semester. Th	s (Intensive) will receive or or enquiry, please contact t	emails in June. The he Department.			

MATH4302	Algebra II (6 credits)	Academic Year	2021			
Offering Department	Mathematics	Quota				
Course Co-ordinator	Prof J H Lu, Mathematics (jhlu@maths.hku.hk)					
Teachers Involved	(Prof J H Lu,Mathematics)					
Course Objectives	This course is an extension of MATH3301 and continues with more advance be followed by MATH7501 and MATH7502.	d topics in algebra.	The course may			
Course Contents & Topics	<ul> <li>Principal ideal domains and unique factorization domains;</li> <li>Structure theorem for finitely generated modules of principal ideal domains with applications to finitely generated abelian groups and canonical forms of matrices;</li> <li>Field extensions; introduction to Galois theory.</li> </ul>					
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 understand basic examples of principal ideal domains and why processing factorization domains	orincipal ideal doma	ains are unique			
	CLO 2 understand the classification of finitely generated modules of principal ideal domains and certain canonical forms of matrices					
	CLO 3 understand and compute splitting fields of irreducible polynomials					
	CLO 4 compute examples of Galois groups					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in MATH2102 and MATH3301					

Offer in 2021 - 2022	Y 2n	nd sem Offer in 2022 -	2023 : Y	Examination	May		
Grade Descriptors (A+ to F)	A	Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.					
	В	applications through corre	ctly analysing problems, but	and ideas by being able to identify the appropr with some minor inadequacies in arguments, id some minor computational errors.			
	С	but with some inadequad		cepts and ideas by being able to correctly identi- ems through incorrectly analysing problems wi s.			
	D		applying the theorems thro	d ideas by being able to correctly identify approp ough incorrectly analysing problems with poor arg			
	Fail	Demonstrate poor and inable being able to complete the		ot being able to identify appropriate theorems or	their applications, or not		
Communication- intensive Course	N						
Course Type	Lecture-l	based course					
Course Teaching	Activities		Details	No. of Hours			
& Learning Activities	Lectures			36			
	Tutorials				12		
	Reading / Self study				100		
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignm	nents		10	CLO 1,2,3,4		
	Examina	ation		50	CLO 1,2,3,4		
	Test			40	CLO 1,2,3,4		
Required/recommended reading and		Goodman: Algeb mepage.math.uiowa.edu			book) url:		
online materials		ngerford: Abstract Algeb Dummit, Richard M. Foo	`	ooks/Cole, 1997, 2nd ed.) Wiley, 2003, 3rd ed.)			
Course Website	http://mo	odle.hku.hk/					
Additional Course Information	Timetabl http://hku						

MATH4402	Analys	is II (6 credits)		Acaden	nic Year	2021		
Offering Department	Mathema	atics		Quota				
Course Co-ordinator	Dr Y M C	Chan, Mathematics (y	mchan @maths.hku.hk)	<u>'</u>				
Teachers Involved	(Dr Y M	(Dr Y M Chan, Mathematics)						
Course Objectives	treatmen	This course gives a comprehensive and rigorous treatment on calculus of several variables, and a modern treatment of integration theory in the language of differential forms which is essential for more advanced studies in analysis and geometry.						
Course Contents & Topics	theorem, - Integra partition	- Differentiation of functions of several variables: partial derivatives, differential, differentiability, inverse function theorem, implicit function theorem, submanifolds in R^n, method of Lagrange multipliers Integration in R^n: Basic definitions, measure zero and content zero sets, integrability, Fubini's Theorem, partition of unity, change of variables Integration on chains: tensors, alternating tensors, vector fields, differential forms, Poincare Lemma, Stokes'						
Course Learning	On succe	essful completion of t	his course, students should be	able to:				
Outcomes	CLO 1 c	demonstrate knowled	lge and understanding of the manipulate differential forms	e modern language of ma	thematic	al analysis and		
			skills acquired in mathematica to determine the differentiabili					
		hink creatively and la of specific functions o	terally to generate innovative s n chains)	solutions to novel problems (	e.g., able	to do integration		
Pre-requisites and Co-requisites	Pass in N	MATH3401						
and Impermissible combinations)								
and Impermissible combinations)	N O	ffer in 2022 - 2023 : Y		Examin				
and Impermissible combinations) Offer in 2021 - 2022	A	Demonstrate an excell applications through co and being able to carry	ent understanding of key concepts an orrectly analysing problems, clearly ar out computations carefully and correc	d ideas by being able to identify the nd elegantly presenting correct logic ctly, and with some innovative appro	e appropria cal reasonir aches to so	ng and argumentatio olving problems.		
and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors		Demonstrate an excell applications through co and being able to carry Demonstrate a good upplications through co	ent understanding of key concepts an orrectly analysing problems, clearly ar	d ideas by being able to identify the delegantly presenting correct logically, and with some innovative approbeas by being able to identify the some minor inadequacies in argum	e appropria cal reasoninaches to so appropriate	ng and argumentatio olving problems. e theorems and thei		
and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	A	Demonstrate an excell applications through or and being able to carry Demonstrate a good upplications through or theorems or their applications through or theorems or their applications through or the properties of the same acception of the same acception or the same acception.	ent understanding of key concepts an orrectly analysing problems, clearly are out computations carefully and correct understanding of key concepts and in orrectly analysing problems, but with	d ideas by being able to identify the delegantly presenting correct logically, and with some innovative approdeas by being able to identify the some minor inadequacies in argum minor computational errors.  and ideas by being able to correcti	e appropria cal reasonir aches to so appropriate ents, ident	ng and argumentation of the problems. The state of the problems and the ifying the appropriate appropriate theorems.		
and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	В	Demonstrate an excell applications through or and being able to carry Demonstrate a good theorems or their applications through or theorems or their applicationstrate an acceptut with some inader presentation or a numb Demonstrate some under the process of the control of the	ent understanding of key concepts an orrectly analysing problems, clearly at out computations carefully and correct understanding of key concepts and is orrectly analysing problems, but with cations and presentation or with some table understanding of key concepts quacies in applying the theorems to the of minor computational errors. derstanding of key concepts and idea as in applying the theorems through in provident standard provident standard provident standard provident standard provident pro	d ideas by being able to identify the delegantly presenting correct logically, and with some innovative approdeas by being able to identify the some minor inadequacies in argum minor computational errors. and ideas by being able to correct hrough incorrectly analysing problems by being able to correctly as by being able to correctly and the source of	e appropria cal reasonir aches to so appropriate lents, ident ly identify a lems with	ng and argumentatio blving problems. e theorems and thei ifying the appropriat appropriate theorems poor argument and te theorems, but wit		
and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	A B C	Demonstrate an excell applications through or and being able to carry Demonstrate a good tapplications through or theorems or their applications through or theorems or their applications through or theorems or their application or an unit Demonstrate some unsubstantial inadequacie with substantial compu	ent understanding of key concepts an orrectly analysing problems, clearly are out computations carefully and correctly analysing problems, but with cations and presentation or with some table understanding of key concepts quacies in applying the theorems to the of minor computational errors. derstanding of key concepts and idea se in applying the theorems through in tational errors. inadequate understanding by not bei	d ideas by being able to identify the delegantly presenting correct logic class by being able to identify the some minor inadequacies in argum minor computational errors. and ideas by being able to correctly hrough incorrectly analysing problems by being able to correctly identify analysing apple to correctly analysing problems with property analysing problems with procure of the property of the	e appropria cal reasonir aches to so appropriate ents, ident by identify a lems with appropria	ng and argumentatio blving problems. e theorems and thei ifying the appropriat appropriate theorems poor argument and te theorems, but wit ent or presentation of		
and Impermissible combinations)  Offer in 2021 - 2022  Grade Descriptors (A+ to F)	B C	Demonstrate an excell applications through or and being able to carry Demonstrate a good utheorems or their applications through or theorems or their applicationstrate an accept but with some inadeupresentation or a numb Demonstrate some un substantial inadequacion with substantial compu Demonstrate poor and	ent understanding of key concepts an orrectly analysing problems, clearly are out computations carefully and correctly analysing problems, but with cations and presentation or with some table understanding of key concepts quacies in applying the theorems to the of minor computational errors. derstanding of key concepts and idea se in applying the theorems through in tational errors. inadequate understanding by not bei	d ideas by being able to identify the delegantly presenting correct logic class by being able to identify the some minor inadequacies in argum minor computational errors. and ideas by being able to correctly hrough incorrectly analysing problems by being able to correctly identify analysing apple to correctly analysing problems with property analysing problems with procure of the property of the	e appropria cal reasonir aches to so appropriate ents, ident by identify a lems with appropria	ng and argumentatio blving problems. e theorems and thei ifying the appropriat appropriate theorems poor argument and te theorems, but wit ent or presentation of		
nd Impermissible ombinations)  Offer in 2021 - 2022  Grade Descriptors (A+ to F)	A B C D Fail	Demonstrate an excell applications through or and being able to carry Demonstrate a good utheorems or their applications through or theorems or their applicationstrate an accept but with some inadeupresentation or a numb Demonstrate some un substantial inadequacion with substantial compu Demonstrate poor and	ent understanding of key concepts an orrectly analysing problems, clearly are out computations carefully and correctly analysing problems, but with cations and presentation or with some table understanding of key concepts quacies in applying the theorems to the of minor computational errors. derstanding of key concepts and idea se in applying the theorems through in tational errors. inadequate understanding by not bei	d ideas by being able to identify the delegantly presenting correct logic class by being able to identify the some minor inadequacies in argum minor computational errors. and ideas by being able to correctly hrough incorrectly analysing problems by being able to correctly identify analysing apple to correctly analysing problems with property analysing problems with processing problems.	e appropria cal reasonir aches to so appropriate ents, ident by identify a lems with appropria	ng and argumentatio blving problems. e theorems and thei ifying the appropriat appropriate theorems poor argument and te theorems, but wit ent or presentation of		
nd Impermissible ombinations)  Offer in 2021 - 2022  Grade Descriptors (A+ to F)  Communication- ntensive Course Course Type	A B C D Fail	Demonstrate an excell applications through or and being able to carry Demonstrate a good tapplications through or theorems or their applications through or theorems or their applications through or theorems or their application or a numb Demonstrate some under the properties of the	ent understanding of key concepts an orrectly analysing problems, clearly are out computations carefully and correctly analysing problems, but with cations and presentation or with some table understanding of key concepts quacies in applying the theorems to the of minor computational errors. derstanding of key concepts and idea se in applying the theorems through in tational errors. inadequate understanding by not bei	d ideas by being able to identify the delegantly presenting correct logic class by being able to identify the some minor inadequacies in argum minor computational errors. and ideas by being able to correctly hrough incorrectly analysing problems by being able to correctly identify analysing apple to correctly analysing problems with property analysing problems with processing problems.	e appropria cal reasonir aches to so appropriate ents, ident by identify a lems with appropria	ng and argumentatio blving problems. e theorems and the ifying the appropriat appropriate theorems poor argument and te theorems, but wit ent or presentation of		
nd Impermissible ombinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)  Communication- Intensive Course Course Type Course Teaching	A B C D Fail N Lecture-I	Demonstrate an excell applications through or and being able to carry Demonstrate a good to applications through or theorems or their applications through or theorems or their applications through or theorems or their application or a numb Demonstrate some under the presentation or a numb Demonstrate some under the substantial inadequacie with substantial compu Demonstrate poor and being able to complete the based course	ent understanding of key concepts an orrectly analysing problems, clearly at out computations carefully and correct understanding of key concepts and in orrectly analysing problems, but with cations and presentation or with some table understanding of key concepts quacies in applying the theorems to her of minor computational errors. derstanding of key concepts and idea as in applying the theorems through in tational errors. inadequate understanding by not bei the solution.	d ideas by being able to identify the delegantly presenting correct logic class by being able to identify the some minor inadequacies in argum minor computational errors. and ideas by being able to correctly hrough incorrectly analysing problems by being able to correctly identify analysing apple to correctly analysing problems with property analysing problems with processing problems.	e appropria cal reasonir aches to so appropriate ents, ident by identify a lems with appropria	ng and argumentation of the problems.  The theorems and the individual of the properties appropriate theorems poor argument and the theorems, but with the theorems, but with the presentation of the problems		
nd Impermissible ombinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)  Communication- Intensive Course Course Type Course Teaching	A B C D Fail N Lecture-I Activitie	Demonstrate an excell applications through or and being able to carry Demonstrate a good to applications through or theorems or their applications through or theorems or their applications through or theorems or their application or a numb Demonstrate and their presentation or a numb Demonstrate some unsubstantial inadequacie with substantial compu Demonstrate poor and being able to complete based course	ent understanding of key concepts an orrectly analysing problems, clearly at out computations carefully and correct understanding of key concepts and in orrectly analysing problems, but with cations and presentation or with some table understanding of key concepts quacies in applying the theorems to her of minor computational errors. derstanding of key concepts and idea as in applying the theorems through in tational errors. inadequate understanding by not bei the solution.	d ideas by being able to identify the delegantly presenting correct logic class by being able to identify the some minor inadequacies in argum minor computational errors. and ideas by being able to correctly hrough incorrectly analysing problems by being able to correctly identify analysing apple to correctly analysing problems with property analysing problems with processing problems.	e appropria cal reasonir aches to so appropriate ents, ident by identify a lems with appropria	ng and argumentation of the problems. The problems and the iffying the appropriate theorem poor argument and the theorems, but without or presentation of the problems. The problems is applications, or not the problems are problems.		
and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	A B C D Fail N Lecture-I Activitie Lectures Tutorials	Demonstrate an excell applications through or and being able to carry Demonstrate a good to applications through or theorems or their applications through or theorems or their applications through or theorems or their application or a numb Demonstrate and their presentation or a numb Demonstrate some unsubstantial inadequacie with substantial compu Demonstrate poor and being able to complete based course	ent understanding of key concepts an orrectly analysing problems, clearly at out computations carefully and correct understanding of key concepts and in orrectly analysing problems, but with cations and presentation or with some table understanding of key concepts quacies in applying the theorems to her of minor computational errors. derstanding of key concepts and idea as in applying the theorems through in tational errors. inadequate understanding by not bei the solution.	d ideas by being able to identify the delegantly presenting correct logic class by being able to identify the some minor inadequacies in argum minor computational errors. and ideas by being able to correctly hrough incorrectly analysing problems by being able to correctly identify analysing apple to correctly analysing problems with property analysing problems with processing problems.	e appropria cal reasonir aches to so appropriate ents, ident by identify a lems with appropria	ng and argumentatio blving problems. e theorems and the ifying the appropriat appropriate theorems poor argument and te theorems, but wit ent or presentation of eir applications, or no  No. of Hours 36		

				to CLO Mapping
	Examination		50	CLO 1,2,3
	Test		50	CLO 1,2,3
Required/recommended reading and online materials	Apostol: Mathematical Analysis Munkres: Analysis on Manifolds Rudin: Principles of Mathematical A Spivak: Calculus on Manifolds	Analysis		
Course Website	http://moodle.hku.hk/			
Additional Course Information	Timetable: http://hkumath.hku.hk/~math/Timet	able/timetable2122_S2.pdf		

MATH4404	Function	nal analysis (6 cred	dits)		Academic Year	2021	
Offering Department	Mathemat		,		Quota		
Course Co-ordinator	Dr C W W	Dr C W Wong, Mathematics (cwwongab@hku.hk)					
Teachers Involved	(Dr C W Wong,Mathematics)						
Course Objectives	This cour modern a		s to the basic knowled	ge of linear functional a	analysis, an imp	oortant branch of	
Course Contents & Topics	<ul> <li>Normed spaces, Banach spaces: Finite dimensional normed spaces and subspaces. Compactness and finite dimension. Bounded linear operators. Normed spaces of operators, dual space.</li> <li>Inner product spaces, Hilbert spaces: Orthogonal complements, direct sums. Orthonormal sets and sequences, series related to orthonormal sets and sequences. Total orthonormal sets and sequences. Special polynomials. Riesz's representation theorem. Adjoint operator, self-adjoint, normal and unitary operators.</li> <li>Fundamental theorems for normed and Banach spaces: Hahn-Banach theorem. Reflexive spaces. Category theorem, uniform boundedness principle. Open mapping theorem. Closed graph theorem.</li> <li>Spectral theory of linear operators.</li> </ul>						
Course Learning	On succes	ssful completion of this	course, students should	l be able to:			
Outcomes	sp ar CLO 2 ur th CLO 3 dis	pace, and (iii) normed and discuss how vectors derstand the notions dese spaces scuss the dual spaces	and inner product spaces are represented in these of Banach spaces and he of some standard Banace	Hilbert Spaces. State and	the importance	of completeness	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in M	ATH2101, MATH2102	, MATH2211, MATH224	1 and MATH3401			
Offer in 2021 - 2022	Y 2nd	sem Offer in 2022 -	2023 : Y		Examination	May	
Grade Descriptors (A+ to F)	A B	applications through corre and being able to carry ou	ectly analysing problems, clear it computations carefully and co	s and ideas by being able to id ly and elegantly presenting con prrectly, and with some innovat and ideas by being able to ide	rect logical reasonir	ng and argumentation olving problems.	
	B Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.  C Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.  D Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or						
	with substantial computational errors.  Pail Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not being able to complete the solution.						
Communication- intensive Course	N	asia to complete the					
Course Type	Lecture-ba	ased course					
Course Teaching	Activities	3	Details			No. of Hours	
& Learning Activities	Lectures					36	
	Tutorials					12	
	Reading /	Self study				100	
Assessment Methods and Weighting	Methods		Details		ng in final grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents			10	CLO 1,2,3,4	
	Examination				50	CLO 1,2,3,4	
	Test				40	CLO 1,2,3,4	
Required/recommended reading and online materials	Erwin Kre	yszig: Introductory Fur	nctional Analysis with Ap	plications (John-Wiley an	d Sons, 1978)		
Course Website	http://moo	dle.hku.hk/					
Additional Course	Timetable						
Information	http://hkur	math.hku.hk/~math/Tin	netable/timetable2122 S	2.pdf			

MATH4406	Introduction to partial differential equations (6 credits)	Academic Year	2021			
Offering Department	Mathematics	Quota				
Course Co-ordinator	Dr T K Wong, Mathematics (takkwong@maths.hku.hk)					
Teachers Involved	(Dr T K Wong, Mathematics)					
Course Objectives	This course introduces students to the basic techniques for solving partial differential equations as well as the underlying theories.					
Course Contents & Topics	- Laplace, heat and wave equations. Classification of partial differential equation eigenvalue problems. Separation of variables, Fourier series, linearity and s					

	characteris	stic method.						
	- Green's f	function, generalized fu	unctions and fundamental	solutions.				
			uniqueness and continuou					
	- If time permits Cauchy-Kowalevski theorem, variational method, nonlinear partial differential equations.							
Course Learning	On succes	On successful completion of this course, students should be able to:						
Outcomes				atical analysis in a coherent way to				
	CLO 2 un	nderstand the basic the	eory of partial differential e	quations and the methods to solve t	hem			
	CLO 3 ap	oply the knowledge of p	partial differential equation	s to physical sciences and engineer	ing			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in MATH2101, MATH2102, MATH2241; and Pass in MATH3405, or already enrolled in this course.							
Offer in 2021 - 2022	Y 1st	sem Offer in 2022 - 2	2023 : Y	Examination	Dec			
Grade Descriptors (A+ to F)	В	applications through corre and being able to carry ou Demonstrate a good und applications through corre	ectly analysing problems, clearly at t computations carefully and correstanding of key concepts and ectly analysing problems, but with	and ideas by being able to identify the appro and elegantly presenting correct logical reas ectly, and with some innovative approaches ideas by being able to identify the approp n some minor inadequacies in arguments, i	oning and argumentation to solving problems.			
			ons and presentation or with som		· · · · · · · · · · · · · · · · · · ·			
	C	Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.						
	Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.							
	Fail Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not being able to complete the solution.							
Communication- intensive Course	N	, ,						
Course Type	Lecture-ba	ased course						
Course Teaching	Activities		Details		No. of Hours			
& Learning Activities	Lectures		Dotailo	36				
J	Tutorials			12				
		Self study			100			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignme	nts		10	CLO 1,2,3			
	Examinati	on		50	CLO 1,2,3			
	Test			40	CLO 1,2,3			
Required/recommended reading and online materials	- R. Habei Pearson ca - D. Bleeck	- W.A. Strauss: Partial Differential Equations: An Introduction, Hoboken, N.J.: Wiley c2008 2nd ed.  - R. Haberman: Applied partial differential equations: with Fourier series and boundary value problems, Boston: Pearson c2013 5th ed.  - D. Bleecker & G. Csordas: Basic partial differential equations, Cambridge, Mass.: International Press c1996  - L.C. Evans: Partial differential equations, Providence, R.I.: American Mathematical Society c2010 2nd ed.						
Course Website		dle.hku.hk/	,,					
Additional Course	Timetable:							
Information			netable/timetable2122_S1.	pdf				

MATH4501	Geome	try (6 credits)		Academic Year	2021	
Offering Department	Mathema	tics		Quota		
Course Co-ordinator	Dr Z Hua	, Mathematics (huazheng@maths	.hku.hk)			
Teachers Involved	(Dr Z Hu	a,Mathematics)				
Course Objectives	As geometric forms often appear in nature, the study of geometry helps us to understand better the universe in which we live. Moreover, geometry has much intrinsic beauty and the study of it is an excellent training in intuitive thinking. In this course we study the differential geometry of curves and surfaces in 3-space. In the study of regular surfaces in 3-space we exhibit geometric notions that are definable in terms of metrical properties of these surfaces alone, leading to the intrinsic geometry of surfaces.					
Course Contents & Topics	- The G Theorem - Rieman	auss map, Gaussian and mean			s, Gauss-Bonne	
Course Learning	On succe	ssful completion of this course, st	udents should be able to:			
Outcomes	CLO 1	understand the fundamental prope	erties of curves and surfaces in space			
	CLO 2	compute and interpret the Frenet	apparatus, fundamental forms and the	ir derived quantit	ies	
	CLO 3	understand the basics of intrinsic	geometry of surfaces			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in (	MATH2101 and MATH2211); and MATH3401 or MATH3403 or MAT are strongly recommended to hav				
Offer in 2021 - 2022	Y 1s	sem Offer in 2022 - 2023 : Y		Examination	Dec	
Grade Descriptors (A+ to F)	A	applications through correctly analysing	g of key concepts and ideas by being able to i p problems, clearly and elegantly presenting co s carefully and correctly, and with some innova	rrect logical reasonir	g and argumentation	
	<b>B</b> Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.					
	C Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.					
	Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.					

	Fail	Demonstrate poor a being able to complete		t being able to identify appropriate theorems or	their applications, or not		
Communication- intensive Course	N						
Course Type	Lecture-b	ased course					
Course Teaching	Activities	s	Details		No. of Hours		
& Learning Activities	Lectures				36		
	Tutorials				12		
	Reading	/ Self study					
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Examinat	tion		50	CLO 1,2,3		
	Test			50	CLO 1,2,3		
Required/recommended reading and online materials	M P Do C	armo: Differential	Geometry of Curves and Surf	faces (Prentice-Hall, 1976)			
Course Website	http://mod	odle.hku.hk/					
Additional Course	Timetable	<b>:</b>					
Information	http://hkui	math.hku.hk/~mat	n/Timetable/timetable2122 S	1.pdf			

	IIIII Ouuc	tion to differentiable	manifolds (6 credits)	Aca	demic Year	2021	
Offering Department	Mathemat			Quo	ota		
Course Co-ordinator		u, Mathematics <i>(jhlu</i> @ <i>mat</i>	hs.hku.hk)				
Teachers Involved		_u,Mathematics)					
Course Objectives	their study	r. The course also aims at	ents to the notion of differer presenting concrete example	es that are relevant t	to further field	•	
Course Contents & Topics	- Differenti - Maps be - Integration	eview on functions of several variables, inverse mapping theorem, implicit function theorem.  Ifferentiable manifolds: definitions and examples.  Ifferentiable manifolds, submanifolds. Differential forms and exterior differentiation.  Itegration on manifolds.  In manifolds.  In the topics.					
Course Learning Outcomes	CLO 1 sp	successful completion of this course, students should be able to: O 1 speak the language of differentiable manifolds such as that of vector fields, differential forms, vector bundles, and integration on manifolds O 2 present a number of examples of differentiable manifolds and carry out explicit calculations on such					
		amples	proc 0: a	nuo unu oun, out	5,tp.10.11 00.100		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in M MATH440		It would be helpful if stud	ents have also tak	en or are co	ncurrently takinç	
Offer in 2021 - 2022	N Offe	er in 2022 - 2023 : Y		Exa	mination		
Grade Descriptors (A+ to F)	A Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.						
	B Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.						
	С	C Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.					
		presentation or a number of mir		i incorrectly analysing	problems with	poor argument and	
	D	Demonstrate some understand	nor computational errors. ling of key concepts and ideas by olying the theorems through incorre	being able to correctly id	lentify appropriat	te theorems, but wit	
	D Fail	Demonstrate some understand substantial inadequacies in app with substantial computational of Demonstrate poor and inadequ	nor computational errors.  ling of key concepts and ideas by lolying the theorems through incorre errors.  late understanding by not being ab	peing able to correctly id ctly analysing problems v	lentify appropriat with poor argume	te theorems, but wit ent or presentation o	
		Demonstrate some understand substantial inadequacies in app with substantial computational of	nor computational errors.  ling of key concepts and ideas by lolying the theorems through incorre errors.  late understanding by not being ab	peing able to correctly id ctly analysing problems v	lentify appropriat with poor argume	te theorems, but wit ent or presentation o	
ntensive Course	<b>Fail</b>	Demonstrate some understand substantial inadequacies in app with substantial computational of Demonstrate poor and inadequ	nor computational errors.  ling of key concepts and ideas by lolying the theorems through incorre errors.  late understanding by not being ab	peing able to correctly id ctly analysing problems v	lentify appropriat with poor argume	te theorems, but wit ent or presentation o	
ntensive Course Course Type	<b>Fail</b>	Demonstrate some understand substantial inadequacies in app with substantial computational of Demonstrate poor and inadequ being able to complete the solu ased course	nor computational errors.  ling of key concepts and ideas by lolying the theorems through incorre errors.  late understanding by not being ab	peing able to correctly id ctly analysing problems v	lentify appropriat with poor argume	te theorems, but wit ent or presentation o	
ntensive Course Course Type Course Teaching	Fail N Lecture-ba	Demonstrate some understand substantial inadequacies in app with substantial computational of Demonstrate poor and inadequ being able to complete the solu ased course	nor computational errors.  ling of key concepts and ideas by lolying the theorems through incorre errors.  late understanding by not being ab tion.	peing able to correctly id ctly analysing problems v	lentify appropriat with poor argume	te theorems, but wit ent or presentation of ir applications, or no	
ntensive Course Course Type Course Teaching	Fail N Lecture-ba	Demonstrate some understand substantial inadequacies in app with substantial computational of Demonstrate poor and inadequ being able to complete the solu ased course	nor computational errors.  ling of key concepts and ideas by lolying the theorems through incorre errors.  late understanding by not being ab tion.	peing able to correctly id ctly analysing problems v	lentify appropriat with poor argume	te theorems, but wit ent or presentation of ir applications, or no No. of Hours	
ntensive Course Course Type Course Teaching	Fail  N  Lecture-ba  Activities Lectures Tutorials	Demonstrate some understand substantial inadequacies in app with substantial computational of Demonstrate poor and inadequ being able to complete the solu ased course	nor computational errors.  ling of key concepts and ideas by lolying the theorems through incorre errors.  late understanding by not being ab tion.	peing able to correctly id ctly analysing problems v	lentify appropriat with poor argume	te theorems, but witent or presentation of ir applications, or not not not not not not not not not not	
Intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail  N  Lecture-ba  Activities Lectures Tutorials	Demonstrate some understand substantial inadequacies in app with substantial computational   Demonstrate poor and inadeque being able to complete the solution   Demonstrate poor and inadeque being able to complete the solution   Demonstrate poor and inadeque being able to complete the solution   Demonstrate poor and inadeque being able to complete the solution   Demonstrate some understand substantial inadeque   Demonstrate some understand substantial inadeque   Demonstrate some understand substantial inadeque   Demonstrate poor and ina	nor computational errors.  ling of key concepts and ideas by lolying the theorems through incorre errors.  late understanding by not being ab tion.	peing able to correctly id ctly analysing problems v	lentify appropriat with poor argume theorems or the  in final ade (%)	No. of Hours 36 12 100 Assessment Methods	
ntensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail  N  Lecture-ba  Activities  Lectures  Tutorials  Reading /	Demonstrate some understand substantial inadequacies in app with substantial computational   Demonstrate poor and inadequ being able to complete the solution   Demonstrate poor and inadequ being able to complete the solution   Demonstrate poor and inadequ being able to complete the solution   Demonstrate poor and inadequ being able to complete the solution   Demonstrate poor and inadequacies in approximation   Demonstrate poor and inadequacies   Demonstrate poor and i	nor computational errors.  ling of key concepts and ideas by lolying the theorems through incorre errors.  late understanding by not being ab tion.  Details	being able to correctly id ctly analysing problems value to identify appropriate	lentify appropriat with poor argume theorems or the  in final ade (%)	No. of Hours 36 12 100 Assessment Methods	
Intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail N Lecture-ba Activities Lectures Tutorials Reading / Methods	Demonstrate some understand substantial inadequacies in app with substantial computational © Demonstrate poor and inadequation being able to complete the solutions assed course  Self study  Demonstrate poor and inadequation being able to complete the solutions assed course  Demonstrate poor and inadequation being able to complete the solutions assed course	nor computational errors.  ling of key concepts and ideas by lolying the theorems through incorre errors.  late understanding by not being ab tion.  Details	being able to correctly identify analysing problems were to identify appropriate  Weighting course gra	lentify appropriat with poor argume theorems or the  in final ade (%)	No. of Hours 36 12 100 Assessment Methods CCLO Mapping	
Intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail N Lecture-ba Activities Lectures Tutorials Reading / Methods Assignment	Demonstrate some understand substantial inadequacies in app with substantial computational © Demonstrate poor and inadequation being able to complete the solutions assed course  Self study  Demonstrate poor and inadequation being able to complete the solutions assed course  Demonstrate poor and inadequation being able to complete the solutions assed course	nor computational errors.  ling of key concepts and ideas by lolying the theorems through incorre errors.  late understanding by not being ab tion.  Details	weighting course gra	lentify appropriat with poor argume theorems or the  in final ade (%)	No. of Hours 36 12 100 Assessment Methods OCLO Mapping	
Intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Fail  N  Lecture-ba Activities Lectures Tutorials Reading / Methods  Assignme Examinati Test W. Boothb	Demonstrate some understand substantial inadequacies in app with substantial computational of Demonstrate poor and inadequabeing able to complete the solutions assed course  Self study  Demonstrate poor and inadequabeing able to complete the solutions assed course  Self study  Demonstrate poor and inadequabeing able to complete the solutions assed course  Self study	nor computational errors.  ling of key concepts and ideas by lolying the theorems through incorre errors.  late understanding by not being ab tion.  Details	Weighting course gra  10 50 40	in final ade (%)	No. of Hours 36 12 100 Assessment Methods CLO Mapping CLO 1,2 CLO 1,2 CLO 1,2	
reading and online materials	Fail  N  Lecture-ba Activities Lectures Tutorials Reading / Methods  Assignme Examinati Test W. Boothb John M. Le	Demonstrate some understand substantial inadequacies in app with substantial computational a Demonstrate poor and inadeque being able to complete the solutions as a seed course Self study  Self study  Demonstrate poor and inadeque being able to complete the solutions as a seed course Self study  Demonstrate poor and inadeque being able to complete the solutions as a self-study Demonstrate poor and inadeque being able to complete the solutions as a self-study Demonstrate poor and inadeque being able to complete the solutions as a self-study Demonstrate poor and inadeque being able to complete the solutions as a self-study Demonstrate poor and inadeque being able to complete the solutions as a self-study Demonstrate poor and inadeque being able to complete the solutions as a self-study Demonstrate poor and inadeque being able to complete the solutions as a self-study Demonstrate poor and inadeque being able to complete the solutions as a self-study Demonstrate poor and inadeque being able to complete the solutions as a self-study Demonstrate poor and inadeque being able to complete the solutions as a self-study Demonstrate poor and inadeque being able to complete the solutions as a self-study Demonstrate poor and inadeque being able to complete the solutions as a self-study Demonstrate poor and inadeque being able to complete the solutions as a self-study Demonstrate poor and inadeque being as a self-study Demonstrate poor and inadeque being as a self-study Demonstrate poor and inadeque being as a self-study Demonstrate poor and inadeque being as a self-study Demonstrate poor and inadeque being as a self-study Demonstrate poor and inadeque being as a self-study Demonstrate poor and inadeque being as a self-study Demonstrate poor and inadeque being as a self-study Demonstrate poor and inadeque being as a self-study Demonstrate poor and inadeque being as a self-study Demonstrate poor and inadeque being as a self-study Demonstrate poor and inadeque being as a self-study Demonstrate poor and inadeque being as a self-	nor computational errors.  July of key concepts and ideas by labying the theorems through incorrectors.  July of the through incorrectors.  July of the through incorrectors.  July of the through incorrectors.  July of the through incorrectors.  July of the through incorrectors.  July of the through incorrectors.  July of the through incorrectors.  July of the through incorrectors.  July of the through incorrectors.  July of the through incorrectors.  July of the through incorrectors.  July of the through incorrectors.  July of the through incorrectors.  July of the through incorrectors.  July of through incorrectors.  July of the through incorrectors.  July of through incorrectors.  July of the through incorrectors.  July of through incorrectors.  July of the through incorrectors.  July of through incorrectors.  July of through incorrectors.  Jul	Weighting course gra  10 50 40	in final ade (%)	No. of Hours 36 12 100 Assessment Methods CLO Mapping CLO 1,2 CLO 1,2 CLO 1,2	
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Fail  N  Lecture-ba Activities Lectures Tutorials Reading / Methods  Assignme Examinati Test W. Boothb John M. Le	Demonstrate some understand substantial inadequacies in app with substantial computational a Demonstrate poor and inadequ being able to complete the solularsed course  Self study  Self study  Demonstrate poor and inadequ being able to complete the solularsed course  Self study  Demonstrate poor and inadequ being able to complete the solularsed course as a self-study  Self study  Demonstrate poor and inadequipment and inadequipment and inadequipment and inadequipment and inadequate	nor computational errors.  July of key concepts and ideas by labying the theorems through incorrectors.  July of the through incorrectors.  July of the through incorrectors.  July of the through incorrectors.  July of the through incorrectors.  July of the through incorrectors.  July of the through incorrectors.  July of the through incorrectors.  July of the through incorrectors.  July of the through incorrectors.  July of the through incorrectors.  July of the through incorrectors.  July of the through incorrectors.  July of the through incorrectors.  July of the through incorrectors.  July of through incorrectors.  July of the through incorrectors.  July of through incorrectors.  July of the through incorrectors.  July of through incorrectors.  July of the through incorrectors.  July of through incorrectors.  July of through incorrectors.  Jul	Weighting course gra  10 50 40	in final ade (%)	No. of Hours 36 12 100 Assessment Methods CLO Mapping CLO 1,2 CLO 1,2 CLO 1,2	

MATH4602	Scientific computing (6 credits)	Academic Year	2021
Offering Department	Mathematics	Quota	
Course Co-ordinator	Prof W K Ching, Mathematics (wching@hku.hk)		
Teachers Involved	(Prof W K Ching, Mathematics)		

Course Objectives	To learn s	To learn some basic theoretical and computational techniques for solving scientific computing problems.							
Course Contents & Topics				squares problems, numerical me ts may slightly vary from year to ye					
Course Learning	On succes	ssful completion of	this course, students should be	e able to:					
Outcomes		117	ds to solve linear systems						
			nods to solve linear systems						
		,		alues and eigenvectors of a matrix					
			value decomposition and unde						
			neory and numerical methods for						
<b>.</b>		,	ethods to solve differential equa	itions and partial differential equation	ons				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in M								
Offer in 2021 - 2022	Y 2nd	2nd sem Offer in 2022 - 2023 : Y Examination May							
Grade Descriptors (A+ to F)	В	numerical algorithms reasoning and argur approaches to solving Demonstrate a good	and their applications through correctly mentation and being able to carry ou g problems. understanding of key concepts and ide	and ideas by being able to identify the a y analysing problems, clearly and elegantly ut computations carefully and correctly, ar eas by being able to identify the appropriate	presenting correct logical id with some innovative theorems and numerical				
	С	algorithms and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems and numerical algorithms or their applications and presentation or with some minor computational errors.  C  Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems							
	and numerical algorithms, but with some inadequacies in applying them through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.								
	Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems and numerical algorithms, but with substantial inadequacies in applying them through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.								
	Fail  Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems and numerical algorithms or their applications, or not being able to complete the solution.								
Communication- intensive Course	N								
Course Type	Lecture-ba	ased course							
Course Teaching	Activities	S	Details		No. of Hours				
& Learning Activities	Lectures				36				
	Tutorials				12				
	Reading /	/ Self study			100				
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping				
	Assignme			10	CLO 1,2,3,4,5,6				
	Examinat	tion	Final exam	50	CLO 1,2,3,4,5,6				
	Test			40	CLO 1,2,3,4,5,6				
Required/recommended			Computing (McGraw Hill, 1997)						
reading and				Matlab Curriculum Series (Prentice	Hall, 1997)				
online materials	Paul Glas Peter E. k K.W. Mor Published	serman: Monte Ca Kloeden and Eckha rton, D.F. Mayers, I April 1st 2005 by (	rd Platen: Numerical Solution o Bill Morton, Numerical Solut Cambridge University Press	M, 1 Aug 1997 sering, Springer New York, 19 Nov of Stochastic Differential Equations ion of Partial Differential Equation c Computing: An introduction using	ns: An Introduction,				
				Springer, 2013)					
Course Website	(Springer,	, 2013)							
Course Website Additional Course	(Springer,	, 2013) odle.hku.hk/							

MATH4902	Operations research II (6 credits)	Academic Year	2021			
Offering Department	Mathematics	Quota				
Course Co-ordinator	Dr G Han, Mathematics (ghan @maths.hku.hk)					
Teachers Involved						
Course Objectives	The objective is to provide a fundamental account of the basic result (DP), Markov decision processes (MDP), Queueing Theory (QT) and emphasis on aspects of algorithms as well as applications. The couprogramming and network models, to provide essential optimization studies in operations research.	simulation in operations re	esearch. There is courses on linear			
Course Contents & Topics	<ul> <li>Dynamic programming (deterministic/stochastic)</li> <li>Markov decision process (discounted/average costs)</li> <li>Queueing Theory</li> <li>Simulation</li> </ul>					
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 understand the terminology and nomenclature appropriate to process, queueing theory and simulation	o dynamic programming, I	Markov decision			
	CLO 2 explain the typical techniques employed in dynamic programming, Markov decision process, queueing theory and simulation					
	CLO 3 demonstrate the knowledge on algorithms for a variety of proble	ems in operations research				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in MATH2101, MATH2211 and MATH3603.					
Offer in 2021 - 2022	N Offer in 2022 - 2023 : N	Examination				
Grade Descriptors	A Demonstrate an excellent understanding of key concepts and ideas by	y being able to identify basic pr	inciples, appropriate			

(A+ to F)				correctly analysing problems, clearly and elegantly y out computations carefully and correctly, and to			
	В	, ,					
	С						
	D						
	Fail	Demonstrate poor and inad or their applications, or not l		not being able to identify basic principles, appropriately compute the solution.	oriate theorems, algorithms		
Communication- intensive Course	N						
Course Type	Lecture-b	ased course					
Course Teaching	Activitie	S	Details	No. of Hours			
& Learning Activities	Lectures				36		
	Tutorials				12		
	Reading	/ Self study			100		
Assessment Methods and Weighting	Methods	<b>;</b>	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Examina	tion		50	CLO 1,2,3		
	Test			50	CLO 1,2,3		
Required/recommended	S. Dreyfu	s and A. Law: The Art ar	nd Theory of Dynami	ic Programming (Academic Press, 1977	)		
reading and		Markov Decision Process			,		
online materials	S. M. Ros	ss: Introduction to Probal	bility Models (Acader	mic Press, 2007, 9th ed.)			
Course Website							

MATH4907	Numeri	cal methods fo	r financial calculus (6 credits)	Academic Ye	ar 2021		
Offering Department	Mathema	tics		Quota			
Course Co-ordinator	Dr G Li, N	Mathematics (lotus	li@maths.hku.hk)				
Teachers Involved	(Dr G Li,	Mathematics)					
Course Objectives			ng effective numerical methods as we tives and asset pricing.	ell as their theoretical aspects	for solving problem		
Course Contents & Topics	- Numerio	<ul> <li>Introduction to the mathematical theory of vanilla and exotic options, both the PDE and the Martingale approach.</li> <li>Numerical methods for Black-Scholes pricing differential equations and their performance analyses.</li> <li>Lattice methods, Monte Carlo simulations and their performance analyses.</li> <li>Neural networks for option pricing &amp; hedging.</li> <li>On successful completion of this course, students should be able to:</li> </ul>					
Course Learning Outcomes	CLO 1 d fi CLO 2 ir CLO 3 u	emonstrate knowle nancial derivatives nplement and ana nderstand the con	edge and understanding of the marti lyse various numerical methods on th nection between the binomial tree me	ingale theory in option pricings e Black-Scholes pricing differe	ntial equation		
		choles pricing diffe	•	on the martingale pricing form	ula		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in M	CLO 4 implement and analyse Monte Carlo simulation methods on the martingale pricing formula  Pass in MATH3906 or equivalent.					
Offer in 2021 - 2022	Y 1st	t sem Offer in 20	22 - 2023 : Y	Examination	No Exam		
Grade Descriptors (A+ to F)	<ul> <li>A Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.</li> <li>B Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their</li> </ul>						
	applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.  C Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and						
	presentation or a number of minor computational errors.  Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.						
	Fail  Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or no being able to complete the solution.						
Communication- intensive Course	N						
Course Type	Lecture-b	ased course					
Course Teaching	Activitie	S	Details		No. of Hours		
& Learning Activities	Lectures				36		
	Tutorials						
	Reading	/ Self study			100		
Assessment Methods and Weighting	Methods	5	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignm	ents		10	CLO 1,2,3,4		
	Examina	tion	Oral exam	50	CLO 1,2,3,4		
	Test			40	CLO 1,2,3,4		
Required/recommended reading and online materials	Alison Et	heridge: A Course Dewynne and Hov	nce Schemes and PDEs (Wadsworth in Financial Calculus (Cambridge Un wison: Option Pricing: Mathematical	iversity Press)	est Edition) (Oxfor		

	P. Glasserman: Monte Carlo Methods in Financial Engineering (Latest Edition) (Springer-Verlag) J. Ruf & W. Wang; Neural networks for option pricing and hedging: a literature review. Journal of Computational Finance 24 (1), 1-46, 2020.
Course Website	http://moodle.hku.hk/
Additional Course	Timetable:
Information	http://hkumath.hku.hk/~math/Timetable/timetable2122_S1.pdf

MATH4910	Senior math	nematics semina	ar (6 credits)	Academic Yea	r 2021		
Offering Department	Mathematics			Quota	12		
Course Co-ordinator	Dr X Zhang; D	r T K Wong, Mather	matics (xzhang@maths.hku.hk; takkwo	ng@maths.hku.hk)			
Teachers Involved	(Dr X Zhang,N	, , ,					
Course Objectives	articles and be be attained.	his seminar style capstone course aims to provide students with the experience of intense reading of journal orticles and book chapters, followed by group discussions through which knowledge acquisition and synthesis with the attained. Students will look at particular mathematical topics in depth, and will master the topics through the eading, listening, discussing and writing.					
Course Contents & Topics	This seminar of seminar provide brought about involves discuarguments are development or responsiveness	This seminar course may be in the form of research seminar, reading seminar, or a combination of both. Research seminar provides first-hand research experience to students, who will discuss the advancement of knowledge prought about by the readings, and the difficulties they encounter in the research process. Reading seminar nvolves discussions on arguments delivered by the authors of books or articles, and how convincing the arguments are. Participants will experience the process of argumentation in the construction of knowledge and development of research idea. Student performance is manifested in their preparedness, quality of comments, responsiveness to comments and overall engagement in the seminar. The end product is a research paper or written report and oral presentations. Topics will be chosen by the instructors, including journal articles and book					
Course Learning			course, students should be able to:				
Outcomes			ontents of the topics they studied				
	CLO 3 organi	CLO 2 critique and argue about the ideas and theories of the work they studied CLO 3 organize and synthesize the material they have learned, and report orally and in writing usi mathematical language					
Pre-requisites (and Co-requisites and Impermissible combinations)	This capstone only. The earli Pass in at le	This capstone course is for Mathematics / Mathematics (Intensive), and Mathematics/Physics Majors students only. The earliest that a student is allowed to take this capstone course is their year 3 study.  Pass in at least 24 credits of advanced level disciplinary core/elective mathematics courses (MATH3XXX, MATH4XXX, or MATH7XXX) in the Mathematics/ Mathematics (Intensive), and Mathematics/Physics Majors; and					
Offer in 2021 - 2022		n Offer in 2022 - 2		Examination	No Exam		
Grade Descriptors (A+ to F)	A Demonstrate an excellent understanding of the material by lucid exposition. Engage constructively by providing insightful analyses and raising critical points in group discussion. Demonstrate clear and critical analysis, coherent synthesis, and effective						
	<ul> <li>application of the knowledge through writing and oral presentation using mathematical language.</li> <li>Demonstrate a good understanding of the material by mostly clear and effective presentation. Engage actively in group discussion most of the time by providing helpful points and asking questions that advance the discussion. Demonstrate mostly clear and effective analysis, synthesis, and application of the knowledge through writing and oral presentation using mathematical language.</li> </ul>						
	Demonstrate a general understanding of the material by moderately effective presentation. Engage in group discussion most of the time with some useful input. Demonstrate moderately clear and effective analysis, synthesis, and application of the knowledge through writing and oral presentation using mathematical language.						
	Demonstrate a basic but limited understanding of the material by partially effective presentation. Plays a passive role, or gives limited useful contribution to group discussion. Demonstrate limited or barely effective analysis, synthesis, and application of the knowledge through writing and oral presentation using mathematical language.						
	Fail  Demonstrate inadequate understanding of the material by barely effective or ineffective presentation. Little or no participation in and contribution to group discussion. Demonstrate inadequate or ineffective analysis, synthesis, and application of the knowledge through writing and oral presentation using mathematical language.						
Communication- intensive Course	N						
Course Type	Project-based	course	- · ·				
Course Teaching & Learning Activities	Activities		Details	nrecentations to the	No. of Hours		
a Leanning Activities	Meeting with	•	Seminars: Students take turns to give whole class; group discussions. Reading material and preparation for	36			
	Reading / Sel	f study	discussions; writing of reports/research	ch papers.	100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Oral presenta	tion	Based on seminar presentations, class participations and group discussions.	60	CLO 1,2,3		
	Research rep	ort	Written report / research paper: Individual and/or group reports/research papers totally no more than 10,000 words.	40	CLO 1,2,3		
Required/recommended reading and online materials	TBC						
	http://moodle.h	nku.hk/					
Course Website	Tittp://Titloodic.i						
Course Website Additional Course	Timetable:		etable/timetable2122 S2.pdf				

MATH4911	Mathematics capstone project (6 credits)	Academic Year	2021
Offering Department	Mathematics	Quota	
Course Co-ordinator	Prof T W Ng, Mathematics (ntw@maths.hku.hk)		
Teachers Involved	(Prof T W Ng,Mathematics)		

Course Objectives			udents an experience of engaging in a knowledge they have acquired.	project which requires	integration and/or		
Course Contents & Topics	of this ca students. corporate analysis, o problem u portfolio, a	Students will work collaboratively in small groups on a project under the guidance of their supervisor(s). Emphasis of this capstone project is on the integration and/or application of mathematical knowledge acquired by the students. The project topic is not limited to academic context, but can also be extended to a community or corporate outreach project. Projects may take the form of a combination of literature research, survey, data analysis, creation of artifacts or media contents, exhibition, public lectures, development of solution plan for the problem under study, etc. Assessment may take the form of written report, oral presentation, media production, portfolio, and/or peer evaluation, etc. Topics are either chosen by the supervisor(s), or proposed by the students and approved by their supervisor(s).					
Course Learning			course, students should be able to:				
Outcomes		1 integrate and apply mathematical knowledge they have previously acquired					
	CLO 3 co	<ul><li>LO 2 work collaboratively with others</li><li>LO 3 communicate their project topic to experts and/or lay audiences through suitable media using appropriate mathematical terms and language</li></ul>					
Pre-requisites		capstone course is for Mathematics / Mathematics (Intensive), and Mathematics/Physics Majors students					
(and Co-requisites		This course is for third and fourth year students only. The earliest that a student is allowed to take this					
and Impermissible combinations)	Pass in a		f advanced level disciplinary core/elect the Mathematics/ Mathematics (Intensive				
Offer in 2021 - 2022	N Offe	er in 2022 - 2023 : N		Examination			
Grade Descriptors (A+ to F)	A	initiative in, and collabora mathematical terms and la		effectively through suitable m	edia using appropriate		
		Demonstrate good integration and/or application of the mathematical knowledge previously acquired. Participate actively in, and collaborate mostly effectively on, the project. Communicate mostly effectively through suitable media using appropriate mathematical terms and language.					
	C	moderately effective collaboration on the project. Moderately effective communication using mathematical terms and language.					
	effective collaboration on the project. Show limited ability to effectively communicate using mathematical terms and language.  Fail  Demonstrate weak or poor integration and/or application of the mathematical knowledge previously acquired. Show passive participation in, and ineffective collaboration on, the project. Communicate ineffectively using mathematical terms and language.						
Communication- intensive Course	N	, , , , , , , , , , , , , , , , , , , ,	,		gg		
Course Type		sed course					
Course Teaching & Learning Activities	Activities		Details	No. of Hours			
& Learning Activities		vith supervisor	Students meet with their supervisor(s or to discuss their progress.	20			
Assessment Methods	Assessme	ent	Project work: Students work on their p	•	130		
and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Dissertation  Oral presentation  Research report		Coursework assessment: Based on participation and collaboration throughout the whole project.	20	CLO 1,2,3		
			Oral presentation components of the project may include seminars, lectures, oral reports, audio recordings, etc.	30	CLO 1,2,3		
			Written report / media production: This part may include written reports, booklets, exhibition materials, video productions, computer software, etc.	50	CLO 1,2,3		
Required/recommended reading and online materials	TBC						
Course Website	http://moo	dle.hku.hk/					
Additional Course Information	students v	who have declared No results will be announce to the submitted on the subm	ion procedure are released by email froi Major in Mathematics/Mathematics (Intel nced in late July or early August. For enqu ted by the end of the semester. The dear	nsive) will receive ema uiry, please contact the	ails in June. The Department.		

MATH4966	Mathematics internship (6 credits)	Academic Year	2021			
Offering Department	Mathematics	Quota				
Course Co-ordinator	Dr T K Wong, Mathematics (internship@maths.hku.hk)					
Teachers Involved	(All teaching staff, Mathematics)					
Course Objectives	This course aims to offer students the opportunities to gain work experience in t study. The workplace learning experience would be of great benefits to the gained in the study to the real work environments. Students have to take on at either within the University or outside the University arranged by the department	students to apply least 160 hours o	their knowledge			
Course Contents & Topics	Within the university: each student will be supervised by a staff member (su various tasks as instructed by the supervisor.  Outside the university: each student will carry out approved work under the external supervisor.	. ,				
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 gain work experience in an industry related to mathematical sciences					

	CLO 2	have an understanding of	of how mathematics is used to solve	real-world problems			
Pre-requisites (and Co-requisites and Impermissible combinations)	only. The Pass in MATH4X	This capstone course is for Mathematics / Mathematics (Intensive), and Mathematics/Physics Majors students only. The earliest that a student is allowed to take this capstone course is their year 3 study.  Pass in at least 24 credits of advanced level disciplinary core/elective mathematics courses (MATH3XXX, MATH4XXX, or MATH7XXX) in the Mathematics/ Mathematics (Intensive), and Mathematics/Physics Majors; and subject to approval by the Department.					
Offer in 2021 - 2022	Y 1st	sem 2nd sem Summ	ner Offer in 2022 - 2023 : Y	Examination	No Exam		
Grade Descriptors Distinction/Pass/Fail	Distincti on	performance in handling effective collaboration an requirements set out in th and excellent evaluation by		job or assigned by supervisor agues, and clients in the job. rs, with excellent performance i	r(s). Establishes highly Successfully fulfills the n written and oral report,		
	Pass	or assigned by supervise clients in the job. Success	o solve problems in the workplace. Successi or(s). Establishes effective collaboration ar sfully fulfills the requirements set out in the C on by supervisor(s), etc. Students demons action".	nd communication with supervi Course Description regarding wo	sor(s), colleagues, and orking hours, written and		
	Fail	Very limited or no ability to solve problems in the workplace. Fails to handle or carry out the work required in the job or assigned by supervisor(s). Fails to establish effective collaboration or communication with supervisor(s), other colleagues, or clients in the job. Fails to satisfy the requirements set out in the Course Description regarding working hours, written and oral report, or evaluation by supervisor(s), etc.					
Communication- intensive Course	N						
Course Type	Internship	)					
Course Teaching	Activities Details			No. of Hours			
& Learning Activities	Internship work		it is expected that students are to work at least 160 hours (or the equivalent of 4 weeks full-time)		160		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Written report		written report, employer's feedback and oral presentation	100	CLO 1,2		
Additional Course Information	be record interested Enrolmen	led on the student's trail to enrol in this course sh t of this course is not co	irse can be counted towards the Canscript. This course will be assess nould contact the Department to obtinducted via the online course selection after approval has been obtained from the course selection.	sed on "Pass/Fail" basis. ain the approval. tion system and should b	Students who are e made through the		

MATH4999	Mathem	natics project (12 cre	edits)	Academic Year	2021		
Offering Department	Mathema	itics		Quota			
Course Co-ordinator	Prof X Yu	Prof X Yuan, Mathematics (xmyuan@hku.hk)					
Teachers Involved	(All teach	ing staff,Mathematics)					
Course Objectives	of practic	cal interest and/or to have considered a highly desir	ve a foretaste of mathematical irable part of the training of a ma		on an individua		
Course Contents & Topics	The proje	ects will be selected from he approval from both the	n areas of pure and applied ma e prospective supervisor and the	tion between the student and hathematics. Students must achie a course co-ordinator to take this	ve good standing		
Course Learning	On succe	essful completion of this of	course, students should be able	to:			
Outcomes		, , ,	•	is not available in the regular cu	ırriculum		
			nformation gathered from differe	ent sources			
		articulate their findings ar					
		1	r work in a written report				
Pre-requisites (and Co-requisites and Impermissible combinations)	only. The Pass in MATH4X	earliest that a student is at least 24 credits of	s allowed to take this capstone c advanced level disciplinary co he Mathematics/ Mathematics (	sive), and Mathematics/Physics ourse is their year 3 study. ore/elective mathematics course Intensive), and Mathematics/Physics	es (MATH3XXX,		
Offer in 2021 - 2022		ar long Offer in 2022 -		Examination	No Exam		
Grade Descriptors (A+ to F)	В	Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking, with evidence o original thought. Insightful use and critical evaluation of information drawn from a broad range of high quality sources and to reference aptly. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills.  Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Critical use or relevant information from sources, showing ability to make meaningful comparisons between different secondary interpretations and to reference aptly. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and					
		presentational skills.					
	С	Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Use of relevant information from sources, showing ability to make comparisons between different interpretations and to reference aptly. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.					
	D Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Demonstrate use and reference of several sources, but mainly through summary rather than analysis and comparison. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.						
	Fail  Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Limited use of secondary sources and no critical comparison of them. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.						
Communication- intensive Course	N						
Course Type	Project-b	Project-based course					
Course Teaching	Activitie	s	Details		No. of Hours		
& Learning Activities	Reading	/ Self study	independent work & to attend	meetings & seminars	240		
Assessment Methods and Weighting	Methods	3	Details Weighting in final course grade (%) Meth				

					to CLO Mapping
	Dissertation	Written report plup presentation	us oral	100	CLO 1,2,3,4
Additional Course Information	The offered topics and application students who have declared Ma application results will be annount. The final report must be submitted in the due course.	ajor in Mathematics/N ced in late July or early	lathematics / August. F	s (Intensive) will receive or enquiry, please contact	emails in June. The the Department.

MATH7101	Intermed	liate complex analys	sis (6 credits)	Academic Ye	ar 2021		
Offering Department	Mathemati	CS		Quota			
Course Co-ordinator		rof T W Ng; Dr. X Zhang, Mathematics (ntw@maths.hku.hk; xzhang@maths.hku.hk)					
Teachers Involved		r X Zhang,Mathematics) rof T W Ng,Mathematics)					
Course Objectives			ents with analytic, algebraic and georiable beyond an introductory course				
Course Contents & Topics	using ana meromorph Problem at - A choice Mapping T	In the course we study meromorphic functions on compact Riemann surfaces and on open Riemann surfaces ng analytic and algebraic techniques. Topics on meromorphic functions include the constructions of peromorphic functions on compact Riemann surfaces, elliptic functions, Poincare series, the Mittag-Leffler public and the Weierstrass Problem on compact Riemann surfaces and on open Riemann surfaces. A choice of other topics may be included. Examples of possible topics include normal families, the Riemann apping Theorem, Little Picard Theorem, geometric theory of holomorphic mappings, potential theory in one mplex variable, complex dynamics, and special functions.					
Course Learning			ourse, students should be able to:				
Outcomes	fur CLO 2 for	nctions, on elliptic curves mulate various classica	I existence problems on meromorph	nic functions and reduce			
	CLO 3 ide	entify the key arguments	peing able to solve them in certain ty in the proofs of various mathematic aces or on plain domains and apply t	al results concerning me			
		entify the key elements in ply them in solving problem.	n the theoretic foundation of various	additional topics covere	d in the course and		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in a f	Pass in a first course in Complex Analysis such as MATH3403, and approval by the course coordinator.					
Offer in 2021 - 2022	Y 1st s	sem Offer in 2022 - 20	23 : Y	Examination	No Exam		
Grade Descriptors (A+ to F)	В	Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and tapplications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumenta and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.  Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and t					
	C	applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.  Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems,					
	D	but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.  Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with					
	Fail	substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation of with substantial computational errors.  Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not being able to identify appropriate theorems or their applications, or not being able to identify appropriate theorems.					
Communication-	N	being able to complete the se		only appropriate algorome of	aron approadono, or not		
intensive Course Course Type	Locturo bo	sed course					
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures		Details		36		
J	Reading /	Self study			100		
Assessment Methods and Weighting	Methods	,	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Test		Written midterm test and written/oral end-of-term 100 assessment		CLO 1,2,3,4		
Required/recommended reading and online materials	O. Forster: J.B. Conwa K. Chandra	assessment Narasimhan: Complex Analysis in One Variable (Birkhauser, 2001, 2nd edition) Forster: Lectures on Riemann Surfaces (Springer-Verlag, 1981) . Conway: Functions of One Complex Variable I (Springer-Verlag, 1995) Chandrasekharan: Elliptic Functions (Springer-Verlag, 1985) 3. Krantz, Geometric Function Theory (Birkhauser, 2006)					
Course Website	http://mood						
	Timetable:						
Additional Course Information			table/timetable2122 S1.pdf				

MATH7201	Topics in geometry (6 credits)	Academic Year	2021			
Offering Department	Mathematics	Quota				
Course Co-ordinator	TBC, Mathematics ()					
Teachers Involved						
Course Objectives	This course introduces to students a main area of differential geometry beyond the notion of manifolds and the calculus of differential forms and prepares them to study further and to do research in geometry.					
Course Contents & Topics	- The topic varies according to the year and the instructor. For example, it can following: (i) Riemannian geometry: affine and Levi-Civita connection, Riemann curvature.	•	,			

Required/recommended reading and online materials	TBC						
	Examin	ation		50	CLO 1,2		
	Assignr			50	CLO 1,2		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
A		g / Self study			100		
& Learning Activities	Lecture	-			36		
Course Teaching	Activiti		Details		No. of Hours		
Course Type		-based course					
Communication- intensive Course	N						
	Fail	Pail Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not being able to complete the solution.					
	D	Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.					
	С	Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.					
	В	Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.					
Grade Descriptors (A+ to F)	A	applications through correct and being able to carry out	tly analysing problems, clearl computations carefully and co	s and ideas by being able to identify the appro ly and elegantly presenting correct logical reas prectly, and with some innovative approaches	oning and argumentation solving problems.		
Offer in 2021 - 2022	-	Offer in 2022 - 2023 : N		Examination			
Pre-requisites (and Co-requisites and Impermissible combinations)		Pass in (MATH4402 or MATH4501) and (MATH4511 or the approval of the course coordinator)					
D		, ,		ect chosen and be ready to learn other			
Outcomes	CLO 1	have a working knowledge	e of the calculus of diffe	rential forms beyond the level of MAT	H3511		
Course Learning		cessful completion of this of	• •	•			
		tor bundles: vector bundle ession, topological K-theor		ature, characteristic forms and classe theory	s, superconnections,		
	group actions, moment maps, symplectic quotients, convexity theorems, localization;						
	and Dirac operators, harmonic forms and spinors, applications in relativity;  (ii) Symplectic geometry: symplectic vector spaces, symplectic manifolds, Lagrangian submanifolds, Hamiltonian						

MATH7202	Complex	manifolds (6 credits)		Academic Year	2021			
Offering Department	Mathemati			Quota				
Course Co-ordinator	Prof N Mol	Prof N Mok, Mathematics (nmok@hku.hk)						
Teachers Involved	(Prof N Mo	,Mathematics)						
Course Objectives		aims to present the foundation of search topics, focusing on compact of		ls and to introdu	ce students to			
Course Contents & Topics	cohomolog vector bun - It procee manifolds decomposi - The cou manifolds. (i) Siegel's (ii) geomet	<ul> <li>This course contains an introductory part on basic notions on complex manifolds including sheaf cohomology, cohomology theories in terms of differential forms, Hermitian and Kahler manifolds, and Hermitian holomorphic vector bundles.</li> <li>It proceeds to introduce the theory of harmonic forms, establishing fundamental results on compact complex manifolds including Serre duality, the Kodaira Vanishing Theorem, the Kodaira Embedding Theorem and Hodge decomposition on compact Kahler manifolds.</li> <li>The course concludes with a choice of topics on analytic and geometric aspects of the theory of complex manifolds. Examples of such topics include</li> <li>(i) Siegel's Theorem on the field of meromorphic functions on a compact complex manifold;</li> <li>(ii) geometry of compact quotients of bounded symmetric domains and Hermitian symmetric manifolds;</li> <li>(iii) an introduction to the deformation theory of compact complex submanifolds in a complex manifold.</li> </ul>						
ourse Learning		ful completion of this course, student	• •	ra complex mam	ioid.			
Outcomes	CLO 2 grama har	to the notion of holomorphic line but all holomorphic sections of line bun ifolds by the relationship between sheaf of the relationship to solve when the pasics of complex differential in the pasics of complex differential	dles, and to relate them to the cohomology, de Rham cohomology arious existence problems by a geometry such as notions of core vector bundles, and be able to	embedding of company of company and d-bar company of vanishing the current of the company of compan	ompact complex ohomology, and ng theorems or vature on Kahle			
	CLO 4 identify the key elements in the theoretical foundation of various additional topics covered in the course and to make use of them in solving problems							
Pre-requisites (and Co-requisites and Impermissible combinations)		Pass in MATH3403 or MATH4501 or MATH7101.						
Offer in 2021 - 2022	Y 2nd	em Offer in 2022 - 2023 : N		Examination	No Exam			
Grade Descriptors (A+ to F)	В	Demonstrate an excellent understanding of ke applications through correctly analysing proble and being able to carry out computations carel Demonstrate a good understanding of key c applications through correctly analysing probl	ey concepts and ideas by being able to items, clearly and elegantly presenting co- fully and correctly, and with some innova- oncepts and ideas by being able to id- ems, but with some minor inadequacies	dentify the appropriat orrect logical reasonin tive approaches to so entify the appropriate in arguments, identi	g and argumentation living problems. theorems and their			
		heorems or their applications and presentation	•					
	C	Demonstrate an acceptable understanding of out with some inadequacies in applying th						

		presentation or a num	ber of minor computational errors.				
	D	D Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropr substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argur with substantial computational errors.					
	Fail	Demonstrate poor and being able to complete	d inadequate understanding by not being at the solution.	ole to identify appropriate theorems or	their applications, or not		
Communication- intensive Course	N						
Course Type	Lecture-b	pased course					
Course Teaching	Activitie	S	Details		No. of Hours		
& Learning Activities	Lectures	•			36		
	Reading	/ Self study			100		
Assessment Methods and Weighting	Methods	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Test		Written midterm test a written/oral end-of-term assessment	and 100	CLO 1,2,3,4		
Required/recommended reading and online materials	Mathema Verlag, B - Griffiths Publisher - Kodaira Wissenso	- Barth, W.; Hulek, Klaus; Peters, C.; Van de Ven, A. Compact complex surfaces, Second edition, Ergebnisse der Mathematik und ihrer Grenzgebiete, 3. Folge, A Series of Modern Surveys in Mathematics, Band 4, Springer-Verlag, Berlin, 2004.  - Griffiths, P.; Harris, J. Principles of Algebraic Geometry, Pure and Applied Mathematics, Wiley-Interscience Publishers, New York, 1978.  - Kodaira, K. Complex Manifolds and Deformation of Complex Structures, Grundlehren der mathematischen Wissenschaften 283, Springer-Verlag, Berlin-Heidelberg, 1986.  - Kodaira, K.; Morrow, J. Complex Manifolds, Holt, Rinehart and Winston, New York, 1971.					
Course Website		odle.hku.hk/	, ,	,			
Additional Course	Timetable	e:					
Information	httn://hku	http://hkumath.hku.hk/~math/Timetable/timetable2122 S2.pdf					

MATH7217	Topics	in financial matl	hematics (6 credits)	Ac	ademic Year	2021	
Offering Department	Mathema	ıota					
Course Co-ordinator	TBC, Ma	TBC, Mathematics ()					
Teachers Involved							
Course Objectives			oducing students to fundame eparing students to research or				
Course Contents & Topics	<ul><li>Interest</li><li>Mathem</li><li>Estimation</li></ul>	<ul> <li>Investment models and portfolio theory.</li> <li>Interest rate modeling.</li> <li>Mathematics of financial derivatives, pricing and hedging.</li> <li>Estimation and modeling of volatilities.</li> <li>Risk measures and risk management.</li> </ul>					
Course Learning	On succe	essful completion of	this course, students should b	e able to:			
Outcomes	CLO 1 u	nderstand and be a	ble to utilize various models a	nd results in investment a	and interest ra	te	
			gy in derivative pricings and th				
		nderstand and be a hosen that year	able to utilize the concept of ris	k measures and risk ma	nagement, sul	bject to the topic	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in a	Pass in an advanced level mathematics courses (MATH3XXX, MATH4XXX, or MATH7XXX) and subject to approval of the course coordinator.					
Offer in 2021 - 2022	N Of	fer in 2022 - 2023 :	N	Ex	amination		
Grade Descriptors (A+ to F)	A	Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and the applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentatic and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.					
	В	Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.					
	С	Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.					
	D	Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.					
	Fail	·					
Communication- intensive Course	N						
Course Type	Lecture-b	ased course					
Course Teaching	Activitie	S	Details	Details		No. of Hours	
& Learning Activities	Lectures					36	
	Reading	/ Self study				100	
Assessment Methods and Weighting	Methods	5	Details	Weighting course g	rade (%)	Assessment Methods to CLO Mapping	
	Assignm	ents		50	)	CLO 1,2,3	
	Examina	tion		50	)	CLO 1,2,3	
Required/recommended reading and online materials	TBC						

MATH7219	Topics in applied functional analysis (6 credits)	Academic Year	2021

Offering Department	Mathemat	tics		Quota			
Course Co-ordinator	TBC, Mat	hematics ()					
Teachers Involved							
Course Objectives	This is a graduate to advanced undergraduate university level course on applied functional analysis, which aims a introducing to students the basic knowledge of using functional analysis on various applied topics in mathematics. This course would lay a foundation for students in studying more advanced mathematical courses.						
Course Contents & Topics	<ul> <li>Generalized functions (also called distributions), delta function, generalized Fourier Transform. Applications to differential equations, Fundamental solution, Green's function.</li> <li>Sobolev spaces, Sobolev Embedding Theorem, Trace.</li> <li>Hilbert space linear operator theory (bounded operators, compact operators, closed unbounded operators) spectral theory. Applications to differential equations (infinitesimal generator, semigroup of linear operators).</li> <li>Applications to optimization problems.</li> <li>Wherever needed, we shall also review techniques for Metric spaces (Category Theorem), Banach spaces (Hahl Banach Theorem, Opening Mapping Theorem, Closed Graph Theorem and Uniform Boundedness Principle) and</li> </ul>						
Carres I samina			d best approximation, Fo	• /			
Course Learning Outcomes			course, students should	nsform to practical problems			
Outcomes				em in the process of solving differenti	al aquations		
				em in the process of solving differential equa			
		pply these results to or		and apply it in solving differential equa	alions		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in M	ATH3401 and MATH44	404, or approval of the co	ourse coordinator.			
Offer in 2021 - 2022	N Off	er in 2022 - 2023 : N		Examination			
Grade Descriptors (A+ to F)	A Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.  B Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their						
	applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.  C Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentations or support of minor execute things or some things of the control of the cont						
	D	presentation or a number of minor computational errors.  Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.					
	<b>Fail</b> Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not being able to complete the solution.						
Communication- intensive Course	N	poing abic to complete the	, condition.				
Course Type	Lecture-b	ased course					
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures	-			36		
• • • • • • •	Reading / Self study				100		
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents		50	CLO 1,2,3,4		
	Examinat	tion		50	CLO 1,2,3,4		
Required/recommended reading and online materials	TBC						

MATH7224	Topics	in advanced probability theory (6 credits)	Academic Year	2021		
Offering Department	Mathema	atics	Quota			
Course Co-ordinator	TBC, Ma	athematics ()				
Teachers Involved						
Course Objectives	undergra	urse aims at introducing fundamental knowledge in probability aduate students. It can help preparing these students for advan age applications.				
Course Contents & Topics		e theory, law of large numbers, central limit theorems, random w s, Brownian motion.	ralks, martingales, Marko	v chains, ergod		
Course Learning		essful completion of this course, students should be able to:				
Outcomes	CLO 1	demonstrate in-depth understanding of basic concepts and termin	nologies in probability the	ory		
	CLO 2 understand and apply the fundamental theorems for further problem solving in theory or practice, the learning outcomes are subject to the topics chosen that year					
Pre-requisites and Co-requisites and Impermissible combinations)	Pass in I	MATH3603 and MATH4402, and approval of the course coordina	itor.			
Offer in 2021 - 2022	N O	ffer in 2022 - 2023 : N	Examination			
Grade Descriptors (A+ to F)	A	Demonstrate an excellent understanding of key concepts and ideas by being applications through correctly analysing problems, clearly and elegantly preand being able to carry out computations carefully and correctly, and with sor	senting correct logical reasonin	ig and argumentation		
	B Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.					
	C Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.					
	D Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or					

		with substantial comput	ational errors.				
	Fail	Demonstrates poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or being able to complete the solution.					
Communication- intensive Course	N	N					
Course Type	Lecture-ba	ased course					
Course Teaching & Learning Activities	Activities	3	Details		No. of Hours		
	Lectures				36		
	Reading / Self study				100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents		50	CLO 1,2		
	Examinat	ion		50	CLO 1,2		
Required/recommended reading and online materials		Rick Durrett: Probability: Theory and Examples, Cambridge Series in Statistical and Probabilistic Mathematics (Cambridge University Press, 2010, 4th edition)					
Course Website	http://moo	dle.hku.hk/					

MATH7501	Topics	in algebra (6 cred	lits)	Academic Yea	r 2021		
Offering Department	Mathema	atics	·	Quota			
Course Co-ordinator	Dr Z Hua	Z Hua, Mathematics (huazheng@maths.hku.hk)					
Teachers Involved	(Dr Z Hu	a,Mathematics)					
Course Objectives	To provid	de students specializ	ing in mathematics with the opportunity	to study some topics in	algebra in greater		
Course Contents & Topics	forms; m	ıultilinear algebra; alç	oics in algebra such as group theory; rigebraic number theory; group representa ic geometry. Topics may vary from year t	ations; commutative alge			
Course Learning	On succe	essful completion of the	nis course, students should be able to:				
Outcomes	CLO 1	acquire knowledge	e in the covered topics to considerable de	epth			
	CLO 2	if he/she wishes, p	oursue more advanced studies in areas o	f algebra			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in N	ass in MATH4302					
Offer in 2021 - 2022	N Of	ffer in 2022 - 2023 : Y		Examination			
Grade Descriptors (A+ to F)	A Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.						
	B Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.						
	Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.						
	D						
	Fail  Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not being able to complete the solution.						
Communication- intensive Course	N						
Course Type	Lecture-b	pased course					
Course Teaching	Activitie	es	Details		No. of Hours		
& Learning Activities	Lectures	3			36		
	Reading	/ Self study			100		
Assessment Methods and Weighting	Methods	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignm	nents	coursework assessments (may include presentations)	50	CLO 1,2		
	Examination One 1.5-hour written examination 50			50	CLO 1,2		
Required/recommended reading and	To be de	To be decided by the course instructor.					
•							
online materials Course Website	http://mo	odle.hku.hk/					

MATH7502	Topics in applied discrete mathematics (6 credits)	Academic Year	2021		
Offering Department	Mathematics	Quota			
Course Co-ordinator	Prof W Zang, Mathematics (wzang@maths.hku.hk)				
Teachers Involved	(Prof W Zang,Mathematics)				
Course Objectives	This is a follow-up of the course MATH3600. It introduces students to so probabilistic methods that have been used with striking success in discrete ma most fundamental and beautiful results obtained by these methods.	•	•		
Course Contents & Topics	<ol> <li>Linear algebra method: rank argument, eigenvalue technique, polynomial technique, general position method.</li> <li>Probabilistic method: basic method, linearity of expectation, deletion method, Lov\asz local lemma, second moment method.</li> <li>Additional techniques if time permits.</li> </ol>				
Course Learning	On successful completion of this course, students should be able to:				

Outcomes	CLO 1 demonstrate knowledge and understanding of some research areas of applied discrete mathematics						
	CLO 2 s	CLO 2 solve various discrete mathematics problems using linear algebra and probabilistic methods					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in (N	Pass in (MATH3301 or MATH3600), and approval of the course coordinator.					
Offer in 2021 - 2022	Y 2nd	d sem Offer in 2022 -	2023 : N	Examination	May		
Grade Descriptors (A+ to F)	A	applications through corre and being able to carry ou	understanding of key concepts and ideas by be ctly analysing problems, clearly and elegantly pt t computations carefully and correctly, and with	presenting correct logical reas some innovative approaches t	oning and argumentation solving problems.		
	В	applications through corre theorems or their applicati	erstanding of key concepts and ideas by bein ectly analysing problems, but with some minor ons and presentation or with some minor compl	inadequacies in arguments, id utational errors.	dentifying the appropriate		
	С	but with some inadequa	le understanding of key concepts and ideas by cies in applying the theorems through incor of minor computational errors.				
	D	Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.					
	Fail	Demonstrate poor and ina being able to complete the	adequate understanding by not being able to ide solution.	entify appropriate theorems or	their applications, or not		
Communication- intensive Course	N						
Course Type	Lecture-b	ased course					
Course Teaching	Activitie	S	Details	No. of Hours			
& Learning Activities	Lectures			36			
	Reading	/ Self study			100		
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignm	ents	coursework assessment	50	CLO 1,2		
	Examination		One 2.5-hour written examination	50	CLO 1,2		
Required/recommended reading and online materials	Instructor	Instructor's lecture notes.					
Course Website	http://mod	odle.hku.hk/					
Additional Course Information	Timetable	•	netable/timetable2122 S2.pdf				

MATH7503	Topics		al programming and optimization (	6 Academic Yo	2021		
Offering Department	Mathem	- /		Quota			
Course Co-ordinator	Prof X \	Yuan, Mathematics	(xmyuan @hku.hk)	·			
Teachers Involved	(Prof X	Yuan, Mathematics)	,				
Course Objectives			anced and up-to-date topics in mathemation algorithms and applications.	cal programming and cor	tinuous optimizatio		
Course Contents & Topics	a selectinequali	A deeper and wider study in some advanced topics related to optimization and its applications. This course covers a selection of topics including convex programming, nonconvex programming, saddle point problems, variational nequalities, optimization theory and algorithms suitable for contemporary applications in various areas such as machine learning, artificial intelligence, imaging processing, and computer vision. The selected topics may vary rom year to year.					
Course Learning	On succ	cessful completion o					
Dutcomes	CLO 1	understand the adoptimization approa	lvanced concept and approach of the aches as appropriate in Scientific Computing	ng, Operations Research,	Data Science, etc		
			ledge and understanding of the underly gorithms plus their extensions	ring theory and techniq	ues of the various		
Pre-requisites (and Co-requisites and Impermissible combinations)		Pass in MATH3901, MATH3904 and approval of the course coordinator.					
Offer in 2021 - 2022	Y 2		022 - 2023 : Y	Examination			
Grade Descriptors (A+ to F)	A Demonstrate an excellent understanding of key concepts and ideas by being able to identify appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and to solve problems with some innovative approaches.						
	B Demonstrate a good understanding of key concepts and ideas by being able to identify appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.						
	С	Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.					
	D						
	Fail Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not being able to complete the solution.						
Communication- Intensive Course	N						
Course Type	Lecture	-based course					
Course Teaching	Activit	ies	Details	Details			
Learning Activities	Lecture	es			36		
	Readin	g / Self study	include presentations		100		
Assessment Methods and Weighting	,		Details	Weighting in final course grade (%)	Assessment Methods		

	Assignments	One assignment	10	CLO 1,2
	Essay	Two essays	20	CLO 1,2
	Presentation	Oral Presentation	20	CLO 1,2
	Project reports	Research Project Report	30	CLO 1,2
	Test	One written midterm	20	CLO 1,2
Required/recommended	Stephen Boyd and Lieven Vanden	berghe: Convex Optimization (Cam	bridge University Press, 20	12)
reading and		ght: Numerical Optimization (Spring		
online materials	Dimitri P. Bertsekas, Angelia Ne	edic and Asuman E. Ozdaglar: C	Convex Analysis and Opti	imization (Athena
	Scientific, 2003)			
		onlinear Programming (John Wiley &		
	R. Tyrrell Rockafellar: Convex Ana	alysis (Princeton University Press, 1	997)	
	H.H. Bauschke and P.L. Combette	es: Convex Analysis and Monotone	Operator Theory in Hilbert	Spaces (Springer,
	New York, 2nd edition, 2017)			. , , .
	A. Beck: First Order Methods in Or	otimization (SIAM, Philadelphia, 201	17)	
Course Website	http://moodle.hku.hk/			
Additional Course	Timetable:			
Information	http://hkumath.hku.hk/~math/Time	table/timetable2122_S2.pdf		

MATH7504	Geometr	ric topology (6 cre	dits)	Academic Yea	r 2021			
Offering Department	Mathemati	ics	·	Quota				
Course Co-ordinator	TBC, Math	nematics ()						
Teachers Involved								
Course Objectives	will be on t	the geometric motivati	troduction to some of the methods of a cons and applications of the theory.	0 1 07				
Course Contents & Topics			nectedness. The fundamental group. icial homology. Theory of covering spa					
Course Learning			course, students should be able to:	· · · · · · · · · · · · · · · · · · ·				
Outcomes		derstand basic ideas a in many applications i	and constructions which are important in algebraic topology	both in pursuing the deep	er theories as well			
		derstand the ideas or anifolds	f attaching space, complexes, lifting	and extension properties	s, and surgery on			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in M	ATH3301 and MATH3	401					
Offer in 2021 - 2022	N Offe	er in 2022 - 2023 : N		Examination				
Grade Descriptors (A+ to F)	A Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.							
	B Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.							
	C Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.							
	D Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.							
	Fail  Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not being able to complete the solution.							
Communication- intensive Course	N							
Course Type	Lecture-ba	ased course						
Course Teaching	Activities		Details		No. of Hours			
& Learning Activities	Lectures				36			
	Reading /	Self study			100			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignme	nts	coursework assessment	50	CLO 1,2			
	Examinati	on	One 2.5-hour written examination	50	CLO 1,2			
Required/recommended reading and online materials			(Springer-Verlag UTM) gebraic Topology (Springer-Verlag GT	М)				

MATH7505	Real analysis (6 credits)  Academic Year 20					
Offering Department	Mathematics	Quota				
Course Co-ordinator	Dr C Y Hui, Mathematics (chhui@maths.hku.hk)					
Teachers Involved	(Dr C Y Hui,Mathematics)					
Course Objectives	The aim of the course is to introduce the basic ideas and techniques of measure	theory and the Le	ebesgue integral.			
Course Contents & Topics	<ul> <li>Lebesgue Measure on R: Measurable Sets and Lebesgue Measure, Measurable The Lebesgue Integral: The Lebesgue Integral, Modes of Convergence, Convergence Differentiation and Integration: Functions of Bounded Variation, Differentiation</li> <li>The L^p Spaces: The L^p spaces, Convergence and Completeness, Bounded</li> <li>General Theory: Measurable Spaces, Measurable Functions, Integration, Nikodym Theorem.</li> </ul>	ergence Theorems of an Integral, Abs Linear Functionals	solute Continuity.			
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 describe basic properties of Lebesgue measure and measurable functions and understand various convergence theorems  CLO 2 construct the Lebesgue integral, elucidate its basic properties and appreciate the existence of integration theories besides Riemann's					

			properties of L^p spaces				
Pre-requisites (and Co-requisites and Impermissible combinations)	A good grade in MATH3401 and approval by the course coordinator						
Offer in 2021 - 2022	Y 1	st sem Offer in 202	2 - 2023 : Y	Examination	n Dec		
Grade Descriptors (A+ to F)	A	concepts and apply reasoning and argum	ugh understanding of all concepts and ideas the theorems through correctly analysing entation, and with some innovative approache	problems, clearly and elegantly s to solving problems.	oresenting correct logica		
	В	applications through	understanding of key concepts and ideas be correctly analysing problems, but with some applications, or presentation.				
	С		eptable understanding of key concepts and id quacies in applying the theorems through in				
	D		nderstanding of key concepts and ideas by b				
	Fail	substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation.  Fail Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, and not being able to complete the solution.					
Communication- intensive Course	N	, ,					
Course Type	Lecture-	-based course					
Course Teaching	Activities		Details	Details			
& Learning Activities	Lectures			36			
	Reading / Self study				100		
Assessment Methods and Weighting	Method	ls	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Examination		Written/oral end-of-term assessment	50	CLO 1,2,3		
	Test		Written test/Presentations	50	CLO 1,2,3		
Required/recommended reading and online materials	G.B. Fo G.B. Fo H.L Roy W. Rudi	S. Axler: Measure, Integration and Real Analysis (Springer) G.B. Folland: Real Analysis (Wiley Inter-science) G.B. Folland: A Guide to Advanced Real Analysis (MMA) H.L Royden: Real Analysis (Pearson) W. Rudin: Real and Complex Analysis (McGraw Hill) E.M. Stein and R. Shakarchi: Real Analysis (Princeton Lectures)					
Course Website		oodle.hku.hk/	, (- ····				
Additional Course Information	Timetab		/Timetable/timetable2122 S2.pdf				

PHYS1000	Introduc	ction to astronomy	y (6 credits)	Academic Yea	r 2021		
Offering Department	Physics			Quota			
Course Co-ordinator	Dr J C S I	Pun, Physics <i>(jcspun</i> (	@hku.hk)				
Teachers Involved		Pun,Physics)					
Course Objectives	survey of planets, r	the solar system, the neutron stars, black	on astronomy, including both the obsection, stars, galaxies and the univer holes and dark matter will also be ect to weather conditions).	rse. Selected special topics	such as extrasolar		
Course Contents & Topics	our solar provides s nature wo	Topics covered include the observational aspect of astronomy (including constellations and planets), the physics of our solar system, and our own Sun, stars and their evolution, galaxies, black holes, and cosmology. It also provides students with a basic understanding of the relationship of the science of astronomy to life, and how our nature works on the macroscopic level. The course will arrange for observing activities of the Sun and the night sky with telescopes.					
Course Learning Outcomes	CLO 1 id ga CLO 2 us CLO 3 re di	entify and describe alaxies), and explain the celestial sphere view the evolution of scovery of the expans	s course, students should be able to the major objects in our Solar Sy heir main properties e model to describe the apparent traje of the world-view from the geocent sion of the universe on our world-view sical laws, including Kepler's three	stem and our universe (in- ectories of celestial objects ric model to the heliocentr v	c model and the		
	pı	oblems	oppler shift formula and Hubble's la		mple astronomical		
	CLO 6 co		stars and the evolution of the univer- nical problems and solutions using a		ninology and good		
Pre-requisites (and Co-requisites and Impermissible combinations)	Nil						
Offer in 2021 - 2022	N Off	er in 2022 - 2023 : N		Examination			
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills. Apply highly effective observation skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions.						
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills. Apply effective observation skills and techniques. Correct use of data of results to draw appropriate conclusions.					
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective observation skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.					
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills. Apply partially effective observation skills and techniques. Limited ability to use data and results to draw appropriate conclusions.					
	Fail	of analytical and critical problems. Organization	evidence of command of knowledge and skills I abilities, logical and coherent thinking. Sh and presentational skills are minimally effec chniques. Misuse of data and results and/or u	low very little or no ability to app tive or ineffective. Apply minimally	ly knowledge to solve effective or ineffective		
Communication- intensive Course	N						
Course Type	Lecture w	ith laboratory compon	ent course				
Course Teaching	Activities	S	Details		No. of Hours		
& Learning Activities	Lectures				32		
	Laborato				6		
	Reading	/ Self study			82		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents		40	CLO 1,2,3,4,5,6		
	Examinat	tion	2-hour written exam	50	CLO 1,2,3,4,5,6		
	Laborato	ry reports	Observations with telescope	10	CLO 1,2,3,4,5,6		
reading and			stronomy Today (Pearson, 2011)		/		
online materials							
Course Website	Inttp://mod	odle.hku.hk					

PHYS1001	University physics (6 credits) Academic Year 2021					
Offering Department	Physics	Quota				
Course Co-ordinator	Dr F K Chow, Physics (judychow@hku.hk)					
Teachers Involved	(Dr F K Chow, Physics)					
Course Objectives	This is an introductory, calculus-based physics course for the students who want to have an overview in physics at the university level.					
Course Contents & Topics	It covers mechanics, gravitation, oscillations, waves and sound, heat and thermodynamics, electricity and magnetism, and physical optics. Conceptual ideas in physics are emphasized and the mathematical treatment is moderate.					
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 describe and explain the fundamental physical principles					
	CLO 2 apply these principles, together with logical and mathematical reasoning, to situations of the physical world					
	CLO 3 analyse and solve problems with the aids of mathematics					
	CLO 4 acquire and interpret experimental data to examine the physical laws					

Pre-requisites (and Co-requisites and Impermissible combinations)	NIL					
Offer in 2021 - 2022	N Of	fer in 2022 - 2023 : N		Examination		
Grade Descriptors (A+ to F)	A	learning outcomes. Show s to apply knowledge to a w	strong analytical and critical abilities a vide range of complex, familiar and	sive knowledge and skills required for ind logical thinking, with evidence of or unfamiliar situations. Apply highly effe iques. Critical use of data and results	iginal thought, and ability ective organizational and	
	В	learning outcomes. Show e and some unfamiliar situation	vidence of analytical and critical abilit	dge and skills required for attaining at ies and logical thinking, and ability to a nd presentational skills. Apply effective	oply knowledge to familiar	
	С	outcomes. Show evidence familiar situations. Apply m	of some analytical and critical abiliti oderately effective organizational and	and skills required for attaining moses and logical thinking, and ability to a presentational skills. Apply moderate esults to draw appropriate conclusions.	apply knowledge to most ly effective lab skills and	
	D					
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective. Apply minimally effective or ineffective lab skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions.					
Communication- intensive Course	N					
Course Type	Lecture v	vith laboratory componer	nt course			
Course Teaching	Activitie	es	Details	No. of Hours		
& Learning Activities	Lectures	}			36	
	Laborato	ory			3	
	Tutorials	3			9	
	Reading	/ Self study			72	
Assessment Methods and Weighting	Methods	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignm	ents		35	CLO 1,2,3,4	
	Examination		2-hour written exam	50	CLO 1,2,3	
		ory reports		15	CLO 1,4	
Required/recommended reading and online materials	Lecture r	Lecture notes provided by Course Coordinator Raymond A. Serway and John W. Jewett: Physics for Scientists and Engineers (Thomson, 2011, 8th edition) James S. Walker: Physics (Prentice Hall, 2009, 4th edition)			1, 8th edition)	

PHYS1050	Physics	for engineering students (6 credits)	Academic Year	2021
Offering Department	Physics	,	Quota	
Course Co-ordinator	Dr C C Ling, Physics (ccling@hku.hk)			
Teachers Involved	(Dr C C Ling, Physics)			
Course Objectives	This course offers a comprehensive training of physics for engineers. It covers the major physical laws of mechanics, electricity and magnetism. A calculus-based approach is adopted.			
Course Contents & Topics	This course will introduce and discuss the following topics: Units and Dimensional Analysis, Motion of a Particle in One and Two Dimensions, Newton's Laws of Motion Friction, Circular Motion, Force, Impulse and Momentum, Force Polygon and Static Equilibrium, Work and Energy System of Particles, Moment of Inertia and Rotation of a Rigid Boody, Simple Harmonic Motion and Pendulum Electrostatic Fields and Potential, Gauss's Law, DC circuits, Magnetic field due to Moving Charges, Force on a Moving Charge in Magnetic Field, Biot-Savart law, Ampere's law, Electromagnetic Induction, Faraday's Law, Edd Currents, AC circuits, Phases in Capacitive and Inductive Circuits, Power, DC and AC Generators, Transformer.			
Course Learning Outcomes	On successful completion of this course, students should be able to:			
	CLO 1 describe and explain the physical principles of mechanics, electricity and magnetism			
	CLO 2 apply these principles to situations of the physical and engineering world			
	CLO 3 analyze and solve basic problems using the calculus-based approach			
	CLO 4 acquire and interpret experimental data to examine the physical laws			
(and Co-requisites and Impermissible combinations)	(Level 2 or above in Module 1, or Module 2 of HKDSE Mathematics or equivalent, or Pass in MATH1011) (This course is exclusive for Engineering students.)			
Offer in 2021 - 2022		er in 2022 - 2023 : N	Examination	
Grade Descriptors (A+ to F)	В	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions.  Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course		
	<b>B</b>	learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familia and some unfamiliar situations. Apply effective organizational and presentational skills. Apply effective lab skills and techniques Correct use of data of results to draw appropriate conclusions.		
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.		
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills. Apply partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions.		
	Fail	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve		

		tion and presentational skills are minimally effections. Misuse of data and results and/or unable to		effective or ineffective lab
Communication- intensive Course	N			
Course Type	Lecture with laboratory com	nponent course		
Course Teaching	Activities	Details		No. of Hours
& Learning Activities	Lectures			36
	Laboratory			6
	Tutorials			8
	Reading / Self study			72
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments		10	CLO 1,2,3
	Examination	2-hour written exam	70	CLO 1,2,3
	Laboratory reports		10	CLO 1,4
	Test		10	CLO 1,2,3
Required/recommended reading and online materials		Course Coordinator : Physics for Scientists and Engineer: cientists and Engineers (Pearson, 200		
Course Website	http://moodle.hku.hk	5 ( )	· ,	

PHYS1055	How thir	ngs work (6 cre	dits)	Academic Yea	ar 2021
Offering Department	Physics	•	•	Quota	
Course Co-ordinator	Dr M K Yip	o, Physics (mankit	@hku.hk)		
Teachers Involved	(Dr M K Yi	ip,Physics)			
Course Objectives	course co	vers the working p	orinciples and mechanisms of the are emphasized with mathematic	rears who are curious about scier things and phenomena around s kept at a minimum. Students are s in everyday life can be predictal	us. Logical thinking e trained to develor
Course Contents & Topics	are explor	ed with simple and nagnetic levitated t	d lucid explanations. Developmen rains in public transportation are	of driving, sports and amusemen ts in optical recording, medical im introduced as examples of the r dvances in modern science and te	naging for diagnosis modern technology
Course Learning	On succes	sful completion of	this course, students should be a	ble to:	•
Outcomes	CLO 2 de	sues in daily life monstrate their kn	s the physical principles that are owledge to related topics qualitati views in logical and effective way	•	s and the scientific
	CLO 4 red	cognize the signific	cance of science and technology		
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL				
Offer in 2021 - 2022	Y 2nd	sem Offer in 202	22 - 2023 : Y	Examination	May
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.				
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.				
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.				
	D	Show evidence of solknowledge to solve p	me coherent and logical thinking, but with roblems. Apply limited or barely effective or		w limited ability to appl
	Fail	of analytical and crit		nd skills required for attaining the course ling. Show very little or no ability to appeffective or ineffective.	
Communication- intensive Course	N				
Course Type		ased course	-		
Course Teaching	Activities	1	Details		No. of Hours
& Learning Activities	Lectures				36
	Tutorials	0 15 1 1			12
		Self study			80
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignme	nts		25	CLO 1,2,3,4
	Examinati	ion	2-hour written exam	50	CLO 1,2,3,4
	Presentat	ion		25	CLO 1,2,3,4
Required/recommended reading and online materials				Life (John Wiley & Sons, Inc, 2008	3, 3rd edition)
Course Website	http://www.	.physics.hku.hk/~p	hve1055/		

PHYS1056	Weather, climate and climate change (6 credits)	Academic Year	2021
Offering Department	Physics	Quota	

Course Co-ordinator	Dr F C C	Ling, Physics (ccling)	@hku.hk)			
Teachers Involved	(Dr F C C	Ling,Physics)	·			
		i,Hong Kong Observa				
		Tong,Hong Kong Obs				
0		Nong,Hong Kong Ob			1 11 1 1 1 1	
Course Objectives	students		mportant role in human activities weather, climate and climate chan			
Course Contents			pics on: basic physical principles	on weather phenomena like	wind temperature	
& Topics	humidity, climate. interpreta Experts fr forecasts, and clima	cold/warm fronts, the Through real life ex- tion of meteorological rom the Hong Kong ( public weather servi	nunderstorms and tropical cyclonical manufactures, students will get family information, climatology and climatology and climatology and climatology and climatology and climatology and climatology and climatology and climatology and climatology and control that the state of the	es; introductory weather and iarized with the weather/cli ate change. in the course to cover aspe- ena, tropical cyclones, climat	alysis, forecast and mate science and cts on daily weather ology of Hong Kong	
Course Learning	On succe	ssful completion of th	is course, students should be able	to:		
Outcomes	CLO 1 re	ecall the basic principl	es of weather and climate			
		pply the principles to r media	interpret weather / climate informa	tion, for example from the HK	O web site, internet	
	W	orld	differences of weather and climate		to other parts of the	
			es of climate change and its potent			
Duo vo suicitos		escribe and discuss tr	ne daily operational activities in the	HKU		
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL					
Offer in 2021 - 2022	Y 1st	sem Offer in 2022	- 2023 : Y	Examination	Dec	
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.					
	В					
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	D  Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail	Demonstrate little or no of analytical and critical	rems. Apply limited of barely effective orga- evidence of command of knowledge and s il abilities, logical and coherent thinking. and presentational skills are minimally effec	kills required for attaining the course Show very little or no ability to ap		
Communication- intensive Course	N					
	Lecture-h	ased course				
	LCCturc-b					
Course Type Course Teaching	Activities	S	Details		No. of Hours	
Course Type Course Teaching			Details		36	
Course Type Course Teaching	Activities Lectures Tutorials		Details		36 12	
Course Type Course Teaching & Learning Activities	Activities Lectures Tutorials		Details		36	
Course Type Course Teaching & Learning Activities Assessment Methods	Activities Lectures Tutorials	/ Self study	Details  Details	Weighting in final course grade (%)	36 12	
Course Type Course Teaching & Learning Activities Assessment Methods	Activities Lectures Tutorials Reading	/ Self study			36 12 80 Assessment Methods	
Course Type Course Teaching & Learning Activities Assessment Methods	Activities Lectures Tutorials Reading Methods	/ Self study		course grade (%)	36 12 80 Assessment Methods to CLO Mapping	
Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting	Activities Lectures Tutorials Reading Methods	/ Self study	Details	course grade (%)	36 12 80 Assessment Methods to CLO Mapping CLO 1,2,3,4,5	
Course Type Course Teaching & Learning Activities Assessment Methods	Activities Lectures Tutorials Reading Methods  Assignment Examinat Test Lecture no	/ Self study is ents tion otes provided by Cou	Details  2-hour written exam	25 50 25	36 12 80 Assessment Methods to CLO Mapping CLO 1,2,3,4,5 CLO 1,3,4,5	

PHYS1057	Kitchen science (6 credits)	Academic Year	2021
Offering Department	Physics	Quota	
Course Co-ordinator	Prof A B Djurisic, Physics (dalek@hku.hk)		
Teachers Involved	(Prof A B Djurisic, Physics)		
Course Objectives	The course aims to improve students' understanding of basic science behind the food and cooking and to develop their critical thinking skills.	e common daily a	ctivities related to
Course Contents & Topics	The course will introduce basic scientific concepts and principles necessary t food preparation, as well as kitchen tools. The introduced concepts will be idemonstrations.  The topics include: basic food molecules (water, carbohydrates, fats, protein); foams and bubbles (various examples, beer, sodas, ice-cream); colloids, em jelly); crystallization (sugar, sugar syrups, honey, chocolate); taste and flavor (and chemical reactions (Maillard reactions, caramelization, etc.); chemical application to cakes, bread and cookies; fermentation (alcoholic beverages, fe values in cooking, natural and artificial food colorings, culinary curiosities; molect textures); principles of operation of kitchen tools, such as non-stick cookware, pranges, microwave ovens, etc.	ullsions, gelation (herbs, spices); co reactions for ris ermented dairy prodular gastronomy (	es and practical (various sauces, ooking processes ing dough with oducts, tofu); pH novel flavors and
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 describe principles of operation of kitchen tools encountered in daily life		

	CLO 2 ex	plain basic physical an	d chemical processes involved in fo	od preparation		
			method affects the flavor and textur			
		alyze common metho ocedures in certain way	ods of food preparation and und /s	derstand scientific reaso	ns for performing	
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL					
Offer in 2021 - 2022	N Offe	er in 2022 - 2023 : N		Examination		
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.					
	В	•				
	С	outcomes. Show evidence	incomplete command of knowledge and sl of some analytical and critical abilities and oderately effective organizational and presen	logical thinking, and ability to a		
	D					
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.					
Communication- intensive Course	N					
Course Type	Lecture-ba	ased course				
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures			36		
	Tutorials		inlcuding demonstration (12 hours	24		
	Reading /	Self study			72	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents	essay & student presentations	70	CLO 1,2,3,4	
	Examinat	ion		30	CLO 1,2,3,4	
Required/recommended reading and online materials	T. Lister a S. T. Beck R. L. Wolk Peter Bark Cook (Exp	nd H. Blumenthal: Kitch ett: The Science of Ch e: What Einstein Told I nam: The Science of C bloratorium, Henry Holt	e Coordinator nen Chemistry (Royal Society of Che ocolate (Royal Society of Chemistry His Cook (W.W. Norton & Company cooking (Springer-Verlag, Berlin, 200 and Company, LLC, New York, 199 The Science and Lore of the Kitche	, 2005) Inc., New York, 2002 01) A. Gardiner and S. Wi 8)	·	

PHYS1150	Problem	n solving in ph	nysics (6 credi	ts)		Academic Year	2021
Offering Department	Physics					Quota	
Course Co-ordinator	Dr M K Yi	p, Physics <i>(manl</i>	kit@hku.hk)				
Teachers Involved	(Dr M K Y	ip,Physics)					
Course Objectives	sets that a focus on t analytical series, na	are commonly us training students and numerical r mely, PHYS2150	sed in the study on how to think and neans. After com and/or PHYS21	f university-level p d work as physicis pletion, interested 55 and/or PHYS2	roblem solving, ma hysics. Instead of sts through tackling I students may tak 160. (Knowledge of hough not required	adopting a cookbo g simple physics   te the second lev of Module 1 or Mo	ook approach, voroblems by boel courses in the
Course Contents & Topics	computation vectors are matrix op	onal skills that a nd their operation peration, complo	are commonly us ons, differentiatio ex numbers, a	ed in the study o n, integration, diff nd rudiment of	introducing basic p f university-level p ferential equations numerical metho used in this course	hysics. Topics in , several variable ds in tackling	clude: the use es differentiation
Course Learning	On succes	ssful completion	of this course, stu	udents should be a	able to:		
Outcomes	CLO 2 ap CLO 3 re so CLO 4 de CLO 5 for	ad physics oply calculus to s view the feature olving physical pr escribe the conne rmulate and oper	olve problems s of various solv oblems ections between r rate physical prob	ing tools in physic	ics and employ mans as well as plan attitions and physical dively and quantitative calculations.	and select approp	
Pre-requisites (and Co-requisites and Impermissible combinations)				valent, or Pass in			
Offer in 2021 - 2022	Y 1st	sem 2nd sem	Offer in 2022 -	2023 : Y		Examination	Dec May
Grade Descriptors (A+ to F)	A	learning outcomes to apply knowledg presentational skill	s. Show strong analytige to a wide range of s.	cal and critical abilities f complex, familiar an	ensive knowledge and and logical thinking, w d unfamiliar situations.	vith evidence of original Apply highly effective	al thought, and abili e organizational ar
	В	learning outcomes and some unfamilia	. Show evidence of a ar situations. Apply et	nalytical and critical ab fective organizational a	ledge and skills require ilities and logical thinkin and presentational skills	ig, and ability to apply	knowledge to famili
	С	outcomes. Show e	evidence of some an		ge and skills required lities and logical thinking and presentational skills.		

Communication-	D Fail	Show evidence of some co knowledge to solve problem Demonstrate little or no evi	pherent and logions. Apply limited idence of commabilities, logical	al thinking, but with limited or barely effective organion and of knowledge and skil and coherent thinking. S	quired for attaining some of the danalytical and critical abilities. Stational and presentational skills. Is required for attaining the cours how very little or no ability to ve or ineffective.	Show limited ability to apply se learning outcomes. Lack
Course Type	Lecture-ba	ased course				
Course Teaching	Activities	<b>S</b>	Details			No. of Hours
& Learning Activities	Lectures					36
	Tutorials					12
	Reading /	Self study				80
Assessment Methods and Weighting	Methods		Details		Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignme	ents	Including assignmen	computational ts	20	CLO 1,2,3,4,5,6
	Examinat	ion	2-hour writ	ten exam	50	CLO 1,2,3,4,5
	Test				30	CLO 1,2,3,4,5
Required/recommended reading and online materials	R. Shanka Steven C. 2017, 4th	Chapra: Applied Nume edition) ass, Maurice D. Weir, a	thematics - A erical Method	Fitness Program for s with MATLAB for E	Science (Springer, 1995) ngineers and Scientists (M rsity Calculus: Early Trans	
Course Website	http://moo	dle.hku.hk				

PHYS1240	Physics	by inquiry (6 cr	redits)	Academic Ye	ear 2021
Offering Department	Physics	· <b>,</b> 1· <b>,</b> (· ·	<b>,</b>	Quota	
Course Co-ordinator	Dr F K Ch	ow, Physics (judyci	how@hku.hk)		
Teachers Involved		now,Physics)	<del> </del>		
Course Objectives	our daily l	ife phenomena and	g students a solid background and known activities. It is targeted to those with I and integral calculus. After completing 250.	ittle physics background a	nd is conducted with
Course Contents & Topics	integral ca through qu	alculus. Emphasis	verage in most physics topics and is co will be stressed on the understanding e quantitative analysis. The course co	g of various physical phe	nomena in daily life
Course Learning	On succes	ssful completion of	this course, students should be able to:		
Outcomes	CLO 1	lescribe and disting	uish the concepts and principles in intro	oductory study of physics	
	CLO 2 r	ecognize the under	lying physical principles behind various	daily life phenomena	
			enomena using proper physical laws an		
	CLO 4	pply simple mather	matical techniques for quantitative anal	ysis in solving physics prob	olems
Pre-requisites (and Co-requisites and Impermissible combinations)	Not for stu and	idents who have pa	or above in HKDSE Physics; and assed in PHYS1050 or PHYS1150 or P assed in any level 2 PHYS course or ab	,	led in these courses
Offer in 2021 - 2022	Y 2nd	sem Offer in 202	22 - 2023 : Y	Examination	May
Grade Descriptors (A+ to F)	A B C D	learning outcomes. SI to apply knowledge to Demonstrate substant learning outcomes. SI and some unfamiliar is Demonstrate general outcomes. Show evid familiar situations. App Demonstrate partial b Show evidence of son knowledge to solve prode programmer of analytical and critical strategies.	In mastery at an advanced level of extensive k now strong analytical and critical abilities and log familiar and unfamiliar situations. Apply highly et tial command of a broad range of knowledge an now evidence of analytical and critical abilities an ituations. Apply effective organizational and press but incomplete command of knowledge and sence of some analytical and critical abilities an oly moderately effective organizational and prese ut limited command of knowledge and skills req ne coherent and logical thinking, but with limited oblems. Apply limited or barely effective organiza- tio evidence of command of knowledge and skills cal abilities, logical and coherent thinking. Sh	pical thinking, with evidence of or fective organizational and preser d skills required for attaining at d logical thinking, and ability to apentational skills. Skills required for attaining mos d logical thinking, and ability to a ntational skills. uired for attaining some of the canalytical and critical abilities. Shattonal and presentational skills. I required for attaining the course ow very little or no ability to a tow very little or no ability to a preserved.	iginal thought, and ability tational skills. least most of the course ply knowledge to familial to f the course learning apply knowledge to most ourse learning outcomes ow limited ability to apply learning outcomes. Lack
			n and presentational skills are minimally effective		opi, miomoago to conto
Communication- intensive Course	N				
Course Type		ased course	Detelle		No attri
Course Teaching & Learning Activities	Activities	<b>S</b>	Details		No. of Hours
& Learning Activities	Lectures				36
	Tutorials	Calfatualu			12 80
A 4 M - 4b d -		Self study	B. C. II.	1 14 1 1 d 1 d 1 d 1 d 1	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignme	ents	including in-class quizzes (10%)	25	CLO 1,2,3,4
	Examinat	ion	2-hour written exam	50	CLO 1,2,3,4
	Test			25	CLO 1,2,3,4
Required/recommended reading and online materials	John D. C Paul G. H	ewitt: Conceptual P	ourse Coordinator W. Johnson: Introduction to Physics (J Physics (Addison Wesley, 2009, 11th ec ris Vuille: College Physics (Brooks Cole	lition)	13)

Course Website http://moodle.hku.hk

	Fundar	mental physics (6 ci	redits)	Academic Yea	r 2021	
Offering Department	Physics	,		Quota		
Course Co-ordinator	Dr J H C	Lee, Physics (jleehc@l	nku.hk)	<u>'</u>		
Teachers Involved		C Ling,Physics) C Lee,Physics)	,			
Course Objectives	This is the to have a physics a	ne first physics course for an overview in physics. are emphasized and th	or those who want to minor in ph It covers the fundamental block e mathematical treatment is mo neir astronomy, math/physics or p	s in physics in one semester. Coderate. Those who enter HKU	onceptual ideas i	
Course Contents & Topics	Topics in	nclude: Mechanics, Wav	e Motions, Physical Optics, Ther	modynamics, and Electromagne	etism.	
Course Learning Outcomes	CLO 1 c CLO 2 a CLO 3 a	describe and explain the apply these principles, to analyse and solve proble	course, students should be able fundamental physical principles gether with logical and mathema ems with the aids of mathematics perimental data to examine the pi	atical reasoning, to situations of	the physical world	
Pre-requisites (and Co-requisites and Impermissible combinations)	Not for st	tudents who have passe	sics or equivalent, or Pass in PH ed in PHYS1050, or already enro ed in any level 2 PHYS course or	lled in this course; and		
Offer in 2021 - 2022	Y 1s	st sem 2nd sem Offe	r in 2022 - 2023 : Y	Examination	Dec May	
Grade Descriptors (A+ to F)	A	learning outcomes. Show to apply knowledge to a	astery at an advanced level of extensiversions analytical and critical abilities and wide range of complex, familiar and urely highly effective lab skills and techniques.	d logical thinking, with evidence of originfamiliar situations. Apply highly effect	nal thought, and ability ive organizational and	
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions.					
	С					
	D	Demonstrate partial but ling Show evidence of some continuous knowledge to solve problems.	mited command of knowledge and skills oherent and logical thinking, but with limi ems. Apply limited or barely effective or Limited ability to use data and results to o	required for attaining some of the cour ited analytical and critical abilities. Show ganizational and presentational skills. A	limited ability to apply	
	Fail		vidence of command of knowledge and s	skills required for attaining the course le	,.	
	I all	problems. Organization ar	abilities, logical and coherent thinking.  In presentational skills are minimally effeuse of data and results and/or unable to o	ective or ineffective. Apply minimally effe	arning outcomes. Lack y knowledge to solve	
	N	problems. Organization ar	abilities, logical and coherent thinking. nd presentational skills are minimally effe	ective or ineffective. Apply minimally effe	arning outcomes. Lack y knowledge to solve	
intensive Course Course Type	N	problems. Organization ar	abilities, logical and coherent thinking Id presentational skills are minimally effe use of data and results and/or unable to o	ective or ineffective. Apply minimally effe	arning outcomes. Lack y knowledge to solve	
intensive Course Course Type Course Teaching	N	problems. Organization ar skills and techniques. Miss with laboratory compone	abilities, logical and coherent thinking Id presentational skills are minimally effe use of data and results and/or unable to o	ective or ineffective. Apply minimally effe	arning outcomes. Lack y knowledge to solve	
intensive Course Course Type Course Teaching	N Lecture v	problems. Organization ar skills and techniques. Miss with laboratory compone	abilities, logical and coherent thinking, ind presentational skills are minimally effe use of data and results and/or unable to o ent course	ective or ineffective. Apply minimally effe	arning outcomes. Lack y knowledge to solve ective or ineffective lat	
intensive Course Course Type Course Teaching	N Lecture v	problems. Organization ar skills and techniques. Mist with laboratory compone es	abilities, logical and coherent thinking, ind presentational skills are minimally effe use of data and results and/or unable to o ent course	ective or ineffective. Apply minimally effe	arning outcomes. Lack y knowledge to solve ective or ineffective lat	
intensive Course Course Type Course Teaching	N Lecture v Activitie Lectures	problems. Organization ar skills and techniques. Mist with laboratory compone es s ory	abilities, logical and coherent thinking, ind presentational skills are minimally effe use of data and results and/or unable to o ent course	ective or ineffective. Apply minimally effe	arning outcomes. Lack y knowledge to solve eactive or ineffective lat No. of Hours 36	
intensive Course Course Type Course Teaching	N Lecture v Activitie Lectures Laborato Tutorials	problems. Organization ar skills and techniques. Mist with laboratory compone es s ory	abilities, logical and coherent thinking, ind presentational skills are minimally effe use of data and results and/or unable to o ent course	ective or ineffective. Apply minimally effe	arning outcomes. Lack y knowledge to solve ective or ineffective lat No. of Hours 36 6	
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture v Activitie Lectures Laborato Tutorials	problems. Organization ar skills and techniques. Mist with laboratory compone es s ory s g / Self study	abilities, logical and coherent thinking, ind presentational skills are minimally effe use of data and results and/or unable to o ent course	ective or ineffective. Apply minimally effe	arning outcomes. Lack y knowledge to solve ective or ineffective late.  No. of Hours  36  6  8	
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture v Activitie Lectures Laborato Tutorials Reading	problems. Organization ar skills and techniques. Mist with laboratory compone es s orry s g / Self study	abilities, logical and coherent thinking.  Ind presentational skills are minimally effective of data and results and/or unable to control the course the c	ective or ineffective. Apply minimally effective appropriate conclusions.  Weighting in final	No. of Hours  36 6 8 80  Assessment Methods	
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture v Activitie Lectures Laborator Tutorials Reading Methods	problems. Organization ar skills and techniques. Mist with laboratory compone es s ory s g / Self study s	abilities, logical and coherent thinking.  Ind presentational skills are minimally effective of data and results and/or unable to control the course the c	Weighting in final course grade (%)	naming outcomes. Lacky knowledge to solve active or ineffective late.  No. of Hours 36 6 8 80 Assessment Methods to CLO Mapping	
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture v Activitie Lectures Laborate Tutorials Reading Methods Assignm Examina	problems. Organization ar skills and techniques. Mist with laboratory compone es soory s g / Self study s	abilities, logical and coherent thinking, and presentational skills are minimally effective of data and results and/or unable to determine the course Details  Details	Weighting in final course grade (%)	No. of Hours  36 6 8 80 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3	
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture v Activitie Lectures Laborate Tutorials Reading Methods Assignm Examina Laborate	problems. Organization ar skills and techniques. Mist with laboratory compone es s ory s g / Self study s	abilities, logical and coherent thinking, and presentational skills are minimally effective of data and results and/or unable to determine the course Details  Details	Weighting in final course grade (%)  10 50 15	No. of Hours  No. of Hours  36  6  8  80  Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3 CLO 1,4	
Communication- intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting	N Lecture v Activitie Lectures Laborate Tutorials Reading Methods Assignm Examina Laborate Test	problems. Organization ar skills and techniques. Mist with laboratory components or see sory so y Self study see the study see the study see the study see the set or y reports	abilities, logical and coherent thinking.  Ind presentational skills are minimally effective of data and results and/or unable to determine the course tent course	Weighting in final course grade (%)	No. of Hours  36 6 8 80 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3	
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture v Activitie Lectures Laborate Tutorials Reading Methods Assignm Examina Laborate Test Lecture r Raymone	problems. Organization ar skills and techniques. Mist with laboratory compone es sory sory sory sory sory reports ments ation ory reports motes provided by Cours d A. Serway and John V	abilities, logical and coherent thinking.  Ind presentational skills are minimally effective of data and results and/or unable to determine the course tent course	Weighting in final course grade (%)  10 50 15 25	No. of Hours  36 6 8 80 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3 CLO 1,2,3	

PHYS1650	Nature of the universe (6 credits)	Academic Year	2021
Offering Department	Physics	Quota	
Course Co-ordinator	Dr K M Lee, Physics (kmlee@lily.physics.hku.hk)		
Teachers Involved	(Dr K M Lee,Physics)		
Course Objectives	This is an introductory course in astronomy for students in all disciplines and a in our series of two compulsory courses to introduce basic astronomy knowle for astronomy minor. No prior knowledge in astronomy, physics, and highe help. After completing this course, interested students may take the secon PHYS2650.	dge, methods and r mathematics is	recent advances required, but will
Course Contents & Topics	Topics covered include the observational aspect of astronomy (including constrour solar system, and our own Sun, stars and their evolution, galaxies, be provides students with a basic understanding of the relationship of astronomy the macroscopic level. Students are expected to participate actively in the night	lackholes, and co to life and how oui	smology. It also nature works on
Course Learning	On successful completion of this course, students should be able to:		
Outcomes	CLO 1 identify and describe the major objects in our Solar System and galaxies), and explain their main properties	our universe (incl	uding stars and
	CLO 2 use the celestial sphere model to describe the apparent trajectories of c	elestial objects	
	CLO 3 review the evolution of the world-view from the geocentric model to		model and the

		discovery of the expans	ion of the universe on our world	-view	
	CLO 4 a	apply quantitative phys	sical laws, including Kepler's to oppler shift formula and Hubble	hree laws of planetary motion	
	CLO 5 e	explain the evolution of	stars and the evolution of the ur	niverse	
		communicate astronom English	ical problems and solutions usi	ng appropriate astronomical ter	rminology and good
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL				
Offer in 2021 - 2022	Y 1s	st sem 2nd sem Offe	er in 2022 - 2023 : Y	Examination	Dec May
Grade Descriptors (A+ to F)	Α	learning outcomes. Show to apply knowledge to a presentational skills. App and insightful conclusions		and logical thinking, with evidence of ori unfamiliar situations. Apply highly effe I techniques. Critical use of data and re	iginal thought, and ability ective organizational and esults to draw appropriate
	В	learning outcomes. Show and some unfamiliar situ	command of a broad range of knowled veridence of analytical and critical abilititiations. Apply effective organizational and factorial for the control of data of results to draw appropriate co	ies and logical thinking, and ability to ap and presentational skills. Apply effectiv	ply knowledge to familian
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective observation skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.				
	D				
		knowledge to solve prob	coherent and logical thinking, but with li lems. Apply limited or barely effective	mited analytical and critical abilities. Shorganizational and presentational skills	ow limited ability to apply . Apply partially effective
	Fail	knowledge to solve prob observation skills and tec Demonstrate little or no e of analytical and critical problems. Organization a	coherent and logical thinking, but with li lems. Apply limited or barely effective	mited analytical and critical abilities. Sh organizational and presentational skills results to draw appropriate conclusions d skills required for attaining the course g. Show very little or no ability to ap effective or ineffective. Apply minimall	ow limited ability to apply . Apply partially effective . learning outcomes. Lack ply knowledge to solve ly effective or ineffective
	Fail N	knowledge to solve prob observation skills and tec Demonstrate little or no e of analytical and critical problems. Organization a	coherent and logical thinking, but with li lems. Apply limited or barely effective chniques. Limited ability to use data and evidence of command of knowledge and abilities, logical and coherent thinkin and presentational skills are minimally	mited analytical and critical abilities. Sh organizational and presentational skills results to draw appropriate conclusions d skills required for attaining the course g. Show very little or no ability to ap effective or ineffective. Apply minimall	ow limited ability to apply . Apply partially effective s. learning outcomes. Lack ply knowledge to solve ly effective or ineffective
ntensive Course	N	knowledge to solve prob observation skills and tec Demonstrate little or no e of analytical and critical problems. Organization a	coherent and logical thinking, but with li lems. Apply limited or barely effective thiniques. Limited ability to use data and evidence of command of knowledge and abilities, logical and coherent thinkin and presentational skills are minimally thiniques. Misuse of data and results and	mited analytical and critical abilities. Sh organizational and presentational skills results to draw appropriate conclusions d skills required for attaining the course g. Show very little or no ability to ap effective or ineffective. Apply minimall	ow limited ability to apply . Apply partially effective . learning outcomes. Lack ply knowledge to solve ly effective or ineffective
ntensive Course Course Type	N	knowledge to solve prob observation skills and tec Demonstrate little or no e of analytical and critical problems. Organization a observation skills and tec	coherent and logical thinking, but with li lems. Apply limited or barely effective thiniques. Limited ability to use data and evidence of command of knowledge and abilities, logical and coherent thinkin and presentational skills are minimally thiniques. Misuse of data and results and	mited analytical and critical abilities. Sh organizational and presentational skills results to draw appropriate conclusions d skills required for attaining the course g. Show very little or no ability to ap effective or ineffective. Apply minimall	ow limited ability to apply . Apply partially effective . learning outcomes. Lack ply knowledge to solve ly effective or ineffective
ntensive Course Course Type Course Teaching	N Lecture	knowledge to solve probiobservation skills and tec Demonstrate little or no e of analytical and critical problems. Organization a observation skills and tec with laboratory compones	coherent and logical thinking, but with li lems. Apply limited or barely effective thiniques. Limited ability to use data and evidence of command of knowledge and abilities, logical and coherent thinkin and presentational skills are minimally thiniques. Misuse of data and results and ent course	mited analytical and critical abilities. Sh organizational and presentational skills results to draw appropriate conclusions d skills required for attaining the course g. Show very little or no ability to ap effective or ineffective. Apply minimall	ow limited ability to apply . Apply partially effective s learning outcomes. Lack ply knowledge to solve ly effective or ineffective ions.
ntensive Course Course Type Course Teaching	N Lecture v	knowledge to solve probiobservation skills and tec Demonstrate little or no e of analytical and critical problems. Organization a observation skills and tec  with laboratory componess s	coherent and logical thinking, but with li lems. Apply limited or barely effective thiniques. Limited ability to use data and evidence of command of knowledge and abilities, logical and coherent thinkin and presentational skills are minimally thiniques. Misuse of data and results and ent course	mited analytical and critical abilities. Sh organizational and presentational skills results to draw appropriate conclusions d skills required for attaining the course g. Show very little or no ability to ap effective or ineffective. Apply minimall	ow limited ability to apply Apply partially effective Iterating outcomes. Lack ply knowledge to solve ly effective or ineffective ions.  No. of Hours
ntensive Course Course Type Course Teaching	N Lecture v Activitie Lectures Laborate Tutorials	knowledge to solve probiobservation skills and tec Demonstrate little or no e of analytical and critical problems. Organization a observation skills and tec  with laboratory compones s cory s	coherent and logical thinking, but with li lems. Apply limited or barely effective thiniques. Limited ability to use data and evidence of command of knowledge and abilities, logical and coherent thinkin and presentational skills are minimally thiniques. Misuse of data and results and ent course	mited analytical and critical abilities. Sh organizational and presentational skills results to draw appropriate conclusions d skills required for attaining the course g. Show very little or no ability to ap effective or ineffective. Apply minimall	ow limited ability to apply Apply partially effective Ilearning outcomes. Lack ply knowledge to solve ly effective or ineffective ions.  No. of Hours 36
ntensive Course Course Type Course Teaching	N Lecture v Activitie Lectures Laborate Tutorials	knowledge to solve probiobservation skills and tec Demonstrate little or no e of analytical and critical problems. Organization a observation skills and tec with laboratory compones s ory	coherent and logical thinking, but with li lems. Apply limited or barely effective thiniques. Limited ability to use data and evidence of command of knowledge and abilities, logical and coherent thinkin and presentational skills are minimally thiniques. Misuse of data and results and ent course	mited analytical and critical abilities. Sh organizational and presentational skills results to draw appropriate conclusions d skills required for attaining the course g. Show very little or no ability to ap effective or ineffective. Apply minimall	ow limited ability to apply. Apply partially effective is learning outcomes. Lact ply knowledge to solve by effective or ineffective ions.  No. of Hours  36  12
ntensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture v Activitie Lectures Laborate Tutorials	knowledge to solve probiobservation skills and tec Demonstrate little or no e of analytical and critical problems. Organization a observation skills and tec  with laboratory compones s ory s g / Self study	coherent and logical thinking, but with li lems. Apply limited or barely effective thiniques. Limited ability to use data and evidence of command of knowledge and abilities, logical and coherent thinkin and presentational skills are minimally thiniques. Misuse of data and results and ent course	mited analytical and critical abilities. Sh organizational and presentational skills results to draw appropriate conclusions d skills required for attaining the course g. Show very little or no ability to ap effective or ineffective. Apply minimall	ow limited ability to apply. Apply partially effective is. learning outcomes. Lack ply knowledge to solve by effective or ineffective ions.  No. of Hours  36  12  8
ntensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture v Activition Lectures Laborate Tutorials Reading	knowledge to solve probiobservation skills and tec Demonstrate little or no e of analytical and critical problems. Organization a observation skills and tec  with laboratory compones s ory s g / Self study	coherent and logical thinking, but with li lems. Apply limited or barely effective hindues. Limited ability to use data and evidence of command of knowledge and abilities, logical and coherent thinkin and presentational skills are minimally thiniques. Misuse of data and results and ent course  Details	mited analytical and critical abilities. Shorganizational and presentational skills results to draw appropriate conclusions is skills required for attaining the course g. Show very little or no ability to ap effective or ineffective. Apply minimall d/or unable to draw appropriate conclusions.	ow limited ability to apply . Apply partially effective Ilearning outcomes. Lack ply knowledge to solve ty effective or ineffective ions.  No. of Hours 36 12 8 64  Assessment Methods
ntensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture v Activitie Lectures Laborate Tutorials Reading Method	knowledge to solve probiobservation skills and tec Demonstrate little or no e of analytical and critical problems. Organization a observation skills and tec  with laboratory componees s ory g / Self study ls	coherent and logical thinking, but with li lems. Apply limited or barely effective hindues. Limited ability to use data and evidence of command of knowledge and abilities, logical and coherent thinkin and presentational skills are minimally thiniques. Misuse of data and results and ent course  Details	mited analytical and critical abilities. Sh organizational and presentational skills results to draw appropriate conclusions a skills required for attaining the course g. Show very little or no ability to apeffective or ineffective. Apply minimal d/or unable to draw appropriate conclusions with the course grade (%)	ow limited ability to apply . Apply partially effective learning outcomes. Lack ply knowledge to solve ty effective or ineffective ions.  No. of Hours 36 12 8 64  Assessment Methods to CLO Mappping
ntensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture of Activities Lectures Laborate Tutorials Reading Method	knowledge to solve probiobservation skills and tec Demonstrate little or no e of analytical and critical problems. Organization a observation skills and tec  with laboratory componees s ory g / Self study ls	coherent and logical thinking, but with li lems. Apply limited or barely effective hindues. Limited ability to use data and evidence of command of knowledge and abilities, logical and coherent thinkin and presentational skills are minimally hindues. Misuse of data and results and ent course  Details  Details	mited analytical and critical abilities. Sh organizational and presentational skills results to draw appropriate conclusions it skills required for attaining the course g. Show very little or no ability to ap effective or ineffective. Apply minimal lafor unable to draw appropriate conclusions with the course grade (%)  Weighting in final course grade (%)	ow limited ability to apply. Apply partially effectives. Ilearning outcomes. Lact ply knowledge to solve by effective or ineffective ions.  No. of Hours 36 12 8 64 Assessment Methods to CLO Mapping CLO 1,2,3,4,5,6
Communication- intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	N Lecture of Activitie Lectures Laborate Tutorials Reading Method Assignm Examina Test	knowledge to solve probiobservation skills and tec Demonstrate little or no e of analytical and critical problems. Organization a observation skills and tec  with laboratory compones s ory g / Self study ls ments ation	coherent and logical thinking, but with li lems. Apply limited or barely effective hindues. Limited ability to use data and evidence of command of knowledge and abilities, logical and coherent thinkin and presentational skills are minimally hindues. Misuse of data and results and ent course  Details  Details	mited analytical and critical abilities. Shorganizational and presentational skills results to draw appropriate conclusions it skills required for attaining the course g. Show very little or no ability to ap effective or ineffective. Apply minimal lafor unable to draw appropriate conclusions with the course grade (%)  Weighting in final course grade (%)  25 50 25	ow limited ability to apply. Apply partially effectives.  Ilearning outcomes. Laciply knowledge to solve by effective or ineffective ions.  No. of Hours  36  12  8  64  Assessment Methods to CLO Mapping CLO 1,2,3,4,5,6 CLO 1,2,3,4,5,6

PHYS2055	Introdu	ctory relativity (6 credits)	Academic Year	2021				
Offering Department	Physics		Quota					
Course Co-ordinator	Dr K M L	ee, Physics (kmlee@lily.physics.hku.hk)						
Teachers Involved		_ee,Physics)						
Course Objectives	in all disc	rse aims at introducing students the essence of special relativity. It is objicines and all years with science background. It is also a discipline of the pre-requisites for	elective for the phy	sics major/mind				
Course Contents & Topics	Example	iclude: "Common-sense" concepts of space and time versus Einsteir s of time dilation and space contraction, Paradoxes of relativity inclu -in-the-barn", Four vectors and Lorentz invariant, Some discussion on	ding the famous t					
Course Learning	On succe	essful completion of this course, students should be able to:	·					
Outcomes	CLO 1	recall the setup and significance of Michelson-Morley experiment						
	CLO 2	state the basic postulates and the spacetime concept of special relat	ivity					
	CLO 3							
	CLO 4	describe Lorentz transformation and its applications						
	CLO 5							
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in F	PHYS1050 or PHYS1150 or PHYS1250 or ENGG1300						
Offer in 2021 - 2022	Y 2n	d sem Offer in 2022 - 2023 : Y	Examination	May				
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive knowledge and learning outcomes. Show strong analytical and critical abilities and logical thinking, to apply knowledge to a wide range of complex, familiar and unfamiliar situations presentational skills.	with evidence of origina	al thought, and ability				
	В	Demonstrate substantial command of a broad range of knowledge and skills requir learning outcomes. Show evidence of analytical and critical abilities and logical thinki and some unfamiliar situations. Apply effective organizational and presentational skill	ng, and ability to apply s.	knowledge to familia				
	С	Demonstrate general but incomplete command of knowledge and skills required outcomes. Show evidence of some analytical and critical abilities and logical thinki familiar situations. Apply moderately effective organizational and presentational skills	ing, and ability to apply					
	D	Demonstrate partial but limited command of knowledge and skills required for attair Show evidence of some coherent and logical thinking, but with limited analytical and knowledge to solve problems. Apply limited or barely effective organizational and pre	ning some of the course critical abilities. Show I					

	Fail	of analytical and cr	no evidence of command of knowledge an tical abilities, logical and coherent thinkir on and presentational skills are minimally e	ng. Show very little or no ability to ap	
Communication- intensive Course	N				
Course Type	Lecture-ba	sed course			
Course Teaching	Activities		Details		No. of Hours
& Learning Activities	Lectures				36
	Tutorials				12
	Reading / Self study				80
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignme	nts		25	CLO 2,4
	Examination	on	2-hour written exam	50	CLO 1,2,3,4,5
	Test			25	CLO 1,2,3,4,5
Required/recommended reading and online materials	Robert Re 1992, 2nd	snick and David revised edition) aylor and John A	ourse Coordinator Halliday: Basic Concepts in Rela Wheeler: Spacetime Physics: Intr	•	
Course Website	http://mood	,			

PHYS2150	Method	s in physics I (	6 credits)	Academic Y	ear 2021	
Offering Department	Physics		·	Quota		
Course Co-ordinator	Dr F K Ch	now, Physics <i>(judy</i>	rchow@hku.hk)			
Teachers Involved	(Dr F K C	how,Physics)				
Course Objectives			evel courses in our series of courses t			
	approach problems	, we focus on tra by both analytical	It are commonly used in the study of ining students how to think and work and numerical means. After completion PHYS2155 and/or PHYS2160 or the the PHYS2155 and/or PHYS2160 or the the	k as physicists through tac on, interested students may	ckling simple physi take the other seco	
Course Contents			principles and theories of various matl			
& Topics	dimension and vector	studying university physics. Topics include: ordinary differential equations, partial differential equations, three dimensional coordinate geometry, partial differentiation, multiple integration, vector functions and motion in space and vector analysis. Applications to physical systems and various practical problems solving skills are discussed Further MATLAB commands and basic MATLAB programming will be introduced and used in this course.				
Course Learning	On succe	essful completion of	of this course, students should be able	to:		
Outcomes	CLO 1 re	eview the theory a	nd principles of mathematical methods	and compare the features of	of various methods	
	CLO 2 d	escribe the conne	ctions between mathematical equatior	s and physical problems		
			athematical equations to describe the		nysics systems	
			edge of choosing correct solution of m			
			ems and operate the calculations with			
		. , , ,	the physical meaning of result after ca	lculations		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in M	MATH1013 or MAT	H1821 or MATH1851 or PHYS1150			
Offer in 2021 - 2022	Y 1st	t sem Offer in 20	22 - 2023 : Y uph mastery at an advanced level of extensive	Examination		
(A+ to F)	B C D	to apply knowledge Demonstrate substate learning outcomes, and some unfamilial Demonstrate gener outcomes. Show ever familiar situations. A Demonstrate partial Show evidence of sknowledge to solve Demonstrate little of analytical and configurations.	Show strong analytical and critical abilities and to familiar and unfamiliar situations. Apply highl antial command of a broad range of knowledge Show evidence of analytical and critical abilities r situations. Apply effective organizational and pal but incomplete command of knowledge ar idence of some analytical and critical abilities apply moderately effective organizational and probut limited command of knowledge and skills ome coherent and logical thinking, but with limit problems. Apply limited or barely effective organ r no evidence of command of knowledge and sirtical abilities, logical and coherent thinking, to and presentational skills are minimally effection and presentational skills are minimally effection.	y effective organizational and preses and skills required for attaining a and logical thinking, and ability to a resentational skills. Id skills required for attaining mo and logical thinking, and ability to assentational skills. required for attaining some of the ed analytical and critical abilities. Shizational and presentational skills. (ills required for attaining the cours Show very little or no ability to a	entational skills. It least most of the cour apply knowledge to famili- st of the course learning apply knowledge to mo course learning outcome show limited ability to apple le learning outcomes. La	
Communication-	N		<u> </u>			
intensive Course	ļ					
Course Type		ased course	Detelle		No. CIII	
Course Teaching & Learning Activities	Activitie		Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials				12	
Accessment Mather 1	-	/ Self study	Detelle	Maintain 1 Co.	80	
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin	
	Assignm	ents	Including computational assignments	20	CLO 1,2,3,4,5,6	
	Examina	tion	2-hour written exam	50	CLO 2,3,4	
	Test			30	CLO 1,2,3,4	
Required/recommender reading and online materials	Susan J. Allen B. D	Colley: Vector Cal Downey: Physical I	Course Coordinator culus (Pearson, 2011, 4th edition) Modeling in MATLAB (Green Tea Pres ir, and George B. Thomas Jr.: Unive		cendentals (Pearso	

	2016, 3rd edition) K. F. Riley, M. P. Hobson, and S. J. Bence: Mathematical Methods for Physics and Engineering: A Comprehensive Guide (Cambridge University Press, 2006, 3rd edition) Murray R. Spiegel: Schaum's Outline of Advanced Mathematics for Engineers and Scientists (McGraw-Hill Education, 2009)
Course Website	http://moodle.hku.hk

PHYS2155	Methods	s in physics II (6 o	credits)		Academic	<b>Year</b> 2021	
Offering Department	Physics		•		Quota		
Course Co-ordinator	Dr Y J Tu,	Physics (yanjuntu@	hku.hk)				
Teachers Involved	(Dr Y J Tu	,Physics)					
Course Objectives	computation approach, problems	onal skill sets that ar we focus on trainir by both analytical an	re commonly us ng students how d numerical mea	ed in the study of u to think and work ans. After completio	at introduces problem soluniversity-level physics. In a sphysicists through tan, interested students may rd level course in this seri	stead of the cooks ackling simple phy take the other sec	
Course Contents & Topics	studying u systems o further nu	iniversity physics. To if linear differential ec imerical computation	pics include: ma quations, Line in n techniques in	trices and vector sp tegrals, surface inte physics. Application	ematical methods and skil paces, systems of linear a grals and volume integrals ons to physical systems ning will be introduced and	lgebraic equations s, Fourier analysis, and various pract	
Course Learning	On succes	ssful completion of th	is course, stude	nts should be able t	0:		
Outcomes	CLO 2 de CLO 3 st CLO 4 de CLO 5 sc	escribe the connection ate and set up mathe	ns between mat ematical equation ie of choosing co s and operate the	hematical equations ns to describe the dorrect solution of ma e calculations with o			
Pre-requisites (and Co-requisites and Impermissible combinations)		ATH1013 or MATH18		•	culations		
Offer in 2021 - 2022	Y 2nd	sem Offer in 2022	- 2023 : Y		Examination	on May	
Grade Descriptors (A+ to F)	A	, , , , , , , , , , , , , , , , , , , ,					
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.					
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	D Fail	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack					
	ı an		al abilities, logical a	nd coherent thinking. S	show very little or no ability to		
Communication- intensive Course	N	probleme. Organization	and prosontational c	ining are minimally enece	ve or monecuve.		
Course Type	Lecture-ba	ased course					
Course Teaching	Activities	<b>i</b>	Details			No. of Hour	
& Learning Activities	Lectures					36	
	Tutorials					12	
	Reading /	Self study				80	
Assessment Methods and Weighting	Methods		Details		Weighting in final course grade (%)	Assessment Methods to CLO Mappi	
	Assignme		Including assignment		20	CLO 1,2,3,4,5	
	Examinat	ion	2-hour writt	en exam	50	CLO 2,3,4	
	Test				30	CLO 2,3,4	
Required/recommended reading and online materials	Susan J. ( Allen B. D Stephen V Joel Hass 2016, 3rd David Poo K. F. Riley	s, Maurice D. Weir, a edition) ole: Linear Algebra: A v, M. P. Hobson, and	us (Pearson, 20 deling in MATLA A. Annin: Differe and George B. Modern Introdu	B (Green Tea Press ntial Equations and Thomas Jr.: Univer ction (Cengage Lea	s, 2008) Linear Algebra (Pearson, sity Calculus: Early Tran rning, 2015, 4th edition) s for Physics and Enginee	scendentals (Pear	
	,		, ,	edition)	cs for Engineers and S		

PHYS2160	Introductory computational physics (6 credits)	Academic Year	2021
Offering Department	Physics	Quota	30
Course Co-ordinator	Dr F K Chow, Physics (judychow@hku.hk)		
Teachers Involved	(Dr F K Chow, Physics)		
Course Objectives	This is one of the second level courses in our series of courses that introduces computational skill sets that are commonly used in the study of university-lev		

	language physical PHYS41	e. Students are exper problems. After comp 51 to further their stud	ues, and methods in physics are cted to spend a substantial amo pletion, interested students may t dies in computational physics.	unt of time in writing compute take the sequel courses PHYS	er programs to solve 3151, PHYS4150 or		
Course Contents & Topics	oriented in scient numerica	programming in Pyth tific programming; so	omputer programming; Python p non; scientific programming with N olution of non-linear equations w want examples in physics; numer on.	Matplotlib, NumPy, and SciPy; rith application in quantum ph	simple error analysis ysics; Calculus and		
Course Learning	On succe	essful completion of the	his course, students should be abl	le to:			
Outcomes	CLO 2 a	apply Python program employ appropriate nu physics	ge in basic computational techniques in basic computational techniques and relevant pack- umerical methods for solving ordinates and the solving ordinates are the solving ordinates are the solving of various process.	ages to solve simple physical pinary differential equations that			
Pre-requisites (and Co-requisites and Impermissible combinations)			1821 or MATH1851 or PHYS1150				
Offer in 2021 - 2022	Y 2n	nd sem Offer in 2022	2 - 2023 : Y	Examination	May		
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all th learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, a to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizatis presentational skills. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropinsightful conclusions.						
	В						
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.					
	D						
	Fail	of analytical and critic problems. Organization	o evidence of command of knowledge and cal abilities, logical and coherent thinkin, n and presentational skills are minimally el Misuse of data and results and/or unable to	<ul> <li>g. Show very little or no ability to a ffective or ineffective. Apply minimally</li> </ul>	oply knowledge to solve		
Communication- intensive Course	N						
Course Type	Lecture v	with laboratory compo	onent course				
Course Teaching	Activitie	∋s	Details		No. of Hours		
& Learning Activities	Lectures	3			30		
	Laborato	•			18		
	Project v				12		
	- 0	g / Self study			64		
Assessment Methods and Weighting	Methods	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Examina		2-hour written exam	50	CLO 1,2,3,4		
		ory reports		20	CLO 1,2		
	Presenta			10	CLO 1,2,3,4		
	Project r	•		20	CLO 1,2,3,4		
Required/recommended reading and online materials	Christian Andi Klei Mark Nev Hans Per	in and Alexander God wman: Computational tter Langtangen: A Pr	urse Coordinator titlic Programming with Python (Cadunov: Introductory computational all Physics (CreateSpace Independ rimer on Scientific Programming watplotlib Essentials for Scientists at	physics (Cambridge University ent Publishing Platform, 2012) vith Python (Springer, 2016, 5th	Press, 2010)		
			ithintiin Essentiais tor Scientiete ai	na Enaineers (Moraan & Clavo	nol 2015)		

PHYS2250	Introductory mechanics (6 credits)	Academic Year	2021
Offering Department	Physics	Quota	
Course Co-ordinator	Dr M K Yip, Physics (mankit@hku.hk)		
Teachers Involved	(Dr M K Yip, Physics)		
Course Objectives	This calculus-based course covers the foundation of Newtonian mechanics in o physics major, a discipline elective for physics minor, as well as an elective of fundamental Newtonian mechanics concepts and to link them up with their chemistry and mathematics. Problem solving and analytical skills will supplemented by numerical skills occasionally. Upon completion, interested continue their study in Lagrangian mechanics.	ourse for those w studies in fields be extensively u	rho want to learn like engineering, ised. They are
Course Contents & Topics	Topics include: Kinematics, Newton's Laws of Motion and Their Applicat Conservation, Variable Mass Problems, System of Particles and Centre of Mas Inertia, Angular Momentum and its Conservation, Work, Energy and its Harmonic Motions, Damped and Driven Oscillations, Wave Equation, Energy in Principle of Superposition.	s, Torque and Rot Conservation, Gra	ation, Moment of avitation, Simple
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 describe and explain the fundamental physical principles CLO 2 apply these principles, together with logical and mathematical reasoning CLO 3 analyse and solve problems with the aids of mathematics	, to situations of th	ne physical world

		oquiro una interpret exp	perimental data to examine the phy	0.00. 10.10			
Pre-requisites (and Co-requisites and Impermissible combinations)			0 or PHYS1250 or ENGG1300				
Offer in 2021 - 2022	-		er in 2022 - 2023 : Y	Examinatio			
Grade Descriptors (A+ to F)	A	learning outcomes. Show to apply knowledge to a	astery at an advanced level of extensive strong analytical and critical abilities and le wide range of complex, familiar and unfally highly effective lab skills and techniques	ogical thinking, with evidence of a miliar situations. Apply highly e	original thought, and ability ffective organizational and		
	В	learning outcomes. Show and some unfamiliar situa	command of a broad range of knowledge a evidence of analytical and critical abilities a titions. Apply effective organizational and pr ults to draw appropriate conclusions.	and logical thinking, and ability to	apply knowledge to familiar		
	С	outcomes. Show evidence familiar situations. Apply	t incomplete command of knowledge and e of some analytical and critical abilities a moderately effective organizational and pre t but some erroneous use of data and resuli	nd logical thinking, and ability to esentational skills. Apply modera	apply knowledge to most tely effective lab skills and		
	D	techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.  Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills. Apply partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions.					
	Fail						
Communication- intensive Course	N						
Course Type	Lecture w	rith laboratory compone					
	Loctaro II		ent course				
Course Teaching	Activities	, ,	Details		No. of Hours		
		, ,			No. of Hours		
	Activities	s					
	Activities Lectures	s			36		
	Activities Lectures Laborator Tutorials	s			36 6		
Course Teaching & Learning Activities Assessment Methods and Weighting	Activities Lectures Laborator Tutorials	s ry / Self study		Weighting in final course grade (%)	36 6 12		
& Learning Activities  Assessment Methods	Activities Lectures Laborator Tutorials Reading	s ry / Self study	Details		36 6 12 80 Assessment Methods		
& Learning Activities  Assessment Methods	Activities Lectures Laborator Tutorials Reading /	s ry / Self study ents	Details  Details  Including computational	course grade (%)	36 6 12 80 Assessment Methods to CLO Mapping		
& Learning Activities  Assessment Methods	Activities Lectures Laborator Tutorials Reading / Methods	s ry / Self study ents	Details  Details  Including computational assignments	course grade (%)	36 6 12 80 Assessment Methods to CLO Mapping		
& Learning Activities  Assessment Methods	Activities Lectures Laborator Tutorials Reading Methods  Assignme	s ry / Self study ents	Details  Details  Including computational assignments	course grade (%)  10  50	36 6 12 80 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3		
& Learning Activities  Assessment Methods	Activities Lectures Laborator Tutorials Reading / Methods  Assignme Examinat Laborator Test Lecture no D. Kleppn	ry / Self study ents tion ry reports otes provided by Cours er and Robert J. Kolen	Details  Details  Including computational assignments 2-hour written exam	course grade (%)  10  50  15  25  (Cambridge University Property of the course of the	36 6 12 80 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3 CLO 1,4 CLO 1,2,3		

PHYS2255	Introdu	uctory electricity and magnetism (6 credits)	Academic Year	2021		
Offering Department	Physics		Quota			
Course Co-ordinator	Dr J C S	Pun, Physics (jcspun@hku.hk)	·			
Teachers Involved	(Dr J C S	S Pun,Physics)				
Course Objectives	for physi fundame chemistr by nume	culus-based course covers the foundation of electricity and magics major, a discipline elective for physics minor, as well as an ental electricity and magnetism concepts and to link them up by and mathematics. Problem solving and analytical skills will be erical skills occasionally. Upon completion, interested students omagnetism.	elective course for those with their studies in fields extensively used. They	who want to lear like engineering are supplemente		
Course Contents & Topics	potential	nclude: electric force and electric field; Gauss' law and electri l; capacitance and DC circuits; magnetic force; magnetic fi n; inductance and Lenz's law; Maxwell's equations; wave nature	eld and Ampere's law;	Faraday's law of		
Course Learning		essful completion of this course, students should be able to:	<u> </u>			
Outcomes	CLO 1	describe and explain the fundamental physical principles				
	CLO 3	apply these principles, together with logical and mathematical re analyse and solve problems with the aids of mathematics acquire and interpret experimental data to examine the physical	<u>.</u>	he physical world		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in I	PHYS1050 or PHYS1150 or PHYS1250 or ENGG1310				
Offer in 2021 - 2022	Y 2r	nd sem Offer in 2022 - 2023 : Y	Examination	May		
Grade Descriptors (A+ to F)	Α	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and abilit to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions.				
	В	Demonstrate substantial command of a broad range of knowledge and si learning outcomes. Show evidence of analytical and critical abilities and log and some unfamiliar situations. Apply effective organizational and present. Correct use of data of results to draw appropriate conclusions.	ical thinking, and ability to apply ational skills. Apply effective lab	knowledge to familian skills and techniques.		
	С	Demonstrate general but incomplete command of knowledge and skills outcomes. Show evidence of some analytical and critical abilities and log familiar situations. Apply moderately effective organizational and presenta techniques. Mostly correct but some erroneous use of data and results to d	ical thinking, and ability to app tional skills. Apply moderately e	ly knowledge to most		
	D	Demonstrate partial but limited command of knowledge and skills required Show evidence of some coherent and logical thinking, but with limited anal				

					nizational and presentational ski w appropriate conclusions.	lls. Apply partially effective
	of ar	nalytical and critical al ems. Organization and	bilities, logical a d presentational	ind coherent thinking. S skills are minimally effecti	Is required for attaining the cours how very little or no ability to ve or ineffective. Apply minimally w appropriate conclusions.	apply knowledge to solve
Communication- intensive Course	N					
Course Type	Lecture with lab	oratory componer	nt course			
Course Teaching	Activities		Details			No. of Hours
& Learning Activities	Lectures					36
	Laboratory					6
	Tutorials					12
	Reading / Self study					80
Assessment Methods and Weighting	Methods		Details		Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments		Including assignment	computational s	10	CLO 1,2,3,4
	Examination		2-hour written exam 50		CLO 1,2,3	
	Laboratory rep	orts			15	CLO 1,4
	Test				25	CLO 1,2,3
Required/recommended reading and online materials	R. D. Knight: Ph R. Resnick, D. I	nysics for Scientist Halliday, and K. Kr	ts and Engine rane: Physics	ers (Pearson, 2008, Volume 2 (John Wil		lition)
Course Website	http://moodle.hl			5 (	, ,	,

PHYS2260	Heat and	d waves (6 credit	s)			Academic Yea	r  2021
Offering Department	Physics	•				Quota	
Course Co-ordinator	Dr M Su, F	Physics (mengsu84@	Dhku.hk)			'	
Teachers Involved	(Dr M Su,l	Physics)	,				
Course Objectives	This cours	se covers the founda	tion of heat ar	nd waves in on	e semester. It s	erves as a core cours	e for students wh
						or. It also serves stud in heat and waves are	
Course Contents						ty and phase, Wave p	
& Topics	equation, resonance interference and equilil energy, Co gas, Mola including a	Energy in wave mo e, Beats, The Dopple ce, Interference from brium, Ideal gas law oncept of heat, First ar heat capacities a	tion, The print of the print of	nciple of supe t wave as an e ngle slit diffrac- iew of pressure odynamic, Work olume and co ume, cyclical a	rposition, Interfelectromagnetic tion, Multiple slie, Mean free pak done on or by bostant pressure and free expansi	an example for longituerence of waves, Stawave, Reflection, Reft and grating, Polarizath, distributions of man ideal gas, Internal e, Different thermodytion, Reversibility of prical view of entropy	anding waves ar raction, Double s ation, Temperatu blecular speed ar energy of an ide ynamic processe
Course Learning		ssful completion of th				iodi vion oi oiniopy.	
Outcomes		escribe and explain th					
Outcomes					•	oning, to situations of	the physical worl
		nalyse and solve prob				orning, to ortadizono or	ano priyotodi won
		quire and interpret e				NS	
Pre-requisites		HYS1050 or PHYS12	•	ata to examine	the physical lav		
(and Co-requisites							
and Impermissible combinations)							
and Impermissible combinations) Offer in 2021 - 2022		er in 2022 - 2023 : N				Examination	
and Impermissible combinations) Offer in 2021 - 2022	N Offe	Demonstrate thorough learning outcomes. Sho to apply knowledge to presentational skills. Ap- insightful conclusions. Demonstrate substantia	w strong analytic a wide range of oply highly effecti	cal and critical ability complex, familiar ive lab skills and the broad range of kn	ities and logical thin and unfamiliar situ techniques. Critical nowledge and skills	e and skills required for a king, with evidence of orig lations. Apply highly effect use of data and results to required for attaining at le	nal thought, and abilitive organizational are draw appropriate are ast most of the cours
and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	A	Demonstrate thorough learning outcomes. Sho to apply knowledge to presentational skills. Ar insightful conclusions. Demonstrate substantia learning outcomes. Sho	w strong analytic a wide range of oply highly effecti al command of a w evidence of an uations. Apply eff	cal and critical ability complex, familiar ive lab skills and the broad range of knalytical and critical fective organization	ities and logical thin and unfamiliar situ techniques. Critical nowledge and skills abilities and logical nal and presentatior	e and skills required for a king, with evidence of orig lations. Apply highly effec- use of data and results to	nal thought, and abilive organizational ardraw appropriate arast most of the coursy knowledge to famili
and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	A	Demonstrate thorough learning outcomes. Sho to apply knowledge to presentational skills. Af insightful conclusions. Demonstrate substantia learning outcomes. Sho and some unfamiliar sitt Correct use of data of re Demonstrate general boutcomes. Show evider familiar situations. Appl	w strong analytic a wide range of opply highly effecti il command of a w evidence of an uations. Apply effective sults to draw app ut incomplete croce of some analy moderately effective	cal and critical abilicomplex, familiar ive lab skills and thou and the proad range of kn alytical and critical fective organization or propriate conclusion ommand of knowly ligital and critical active organization organization organization	ities and logical thin and unfamiliar situtechniques. Critical nowledge and skills abilities and logical nal and presentation ins. edge and skills recabilities and logical al and presentation and logical al and presentation and logical and presentation.	e and skills required for a king, with evidence of orig lations. Apply highly effec- use of data and results to required for attaining at le thinking, and ability to app	nal thought, and abilive organizational ardraw appropriate ardraw appropriate areast most of the coursy knowledge to familio skills and technique of the course learningly knowledge to mo
and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	B C	Demonstrate thorough learning outcomes. Sho to apply knowledge to presentational skills. Applied in the presentational skills. Applied in the presentational skills. Applied in the presentational skills and some unfamiliar sit correct use of data of recommendations. Applied in the presentation of the prese	w strong analytic a wide range of poply highly effecti il command of a w evidence of an uations. Apply eff esults to draw app rut incomplete conce of some ana y moderately effe ect but some erro limited comman- e coherent and loy blems. Apply lim s. Limited ability t	cal and critical abilitic complex, familiar ive lab skills and the broad range of kn alytical and critical fective organization ormmand of knowly liptical and critical active organization oneous use of data dof knowledge an gical thinking, but vilted or barely effecto use data and resouse of ouse data and resouse of couse data and resouse of couse data and resouse of couse data and resouse liptical skills.	ities and logical thin and unfamiliar situtechniques. Critical mowledge and skills abilities and logical nal and presentation in the still still skills recabilities and logical al and presentation and results to draw and skills required for with limited analyticactive organizational sults to draw appropublic.	e and skills required for a king, with evidence of orig autions. Apply highly effect use of data and results to required for attaining at le thinking, and ability to apparal skills. Apply effective la quired for attaining most thinking, and ability to ap al skills. Apply moderately appropriate conclusions.  Tattaining some of the coular and critical abilities. Show and presentational skills. Ariate conclusions.	nal thought, and abilive organizational ardraw appropriate are ast most of the coursy knowledge to familia skills and technique of the course learningly knowledge to moeffective lab skills are rese learning outcome vimited ability to app.
and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	В	Demonstrate thorough learning outcomes. Sho to apply knowledge to presentational skills. Ag insightful conclusions. Demonstrate substantia learning outcomes. Sho and some unfamiliar sit Correct use of data of re Demonstrate general boutcomes. Show evider familiar situations. Appl techniques. Mostly corre Demonstrate partial but Show evidence of some knowledge to solve pro lab skills and techniques. Demonstrate little or no of analytical and critical control of the control of analytical and critical control of the control of analytical and critical control of the control	w strong analytic a wide range of polyl highly effective polyl highly effective and the wevidence of an unations. Apply effective to the concern of any operations and the weight of the work of the w	cal and critical abilic complex, familiar ive lab skills and the broad range of kn alytical and critical fective organization propriate conclusion ommand of knowl lytical and critical active organization oneous use of data d of knowledge an gical thinking, but valited or barely effect o use data and resumand of knowledge all and coherent the tal skills are minim	ities and logical thin and unfamiliar situtechniques. Critical towledge and skills abilities and logical nal and presentation ones. edge and skills recabilities and logical al and presentation and results to draw and skills required for with limited analyticactive organizational sults to draw appropie and skills required inking. Show very ally effective or inef	e and skills required for a king, with evidence of orig autions. Apply highly effect use of data and results to required for attaining at le thinking, and ability to appal skills. Apply effective la quired for attaining most of thinking, and ability to apal skills. Apply moderately appropriate conclusions.  Tattaining some of the could and critical abilities. Show and presentational skills. And critical abilities. Show and practical abilities. Show and practical abilities. Show and practical abilities. The course left in the course left in	nal thought, and abilive organizational ardraw appropriate and ast most of the coursy knowledge to familia and technique of the course learning obly knowledge to moeffective lab skills are see learning outcome with limited ability to appay ply partially effective arning outcomes. Lay knowledge to solv
and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	B C	Demonstrate thorough learning outcomes. Sho to apply knowledge to presentational skills. Aç insightful conclusions. Demonstrate substantia learning outcomes. Sho and some unfamiliar sitt Correct use of data of re Demonstrate general boutcomes. Show evider familiar situations. Appl techniques. Mostly corre Demonstrate partial but Show evidence of some knowledge to solve pro lab skills and techniques. Demonstrate little or no of analytical and critica problems. Organization	w strong analytic a wide range of polyl highly effective polyl highly effective and the wevidence of an unations. Apply effective to the concern of any operations and the weight of the work of the w	cal and critical abilic complex, familiar ive lab skills and the broad range of kn alytical and critical fective organization propriate conclusion ommand of knowl lytical and critical active organization oneous use of data d of knowledge an gical thinking, but valited or barely effect o use data and resumand of knowledge all and coherent the tal skills are minim	ities and logical thin and unfamiliar situtechniques. Critical towledge and skills abilities and logical nal and presentation ones. edge and skills recabilities and logical al and presentation and results to draw and skills required for with limited analyticactive organizational sults to draw appropie and skills required inking. Show very ally effective or inef	e and skills required for a king, with evidence of orig autions. Apply highly effect use of data and results to required for attaining at le thinking, and ability to appal skills. Apply effective la quired for attaining most of thinking, and ability to apal skills. Apply moderately appropriate conclusions.  Tattaining some of the could and critical abilities. Show and presentational skills. And critical abilities. Show and practical abilities. Show and practical abilities. Show and practical abilities. The course left in the course left in	nal thought, and abilive organizational ardraw appropriate and ast most of the coursy knowledge to familia and technique of the course learning obly knowledge to moeffective lab skills are see learning outcome with limited ability to appay ply partially effective arning outcomes. Lay knowledge to solv
communication- ntensive Course Course Type	A B C D Fail	Demonstrate thorough learning outcomes. Sho to apply knowledge to presentational skills. Aç insightful conclusions. Demonstrate substantia learning outcomes. Sho and some unfamiliar sitt Correct use of data of re Demonstrate general boutcomes. Show evider familiar situations. Appl techniques. Mostly corre Demonstrate partial but Show evidence of some knowledge to solve pro lab skills and techniques. Demonstrate little or no of analytical and critica problems. Organization	w strong analytic a wide range of poply highly effect il command of a w evidence of an uations. Apply eff soults to draw app ut incomplete croce of some an y moderately effe act but some erro in coherent and lo blems. Apply lim s. Limited ability t evidence of com all abilities, logica and presentation issue of data and	cal and critical abilic complex, familiar ive lab skills and the broad range of kn alytical and critical fective organization propriate conclusion ommand of knowl lytical and critical active organization oneous use of data d of knowledge an gical thinking, but valited or barely effect o use data and resumand of knowledge all and coherent the tal skills are minim	ities and logical thin and unfamiliar situtechniques. Critical towledge and skills abilities and logical nal and presentation ones. edge and skills recabilities and logical al and presentation and results to draw and skills required for with limited analyticactive organizational sults to draw appropie and skills required inking. Show very ally effective or inef	e and skills required for a king, with evidence of orig autions. Apply highly effect use of data and results to required for attaining at le thinking, and ability to appal skills. Apply effective la quired for attaining most of thinking, and ability to apal skills. Apply moderately appropriate conclusions.  Tattaining some of the could and critical abilities. Show and presentational skills. And critical abilities. Show and practical abilities. Show and practical abilities. Show and practical abilities. The course left in the course left in	nal thought, and abilive organizational ardraw appropriate and ast most of the coursy knowledge to familia and technique of the course learning obly knowledge to moeffective lab skills are see learning outcome with limited ability to appay ply partially effective arning outcomes. Lay knowledge to solv
Communication- ntensive Course Course Type Course Teaching	A B C D Fail	Demonstrate thorough learning outcomes. Sho to apply knowledge to presentational skills. At insightful conclusions. Demonstrate substantial learning outcomes. Sho and some unfamiliar sit Correct use of data of re Demonstrate general boutcomes. Show evider familiar situations. Appl techniques. Mostly correct use of some knowledge to solve pro Demonstrate partial but Show evidence of some knowledge to solve pro lab skills and techniques. Demonstrate little or no of analytical and critica problems. Organization skills and techniques. M	w strong analytic a wide range of poply highly effect il command of a w evidence of an uations. Apply eff soults to draw app ut incomplete croce of some an y moderately effe act but some erro in coherent and lo blems. Apply lim s. Limited ability t evidence of com all abilities, logica and presentation issue of data and	cal and critical abilic complex, familiar ive lab skills and the broad range of kn alytical and critical fective organization propriate conclusion ommand of knowl lytical and critical active organization oneous use of data d of knowledge an gical thinking, but valited or barely effect o use data and resumand of knowledge all and coherent the tal skills are minim	ities and logical thin and unfamiliar situtechniques. Critical towledge and skills abilities and logical nal and presentation ones. edge and skills recabilities and logical al and presentation and results to draw and skills required for with limited analyticactive organizational sults to draw appropie and skills required inking. Show very ally effective or inef	e and skills required for a king, with evidence of orig autions. Apply highly effect use of data and results to required for attaining at le thinking, and ability to appal skills. Apply effective la quired for attaining most of thinking, and ability to apal skills. Apply moderately appropriate conclusions.  Tattaining some of the could and critical abilities. Show and presentational skills. And critical abilities. Show and practical abilities. Show and practical abilities. Show and practical abilities. The course left in the course left in	nal thought, and abilive organizational ardraw appropriate and ast most of the coursy knowledge to familia and technique of the course learning obly knowledge to moeffective lab skills are see learning outcome with limited ability to appay ply partially effective arning outcomes. Lay knowledge to solv
Communication- ntensive Course Course Type Course Teaching	A B C D Fail N Lecture wi	Demonstrate thorough learning outcomes. Sho to apply knowledge to presentational skills. At insightful conclusions. Demonstrate substantial learning outcomes. Sho and some unfamiliar sit Correct use of data of re Demonstrate general boutcomes. Show evider familiar situations. Appl techniques. Mostly correct use of some knowledge to solve pro Demonstrate partial but Show evidence of some knowledge to solve pro lab skills and techniques. Demonstrate little or no of analytical and critica problems. Organization skills and techniques. M	w strong analytic a wide range of opply highly effection opply highly effection we evidence of an uations. Apply effection of a concept of some and y moderately effect but some error of coherent and log blems. Apply lim s. Limited abilities, logical and presentation issues of data and ment course.	cal and critical abilic complex, familiar ive lab skills and the broad range of kn alytical and critical fective organization propriate conclusion ommand of knowl lytical and critical active organization oneous use of data d of knowledge an gical thinking, but valited or barely effect o use data and resumand of knowledge all and coherent the tal skills are minim	ities and logical thin and unfamiliar situtechniques. Critical towledge and skills abilities and logical nal and presentation ones. edge and skills recabilities and logical al and presentation and results to draw and skills required for with limited analyticactive organizational sults to draw appropie and skills required inking. Show very ally effective or inef	e and skills required for a king, with evidence of orig autions. Apply highly effect use of data and results to required for attaining at le thinking, and ability to appal skills. Apply effective la quired for attaining most of thinking, and ability to apal skills. Apply moderately appropriate conclusions.  Tattaining some of the could and critical abilities. Show and presentational skills. And critical abilities. Show and practical abilities. Show and practical abilities. Show and practical abilities. The course left in the course left in	nal thought, and abilive organizational ardraw appropriate and draw appropriate and ast most of the coursy knowledge to familia skills and technique of the course learning by knowledge to moeffective lab skills and see learning outcomes are learning outcomes around the course learning outcomes. Lay knowledge to solvective or ineffective lab skills around the course learning outcomes. Lay knowledge to solvective or ineffective lab
Communication- intensive Course Course Type Course Teaching	A B C D Fail N Lecture wi	Demonstrate thorough learning outcomes. Sho to apply knowledge to presentational skills. At insightful conclusions. Demonstrate substantial learning outcomes. Sho and some unfamiliar sit. Correct use of data of reduction to the control of the con	w strong analytic a wide range of opply highly effection opply highly effection we evidence of an uations. Apply effection of a concept of some and y moderately effect but some error of coherent and log blems. Apply lim s. Limited abilities, logical and presentation issues of data and ment course.	cal and critical abilic complex, familiar ive lab skills and the broad range of kn alytical and critical fective organization propriate conclusion ommand of knowl lytical and critical active organization oneous use of data d of knowledge an gical thinking, but valited or barely effect o use data and resumand of knowledge all and coherent the tal skills are minim	ities and logical thin and unfamiliar situtechniques. Critical towledge and skills abilities and logical nal and presentation ones. edge and skills recabilities and logical al and presentation and results to draw and skills required for with limited analyticactive organizational sults to draw appropie and skills required inking. Show very ally effective or inef	e and skills required for a king, with evidence of orig autions. Apply highly effect use of data and results to required for attaining at le thinking, and ability to appal skills. Apply effective la quired for attaining most of thinking, and ability to apal skills. Apply moderately appropriate conclusions.  Tattaining some of the could and critical abilities. Show and presentational skills. And critical abilities. Show and practical abilities. Show and practical abilities. Show and practical abilities. The course left in the course left in	nal thought, and abilive organizational ardraw appropriate ardraw appropriate ardraw appropriate are set most of the coursy knowledge to familia o skills and technique of the course learning by knowledge to moeffective lab skills are see learning outcomes within the dependent of the course learning outcomes are learning outcomes. Lay knowledge to solvective or ineffective lab.
and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)	B C D Fail N Lecture wi Activities Lectures	Demonstrate thorough learning outcomes. Sho to apply knowledge to presentational skills. At insightful conclusions. Demonstrate substantial learning outcomes. Sho and some unfamiliar sit. Correct use of data of reduction to the control of the con	w strong analytic a wide range of opply highly effection opply highly effection we evidence of an uations. Apply effection of a concept of some and y moderately effect but some error of coherent and log blems. Apply lim s. Limited abilities, logical and presentation issues of data and ment course.	cal and critical abilic complex, familiar ive lab skills and the broad range of kn alytical and critical fective organization propriate conclusion ommand of knowl lytical and critical active organization oneous use of data d of knowledge an gical thinking, but valited or barely effect o use data and resumand of knowledge all and coherent the tal skills are minim	ities and logical thin and unfamiliar situtechniques. Critical towledge and skills abilities and logical nal and presentation ones. edge and skills recabilities and logical al and presentation and results to draw and skills required for with limited analyticactive organizational sults to draw appropie and skills required inking. Show very ally effective or inef	e and skills required for a king, with evidence of orig autions. Apply highly effect use of data and results to required for attaining at le thinking, and ability to appal skills. Apply effective la quired for attaining most of thinking, and ability to apal skills. Apply moderately appropriate conclusions.  Tattaining some of the could and critical abilities. Show and presentational skills. And critical abilities. Show and practical abilities. Show and practical abilities. Show and practical abilities. The course left in the course left in	nal thought, and abilive organizational ardraw appropriate ardraw appropriate areast most of the coursy knowledge to familia of the course learning of the course learning by knowledge to moeffective lab skills are see learning outcomes wilmited ability to appare apply partially effective arning outcomes. Lay knowledge to solvective or ineffective lab.  No. of Hours  36

Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments		10	CLO 1,2,3,4		
	Examination	2-hour written exam	50	CLO 1,2,3		
	Laboratory reports		15	CLO 1,4		
	Test		25	CLO 1,2,3		
Required/recommended reading and online materials	P. A. Tipler and G. Mosca: Physics for Scientists and Engineers (Freeman, 2008, 6th edition) R. Resnick, D. Halliday, and K. Krane: Physics Volume 1 (John Wiley and Sons, 2002, 5th edition) R. Resnick, D. Halliday, and K. Krane: Physics Volume 2 (John Wiley and Sons, 2002, 5th edition)					

PHYS2261	Introduc	tory heat and therm	nodynamics (6 credits)	Academic Y	ear 2021	
Offering Department	Physics			Quota		
Course Co-ordinator	Dr S Z Zh	ang, Physics <i>(shizhong)</i>	@hku.hk)			
Teachers Involved		nang,Physics)				
Course Objectives	This calculus-based course covers the basics of thermodynamics and kinetic theory in one semester. It is a core course for physics major, a discipline elective for physics minor, as well as an elective course for those who want to learn fundamental thermodynamics concepts and to link them up with their studies in fields like engineering, chemistry and mathematics. Problem solving and analytical skills will be extensively used. They are supplemented by numerical skills occasionally. Upon completion, interested students may take PHYS3550 to further their study in thermodynamics and statistical mechanics.					
Course Contents & Topics	Topics include: thermodynamic system, equilibrium state and its characterization; thermodynamic state function and equation of state and state transformation; first law of thermodynamics, adiabatic process, Carnot cycle; entropy and second law of thermodynamics; various thermodynamic potentials and their applications in phase equilibrium and mixtures; third law of thermodynamics and Nernst theorem. It also includes a discussion on kinetic theory.					
Course Learning	On succe	ssful completion of this c	ourse, students should be able to	D:		
Outcomes			undamental physical principles			
			ether with logical and mathemati	cal reasoning, to situations	of the physical world	
			ns with the aids of mathematics			
			rimental data to examine the phy	sical laws		
Pre-requisites (and Co-requisites and Impermissible combinations)		HYS1050 or PHYS1150	or PHYS1250 or ENGG1350			
Offer in 2021 - 2022	Y 1st	sem Offer in 2022 - 20	)23 : Y	Examination	Dec	
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions.					
	В	learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions.				
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.				
	D					
	Fail					
Communication- intensive Course	N					
Course Type		ith laboratory componen	t course			
Course Teaching	Activities	3	Details		No. of Hours	
& Learning Activities	Lectures				36	
	Laborato	ту		6		
	Tutorials				12	
		Self study			80	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
and Weighting			Including computational	10		
and Weighting	Assignme	ents	assignments	10	CLO 1,2,3,4	
and Weighting	Assignme		assignments 2-hour written exam	50	CLO 1,2,3,4 CLO 1,2,3,4	
and Weighting	Examinat					
and Weighting	Examinat	ion		50	CLO 1,2,3,4	
and Weighting  Required/recommended eading and online materials	Examinat Laborator Test Lecture no Stephen	ion ry reports otes provided by Course I. Blundell and Katherine	2-hour written exam	50 15 25 al Physics, Oxford Universit	CLO 1,2,3,4 CLO 3 CLO 1,2,3,4 y Press, 2010	

PHYS2265	Introductory quantum physics (6 credits)	Academic Year	2021
Offering Department	Physics	Quota	
Course Co-ordinator	Dr F K Chow, Physics (judychow@hku.hk)		
Teachers Involved	(Dr F K Chow,Physics)		

	(Prof H F Chau, Physics)					
Course Objectives	physics n fundamer mathema	This calculus-based course covers the foundation of quantum physics in one semester. It is a core course for physics major, a discipline elective for physics minor, as well as an elective course for those who want to learn fundamental quantum physics and to link them up with their studies in fields like engineering, chemistry and mathematics. Problem solving and analytical skills will be extensively used. They are supplemented by numerical skills occasionally. Upon completion, interested students may take PHYS3351 to further their study in quantum mechanics				
Course Contents & Topics	waves; th	ne Schrodinger equation	dern physics; electromagnetic way on; solutions of time-independent he hydrogen atom; many-electron a	Schrodinger equation to		
Course Learning		On successful completion of this course, students should be able to:				
Outcomes			fundamental physical principles		-£46	
	CLO 2 apply these principles, together with logical and mathematical reasoning, to situations of the physic CLO 3 analyse and solve problems with the aids of mathematics					
		,	perimental data to examine the phy	sical laws		
Pre-requisites (and Co-requisites and Impermissible combinations)			0 or PHYS1250 or ENGG1300	50 <b>3</b> . 12.110		
Offer in 2021 - 2022	Y 1st	sem 2nd sem Offe	r in 2022 - 2023 : Y	Examinatio	n Dec May	
Grade Descriptors (A+ to F)	В	learning outcomes. Show to apply knowledge to a presentational skills. Appl insightful conclusions.	astery at an advanced level of extensive strong analytical and critical abilities and Ic wide range of complex, familiar and unfa y highly effective lab skills and techniques	ogical thinking, with evidence of miliar situations. Apply highly e s. Critical use of data and result	original thought, and ability ffective organizational and s to draw appropriate and	
	Ь	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions.				
	С					
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills. Apply partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions.					
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective. Apply minimally effective or ineffective lab skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions.					
Communication-	N					
intensive Course						
Course Type		ith laboratory compone				
Course Teaching & Learning Activities	Activities		Details	No. of Hours		
a Learning Activities	Lectures Laborato			36		
	Tutorials	•			12	
		/ Self study			80	
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents	Including computational assignments	10	CLO 1,2,3,4	
	_			50	CLO 1,2,3	
	Examinat		2-hour written exam			
	Examinat	tion ry reports	2-hour written exam	15	CLO 1,4	
Required/recommended reading and online materials	Examinat Laborator Test Lecture nr Robert Ei Wiley & S Randy Ha Kenneth S Raymond Paul A. T	ry reports otes provided by Cours isberg and Robert Res isons, 1985) arris: Modern Physics (F S. Krane: Modern Phys A. Serway, Clement J. Fipler and Gene Mosca		15 25 Molecules, Solids, Nucle edition) n Physics (Cengage Lear	CLO 1,4 CLO 1,2,3 i, and Particles (John ning, 2005, 3rd edition	
reading and	Examinat Laborator Test Lecture nr Robert Ei Wiley & S Randy Ha Kenneth S Raymond Paul A. T Company	ry reports otes provided by Cours isberg and Robert Res sons, 1985) arris: Modern Physics (F S. Krane: Modern Phys I A. Serway, Clement J.	te Coordinator chick: Quantum Physics of Atoms, Pearson, 2014, 2nd edition) ics (John Wiley & Sons, 2012, 3rd Moses, and Curt A. Moyer: Moder	15 25 Molecules, Solids, Nucle edition) n Physics (Cengage Lear	CLO 1,4 CLO 1,2,3 i, and Particles (John ning, 2005, 3rd edition)	

PHYS2650	Modern astronomy (6 credits)	Academic Year	2021		
Offering Department	Physics	Quota			
Course Co-ordinator	Dr J J L Lim, Physics (jjlim@hku.hk)				
Teachers Involved	(Dr J J L Lim,Physics)				
Course Objectives	This course takes you from the beginnings to the forefronts of contemporary as from the Solar System to the Big Bang - with an emphasis on the most importan astronomy. Advanced physical concepts are explained with a minimum of math to know and manipulate simple algebra. An intermediate astronomy course for years, it also is the second course in our series of two compulsory cours knowledge, methods, and recent advances for astronomy minors. This primstudents to the cutting-edge of contemporary astronomy. After completing this take PHYS3650, PHYS3653 and/or PHYS3660, which are core or discipline eleand astrophysics theme of physics major.	t methodologies a nematics: you will r students in all d es to introduce t ary aim of this c s course, interest	and discoveries in only be required isciplines and all pasic astronomy ourse is to take ed students may		
Course Contents & Topics	Scale of the Solar and Exo-planetary Systems, Astrometry and Scale of the Galaxy, Scale of the Universe, Expansion and Accelerated Expansion of the Universe, Hubble Parameter, Dark Matter and Dark Energy, Cosmology, Critical Density, Cosmic Structure, Cosmic Microwave Background, Inflation, Neutrino Astrophysics				
Course Learning	On successful completion of this course, students should be able to:				

Outcomes	CLO 1 de	escribe the metho	odologies used to determine the scal	le of the Solar System, Galaxy, a	and the Universe		
	CLO 2 ex	xplain how astron	nomical observations imply that the U	Jniverse is expanding at an acce	elerated rate		
	CLO 3 discuss critically why Dark Matter and Dark Energy is required to explain astronomical observations						
	CLO 4 de	escribe the import	tance of precise measurements of the	ne Hubble parameter			
			tions and provide reasoned exp he concepts learnt	lanations to demonstrate cor	npetence on and		
Pre-requisites (and Co-requisites and Impermissible combinations)		Pass in PHYS1650					
Offer in 2021 - 2022	Y 1st	t sem Offer in 20	022 - 2023 : Y	Examination	Dec		
Grade Descriptors (A+ to F)	A	learning outcomes. to apply knowledge presentational skills	ough mastery at an advanced level of exter . Show strong analytical and critical abilities ge to a wide range of complex, familiar and s. tantial command of a broad range of knowle	and logical thinking, with evidence of or I unfamiliar situations. Apply highly effe	iginal thought, and ability ective organizational and		
	В	learning outcomes.	. Show evidence of analytical and critical abili ar situations. Apply effective organizational ar	ities and logical thinking, and ability to ap			
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail	of analytical and of	or no evidence of command of knowledge an critical abilities, logical and coherent thinkir ation and presentational skills are minimally e	ng. Show very little or no ability to ap			
Communication- intensive Course	N						
Course Type	Lecture-b	ased course					
0 T  - !							
Course Leaching	Activities	S	Details		No. of Hours		
	Activities Lectures		Details		No. of Hours		
		_	Details				
Course Teaching & Learning Activities	Lectures Tutorials	_	Details		36		
	Lectures Tutorials	/ Self study	Details  Details	Weighting in final course grade (%)	36 12		
& Learning Activities  Assessment Methods	Lectures Tutorials Reading	/ Self study			36 12 80 Assessment Methods		
& Learning Activities  Assessment Methods	Lectures Tutorials Reading / Methods	/ Self study		course grade (%)	36 12 80 Assessment Methods to CLO Mapping		
& Learning Activities  Assessment Methods	Lectures Tutorials Reading Methods Assignment	/ Self study	Details	course grade (%)	36 12 80 Assessment Methods to CLO Mapping CLO 1,2,3,4,5		
& Learning Activities  Assessment Methods	Lectures Tutorials Reading Methods  Assignme Examinat Texaminat Lecture ne B. W. Car 2nd editio	/ Self study sents tion totes provided by trroll & D. A. Ostlie	Details	course grade (%)  25  50  25  25  whysics (Addison-Wesley Publish	36 12 80 Assessment Methods to CLO Mapping CLO 1,2,3,4,5 CLO 1,2,3,4,5 CLO 1,2,3		

PHYS2850	Atomic	and nuclear physics (6 credits)	Academic Year	2021			
Offering Department	Physics	<u> </u>	Quota				
Course Co-ordinator	Dr S Z Zh	ang, Physics (shizhong@hku.hk)					
Teachers Involved							
Course Objectives	to provide research	This course will introduce students to the fundamentals of atomic physics and rudimentary nuclear physics. It aims to provide a coherent and concise coverage of traditional atomic and nuclear physics. Important topics of current research interest will be also discussed, such as laser cooling and trapping which plays an important role in the realization of Bose-Einstein condensate in atomic vapors.					
Course Contents	Topics in	clude: Atomic structure of hydrogen and hydrogei	n-like atom, multi-electron atom, atom i	n electromagnetion			
& Topics		ctroscopy, laser trapping and cooling; nuclear stru principles of atomic and nuclear physics will be m		ns. Applications o			
Course Learning	On succe	ssful completion of this course, students should b	e able to:				
Outcomes	m	pply general considerations of quantum physics agnitude of estimation of physical effects	, ,	general orders of			
	CLO 2 ex	xplain how light interacting with atom; the working	principle of laser trapping and cooling				
		ecognize the general features of atomic/nuclear sp					
	CLO 4 a	pply quantum physics to understand the basic fea	tures of simple nuclei, binding of deute	ron et al			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in P	HYS2265					
Offer in 2021 - 2022	N Off	fer in 2022 - 2023 : N	Examination				
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of learning outcomes. Show strong analytical and critical abil to apply knowledge to a wide range of complex, familiar presentational skills. Apply highly effective lab skills and insightful conclusions.	lities and logical thinking, with evidence of origin r and unfamiliar situations. Apply highly effectiv	al thought, and ability e organizational and			
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions.						
	С	Demonstrate general but incomplete command of know outcomes. Show evidence of some analytical and critical familiar situations. Apply moderately effective organizatior techniques. Mostly correct but some erroneous use of data	abilities and logical thinking, and ability to appl nal and presentational skills. Apply moderately e	y knowledge to most			
	D	Demonstrate partial but limited command of knowledge at Show evidence of some coherent and logical thinking, but knowledge to solve problems. Apply limited or barely effe lab skills and techniques. Limited ability to use data and re:	with limited analytical and critical abilities. Show ctive organizational and presentational skills. Ap	limited ability to apply			
		Demonstrate little or no evidence of command of knowledge		rning outcomes. La			

	Fail	problems. Organization a	nd presentational skills are mir	t thinking. Show very little or no ability to ap nimally effective or ineffective. Apply minimally e unable to draw appropriate conclusions.	
Communication- intensive Course	N				
Course Type	Lecture-b	ased course			
Course Teaching	Activities	S	Details		No. of Hours
& Learning Activities	Lectures				36
	Tutorials				18
	Reading / Self study				80
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignme	ents		20	CLO 1,2,3,4
	Examinat	tion		50	CLO 1,2,3,4
	Test			30	CLO 1,2,3,4
Required/recommended reading and online materials	Lecture notes provided by Course Coordinator W. Demtroder, Atoms, molecules and photons (Springer, 2nd, 2011) K. Krane, Introductory nuclear physics (John Wiley & Sons, 1988) B. H. Bransden and C. J. Joachain: Physics of Atoms and Molecules (Pearson, 2nd, 2003)				
Course Website	http://wwv	v.physics.hku.hk/~phys	s2628/	<u>'</u>	

PHYS3150	Theoret	ical physics (6 o	credits)	Academic \	Year 2021		
Offering Department	Physics			Quota			
Course Co-ordinator	Dr C J Wa	Dr C J Wang, Physics <i>(cjwang</i> @ <i>hku.hk)</i>					
Teachers Involved	(Dr C J W	/ang,Physics)					
Course Objectives	computati and comp an electiv	This is the third level course in our series of courses that introduces problem solving, mathematical and computational skill sets that are commonly used in the study of university-level physics. We focus on the analytica and computer algebra techniques in solving physics problems. It is one of the core electives for physics major and an elective course for the computational physics and theoretical physics themes. This is also an essential course for those who plan to pursue postgraduate studies in mathematical and theoretical physics.					
Course Contents & Topics	This cour applicatio differentia singular p Bessel fu	This course will introduce and address the following topics: (i) Functions of a complex variable and their applications (Cauchy's integral formula, calculus of residues, etc); (ii) Advanced methods in solving and classifying differential equations commonly appears in physics (such as series solution, second solution, Green's function, and singular points); (iii) Properties of special functions widely used in Physics (Gamma functions, Bessel functions, spherical harmonics etc.), (iv) Integral transforms (Fourier transforms and Laplace transforms); (v) The use of Mathematica in solving simple analytical problems appearing in topics (i)-(iv).					
Course Learning	On succe	ssful completion of	this course, students should be able to	o:			
Outcomes	CLO 1 ar	nalyse and examine	e the analytical properties of complex	functions			
	CLO 2 ca	alculate various def	inite integrals using the method of res	idues			
			pical partial differential equations				
			ctions in handling various physical pro es and Fourier transform in analysino				
		se the Fourier sent ne basics of Laplace	, ,	periodic functions and wa	aves, and understan		
		•		vsics			
Pre-requisites and Co-requisites and Impermissible combinations)		CLO 6 use Mathematica to solve simple analytical problems in physics  Pass in MATH2211 or PHYS2150 or PHYS2155					
Offer in 2021 - 2022	Y 1st	sem Offer in 202	2 - 2023 · V	Examinatio	n Dec		
Grade Descriptors (A+ to F)	B C	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the cours learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and abilit to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.  Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the cours learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familia and some unfamiliar situations. Apply effective organizational and presentational skills.					
		Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.  Fail Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve						
Communication- ntensive Course	N	problems. Organization	on and presentational skills are minimally effect	ive or inellective.			
Course Type	Lecture-h	ased course					
Course Teaching	Activities		Details		No. of Hours		
Learning Activities	Lectures		Bottano	Details			
• • • • • • • • • • • • • • • • • • • •	Tutorials						
	Reading	/ Self study			12 80		
ssessment Methods nd Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents	Including computational assignments	30	CLO 1,2,3,4,5,6		
	Examinat	tion	3-hour written exam	60	CLO 1,2,3,4,5		
	Test	·	2 2	10	CLO 1,2,3,4,5		
Required/recommended reading and		otes provided by Co and H. Weber: Ma	ourse Coordinator thematical Methods for Physicists (Ac	ademic Press, 2005)			

online materials

PHYS3151	Machin	e learning in phys	sics (6 credits)	Academic Yea	r 2021	
Offering Department	Physics	J  J	,	Quota		
Course Co-ordinator		leng, Physics (zymen	g@hku.hk)	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
Teachers Involved	(Dr Z Y Meng, Physics)					
Course Objectives	Machine learning is a technique that enables computers to learn without being explicitly "programmed". It is an essential part of big data science and has been widely used in different fields of physics. This course introduces the basics of machine learning, from key concepts to practical algorithms, with a focus on real-world applications in physics. It is an elective course for the computational physics theme. This is also an essential course for those who plan to apply machine learning techniques in their postgraduate studies or in their future work.					
Course Contents & Topics	Machine learning software packages in Python, Supervised and Unsupervised learning, Regression, Classification, Principal component analysis, Singular value decomposition, Support vector machines, Clustering, K-Nearest Neighbors, Decision trees, Neural Networks, Deep Learning, Application of machine learning in physics research with examples drawing from fields such as astrophysics, particle physics and complex systems.					
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 demonstrate knowledge in essential methods and techniques for machine learning and its application in physics					
			of machine learning in data analys earning packages to solve simple			
	CLO 4 L	use of effective written	and verbal communication skills	through oral presentation		
Pre-requisites (and Co-requisites and Impermissible combinations)	Working	knowledge of Python	2101 or MATH2211 or PHYS2155 is needed (please talk to the cour	se instructor in case of doubt).		
Offer in 2021 - 2022	Y 2r	nd sem Offer in 2022		Examination	May	
Grade Descriptors (A+ to F)	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions.					
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions.				
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.				
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills. Apply partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions.					
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective. Apply minimally effective or ineffective lab skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions.					
Communication- intensive Course	N					
Course Type	Lecture v	with laboratory compo	onent course			
Course Teaching	Activitie		Details		No. of Hours	
& Learning Activities	Lectures				36	
	Laborate	•			12	
	Tutorials	-			8	
	_	g / Self study			80	
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignm	nents		30	CLO 1,2,3,4	
	Examina	ation	2-hour written exam	40	CLO 1,2,3	
	Presenta	ation		10	CLO 1,2,3,4	
	Project r	report		20	CLO 1,2,3,4	
Required/recommended reading and		notes provided by Cou	urse Coordinator achine Learning, 3rd ed., MIT Pres	ss (2014)		
online materials	T. Hastie	e, R. Tibshirani, & J. F	riedman, The Elements of Statisti Learning, 2nd ed., Packt Publishir	cal`Learning, 2nd ed., Springer (2	2016)	

PHYS3350	Classical mechanics (6 credits)	Academic Year	2021			
Offering Department	Physics	Physics Quota				
Course Co-ordinator	Prof S Q Shen, Physics (sshen@hku.hk)					
Teachers Involved	(Prof S Q Shen, Physics)					
Course Objectives	This course covers Lagrangian mechanics in the advanced undergraduate treatment. It is one of the core electives for physics major and an elective theme. This is also an essential course for those who plan to pursue postgrad disciplines. Problem solving and analytical skills will be extensively used. The skills occasionally.	course for the the	eoretical physics hysics or related			
Course Contents & Topics	This course will be essentially divided into two parts. In the first part, fundamental concepts related to Lagrangian mechanics will be treated. Topics include the variational principle, conservation laws and its relation to Newtonian mechanics. In the second part, we shall discuss applications of the Lagrangian mechanics. Topics include the central force problem, the coupled harmonic oscillators and rigid-body dynamics. Lagrangian mechanics in non-inertial frame will also be discussed.					

Course Learning	On succ	essful completion of th	is course, students should be able t	0:			
Outcomes		understand the logica formulation;	al structure of Lagrangian mecha	nics and its advantage of	over the Newtonian		
		write down the form o	f Lagrangian for a mechanical syst	em and solve the dynamic	equations in simple		
	CLO 3	understand the connec	tion between classical mechanics a	nd other mechanics			
Pre-requisites	Pass in	PHYS2150 and PHYS	2250				
(and Co-requisites and Impermissible combinations)							
Offer in 2021 - 2022	Y 19	st sem Offer in 2022	- 2023 : Y	Examination	n Dec		
Grade Descriptors (A+ to F)	Α	learning outcomes. Sho	mastery at an advanced level of extensive w strong analytical and critical abilities and a wide range of complex, familiar and unfa	logical thinking, with evidence of	original thought, and ability		
	В	learning outcomes. Sho	I command of a broad range of knowledge w evidence of analytical and critical abilities a lations. Apply effective organizational and pr	and logical thinking, and ability to			
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.						
Communication- intensive Course	N	· · · · ·	· ·				
Course Type	Lecture-	based course					
Course Teaching	Activiti	es	Details	No. of Hours			
& Learning Activities	Lecture	S			36		
	Tutorial	-			12		
	Reading	g / Self study			80		
Assessment Methods and Weighting	Method	ls	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignn	ments	Including computational assignments	20	CLO 1,2,3		
	Examin	ation	3-hour written exam	60	CLO 1,2,3		
	Test			20	CLO 1,2,3		
Required/recommended reading and online materials	S. T. Th	ornton and J. B. Mario	n, Classical Dynamics (Thomson, 20	004)			

PHYS3351	Quantum	n mechanics (6 credits)	Academic Year	2021		
Offering Department	Physics	· · · · · · · · · · · · · · · · · · ·	Quota			
Course Co-ordinator	Dr Y Wang	, Physics (yongwang@hku.hk)				
Teachers Involved	(Dr Y Wang	g,Physics)				
Course Objectives	mathematic physics the related dis numerical further their	se covers the basics of quantum mechanics in the advance cal treatment. It is one of the core electives for physics major a teme. This is also an essential course for those who plan to puciplines. Problem solving and analytical skills will be extensified skills occasionally. Upon completion, interested students may restudies in quantum mechanics.	and an elective course to a student and an elective course to stude the sequel course to take the sequel course to	for the theoretical dies in physics or supplemented by se PHYS4351 to		
Course Contents & Topics	current and principle; ti transmissic wavepacke and eigenv	Time-dependent Schrodinger equation; statistical interpretation of wave function; probability density; probability current and continuity equation; momentum; physical observable and expectation value; Heisenberg uncertainty principle; time-independent Schrodinger equation; Hamiltonian and stationary states; particle in a square well; transmission and reflection at a barrier; harmonic oscillator problem using ladder operators; free particle and wavepacket; delta function potential; Dirac notations; state vectors; Hilbert space; Hermitian operators; eigenstates and eigenvalues; generalized statistical interpretation; generalized uncertainty principle; angular momentum; hydrogen atom; atomic orbits; spin; non-degenerate perturbation theory.				
Course Learning		sful completion of this course, students should be able to:				
Outcomes	and CLO 2 form	scribe the statistical interpretation of quantum mechanical syst d uncertainty of physical observables mulate energy eigenvalue problems, and solve them in exa alytical forms	,	•		
	CLO 3 formulate time evolution of the wavefunction and the expectation value of physical observables with known energy eigenfunctions					
		ge the applicability of time-independent perturbation theory rections in certain perturbations applied to the physical system	and formulate leadin	g order energy		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in PHYS2150 and PHYS2265, knowledge of PHYS2155 will be advantageous					
Offer in 2021 - 2022	Y 1st s	sem Offer in 2022 - 2023 : Y	Examination	Dec		
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive knowledg learning outcomes. Show strong analytical and critical abilities and logical thin to apply knowledge to a wide range of complex, familiar and unfamiliar situ presentational skills.	king, with evidence of origina	al thought, and ability		
	В	Demonstrate substantial command of a broad range of knowledge and skills learning outcomes. Show evidence of analytical and critical abilities and logical and some unfamiliar situations. Apply effective organizational and presentations	thinking, and ability to apply			
	С	Demonstrate general but incomplete command of knowledge and skills rec	quired for attaining most of	the course learning		

			nce of some analytical and critical abilities moderately effective organizational and pre		apply knowledge to most
	D	Show evidence of some	limited command of knowledge and skills recoherent and logical thinking, but with limitedems. Apply limited or barely effective organ	ed analytical and critical abilities.	Show limited ability to apply
	Fail	of analytical and critical	evidence of command of knowledge and skal abilities, logical and coherent thinking. and presentational skills are minimally effect	Show very little or no ability to	
Communication- intensive Course	N				
Course Type	Lecture-ba	ased course			
Course Teaching	Activities	3	Details		No. of Hours
& Learning Activities	Lectures			36	
	Tutorials			12	
	Reading /	Reading / Self study			80
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments		Including computational assignments	20	CLO 1,2,3,4
	Examinat	ion	2-hour written exam	60	CLO 1,2,3,4
	Test			20	CLO 1,2,3,4
Required/recommended reading and online materials		otes provided by Cou ths: Introduction to C	rse Coordinator Quantum Mechanics (Pearson Prent	tice Hall, 2004, 2nd ed.)	
Course Website	http://moo	dle.hku.hk			

PHYS3450	Electromagnetism (6 credits)  Academic				<b>'ear</b> 2021			
Offering Department	Physics	,	•	Quota				
Course Co-ordinator	Prof S J X	(u, Physics (sjxu@	hku.hk)					
Teachers Involved	(Prof S J Xu,Physics)							
Course Objectives	This course covers the basics of electromagnetism at the advanced undergraduate level with vigorous mathematical treatment. It is one of the core electives for physics major and an elective course for the theoretic physics theme. This is also an essential course for those who plan to pursue postgraduate studies in physics related disciplines. Problem solving and analytical skills will be extensively used. They are supplemented to numerical skills occasionally. Upon completion, interested students may take the sequel course PHYS4450							
		urther their studies in electromagnetism.  opics include introduction to vectors, electric fields and potential, methods in electrostatics, conductors ar						
Course Contents & Topics		, magnetostatics	to vectors, electric fields and pot and electromagnetic induction, r	•	,			
Course Learning			this course, students should be abl					
Outcomes			nental physics in electrostatics and r	•				
			Il tools to describe electrostatics and	0				
			equations to explain various electro	v ,	na			
			en electrostatics in vacuum and in c en magnetism in vacuum and in ma					
Pre-requisites (and Co-requisites and Impermissible combinations)			S2255, knowledge of PHYS2155 w	V				
Offer in 2021 - 2022	Y 2nd	sem Offer in 20	22 - 2023 : Y	Examinatio	n May			
Grade Descriptors (A+ to F)	В	learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and abili to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational an presentational skills.						
	С	and some unfamiliar situations. Apply effective organizational and presentational skills.  C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most						
	familiar situations. Apply moderately effective organizational and presentational skills.  Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to appl knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.							
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lac of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.							
Communication- ntensive Course	N							
Course Type		ased course						
Course Teaching	Activities	B	Details		No. of Hours			
Learning Activities	Lectures							
	Tutorials	/ O If I :						
		/ Self study			80			
ssessment Methods nd Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin			
	Assignme	ents	Including computational assignments	20	CLO 1,2,3,4,5			
	Examinat	ion	3-hour written exam	60	CLO 1,2,3,4,5			
	Examination Test							

online materials		
Course Website	http://moodle.hku.hk	

PHYS3550	Statistic	al mechanics &	thermodynamics (6 credits)	Academic Yea	r 2021			
Offering Department	Physics			Quota				
Course Co-ordinator	Dr S Z Zha	Dr S Z Zhang, Physics (shizhong@hku.hk)						
Teachers Involved	(Dr S Z Zhang, Physics)							
Course Objectives	This course covers statistical mechanics in the advanced undergraduate level with rigorous mathematical treatment. It is one of the core electives for physics major and an elective course for the theoretical physics theme. This is also an essential course for those who plan to pursue postgraduate studies in physics or related disciplines. Problem solving and analytical skills will be extensively used. They are supplemented by numerical skills occasionally. Upon completion, interested and able students may take PHYS7550 to study graduate lever statistical mechanics.							
Course Contents			owing topics: statistical description of					
& Topics	mechanics	s: Bose and Fermi	ribution and its applications in simp distributions; Bose and Fermi gas; con neory of fluctuation, first order and cor	ndensation; photon gas and P				
Course Learning			this course, students should be able t	•				
Outcomes	CLO 1 un	derstand the logica	al structure of statistical mechanics					
	CLO 2 ap	ply Gibbs-Boltzma	nn distribution and partition function ir	various simple situations				
			and Fermi distributions and apply the					
		escribe the classification der phase transition	cation of phase transitions and unde n	rstand the use of mean field	theory in second			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Ph	HYS2150 and (PH\	YS2260 or PHYS2261)					
Offer in 2021 - 2022	Y 2nd	sem Offer in 202	22 - 2023 : Y	Examination	May			
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.							
	В							
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.							
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.							
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.							
Communication- intensive Course	N							
Course Type		ased course			No. of Hours			
Course Teaching	Activities		Details	Details				
& Learning Activities	Lectures				36			
	Tutorials				12			
		Self study			80			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignme	ents	Including computational assignments	20	CLO 1,2,3,4			
	Examinat	ion	2-hour written exam	60	CLO 1,2,3,4			
	Test			20	CLO 1,2,3,4			
Required/recommended reading and online materials	Stephen J	. Blundell and Kath	ourse Coordinator nerine M. Blundell, Concepts in Therm mamics and an Introduction to Thermo					
Course Website		dle.hku.hk		, , , , , , , , , , , , , , , , , , , ,	. ,,			

PHYS3551	Introductory solid state physics (6 credits)	Academic Year	2021
Offering Department	Physics	Quota	
Course Co-ordinator	Prof J Gao, Physics (jugao @hku.hk)		
Teachers Involved			
Course Objectives	To provides a broad introduction to modern theories of the behaviour and proper is designed as a self-contained course which at the same time will serve as a and projects in solid state physics.		
Course Contents & Topics	Crystal structures and symmetry. The formation of crystals. The reciprocal lattic Lattice vibrations and thermal properties. Free-electron theory of metals. Energiand insulators. If time permits, special topics such as superconductor will be brief.	gy bands; metals,	
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 demonstrate knowledge for crystal structures and characterization CLO 2 describe the behavior of solid matter and explain the underlying physica CLO 3 apply physical principles and mathematical equations to discuss the phy CLO 4 apply essential skills of making measurements with appropriate instrume CLO 5 interpret the experimental data and compare with the prediction of unde	sical properties o	periments
Pre-requisites (and Co-requisites	Pass in PHYS2260 and PHYS2265		

combinations)						
Offer in 2021 - 2022		ffer in 2022 - 2023 : N		Examination		
Grade Descriptors (A+ to F)	A	learning outcomes. Show s to apply knowledge to a v	strong analytical and critical abilities a vide range of complex, familiar and	sive knowledge and skills required for and logical thinking, with evidence of ori unfamiliar situations. Apply highly effe iques. Critical use of data and results	ginal thought, and ability	
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions.				
	С	outcomes. Show evidence familiar situations. Apply m	of some analytical and critical abiliti noderately effective organizational and	and skills required for attaining most es and logical thinking, and ability to a d presentational skills. Apply moderate results to draw appropriate conclusions.	apply knowledge to most	
	D	Show evidence of some co knowledge to solve problet	herent and logical thinking, but with li	Ils required for attaining some of the co mited analytical and critical abilities. Sh- organizational and presentational skills o draw appropriate conclusions.	ow limited ability to apply	
	Fail	of analytical and critical a problems. Organization and	bilities, logical and coherent thinkin	d skills required for attaining the course g. Show very little or no ability to ap ffective or ineffective. Apply minimally e o draw appropriate conclusions.	ply knowledge to solve	
Communication- intensive Course	N					
Course Type	Lecture v	with laboratory componer	nt course			
Course Teaching	Activitie	es	Details	No. of Hours		
& Learning Activities	Lectures	3		36		
	Laborate	ory		6		
	Tutorials	3			8	
	Reading	/ Self study			80	
Assessment Methods and Weighting	Method	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignm	nents		15	CLO 1,2,3,5	
	Examina	ation	2-hour written exam	60	CLO 1,2,3	
	Laborate	ory reports		10	CLO 4,5	
	Test			15	CLO 1,2,3	
Required/recommended reading and online materials	C. Kittel:	Introduction to Solid Sta	te Physics (John Wiley, 1986,	6th ed.)		

PHYS3650	Observ	ational astronor	ny (6 credits)		Academic Year	2021		
Offering Department	Physics		,		Quota			
Course Co-ordinator	Dr J J L L	Dr J J L Lim, Physics (jjlim@hku.hk)						
Teachers Involved		(Dr J J L Lim, Physics)						
Course Objectives	waveleng	This course introduced tools of contemporary observational astronomy, with a focus on those used at optical wavelengths. Practical applications of these tools in both amateur astronomy as well as astronomical research will be described. It is a core course for astronomy minor and an elective course for the astrophysics theme.						
Course Contents & Topics	of light, e	Topics include: properties and workings of optical telescopes and astronomical detectors (e.g., CCDs); properties of light, effects of Earth's atmosphere and interstellar medium on astronomical observations; astronomical imaging and magnitude system; astronomical photometry and spectroscopy; observations of stars and galaxies including blackbody radiation, color-magnitude system, emission and absorption spectrum, and astronomical redshifts.						
Course Learning	On succe	essful completion of	this course, students s	nould be able to:				
Outcomes	CLO 1 d	escribe and explain	the workings of astron	omical telescopes and	detectors at optical way	velengths		
		escribe how the inl stronomical observa		nt, the Earth's atmosp	here, and the interstell	ar medium affec		
			nical photometry and s					
	CLO 4 p	erform computation	s to demonstrate comp	etence on and unders	tanding of the concepts	learnt		
	Pass in F	02200 0	2000					
(and Co-requisites and Impermissible combinations)					Examination	Dec		
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022		t sem Offer in 202 Demonstrate thoroug learning outcomes. S	2 - 2023 : Y h mastery at an advanced how strong analytical and cr	itical abilities and logical thi	<b>Examination</b> ge and skills required for att nking, with evidence of origin tuations. Apply highly effectiv	al thought, and abilit		
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 1si	t sem Offer in 202  Demonstrate thorous learning outcomes. S to apply knowledge presentational skills.  Demonstrate substar learning outcomes. S	2 - 2023 : Y h mastery at an advanced how strong analytical and cr to a wide range of complex tial command of a broad range.	itical abilities and logical thi , familiar and unfamiliar sit nge of knowledge and skills nd critical abilities and logica	ge and skills required for att nking, with evidence of origin tuations. Apply highly effectiv s required for attaining at leas al thinking, and ability to apply	caining all the course al thought, and ability are organizational and st most of the course		
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 1st	bemonstrate thoroug learning outcomes. Sto apply knowledge presentational skills. Demonstrate substar learning outcomes. Sand some unfamiliar Demonstrate genera outcomes. Show evice	2 - 2023 : Y h mastery at an advanced how strong analytical and cr to a wide range of complex stial command of a broad ranow evidence of analytical ar situations. Apply effective orgibut incomplete command	tical abilities and logical thi, familiar and unfamiliar sit nge of knowledge and skills d critical abilities and logica anizational and presentation of knowledge and skills red d critical abilities and logica	ge and skills required for att nking, with evidence of origin tuations. Apply highly effectiv is required for attaining at leas al thinking, and ability to apply nal skills. equired for attaining most of al thinking, and ability to appl	aining all the course al thought, and abilitive organizational and st most of the course knowledge to familia the course learning		
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 1s	bemonstrate thorouglearning outcomes. Sto apply knowledge presentational skills. Demonstrate substar learning outcomes. Sand some unfamiliar Demonstrate genera outcomes. Show evifamiliar situations. Ap Demonstrate partial I Show evidence of so	2 - 2023 : Y h mastery at an advanced how strong analytical and cr to a wide range of complex attal command of a broad rail how evidence of analytical are isituations. Apply effective orgout but incomplete command lence of some analytical an elypy moderately effective orgault limited command of know	tical abilities and logical thi, familiar and unfamiliar sit ange of knowledge and skills did critical abilities and logica anizational and presentation of knowledge and skills reductional abilities and logica nizational and presentational great and skills required for any skills required for any the skills r	ge and skills required for att nking, with evidence of origin tuations. Apply highly effectiv is required for attaining at least all thinking, and ability to apply nall skills. Equired for attaining most of all thinking, and ability to appl al skills. or attaining some of the cours and and critical abilities. Show	aining all the course al thought, and abilit re organizational and st most of the course knowledge to familia the course learning y knowledge to most se learning outcomes		
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 1st A B C	bemonstrate thoroug learning outcomes. Sto apply knowledge presentational skills. Demonstrate substar learning outcomes. Sto and some unfamiliar Demonstrate genera outcomes. Show evifamiliar situations. Ap Demonstrate partial if Show evidence of so knowledge to solve p Demonstrate little or of analytical and crit	2 - 2023 : Y  h mastery at an advanced how strong analytical and cr to a wide range of complex attial command of a broad rainhow evidence of analytical assituations. Apply effective orgabut incomplete command dence of some analytical analytic	tical abilities and logical thi, familiar and unfamiliar sit age of knowledge and skills and critical abilities and logica anizational and presentation of knowledge and skills reducited abilities and logica nizational and presentational dedge and skills required for the control of the contr	ge and skills required for att nking, with evidence of origin tuations. Apply highly effectiv is required for attaining at least all thinking, and ability to apply nall skills. Equired for attaining most of all thinking, and ability to apply all skills. For attaining some of the course call and critical abilities. Show and presentational skills. The defor attaining the course least y little or no ability to apply	aining all the course al thought, and abilit re organizational and st most of the course knowledge to familia the course learning y knowledge to mos se learning outcomes limited ability to appl rming outcomes. Lac		
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)	Y 1st A B C D	bemonstrate thoroug learning outcomes. Sto apply knowledge presentational skills. Demonstrate substar learning outcomes. Sto and some unfamiliar Demonstrate genera outcomes. Show evifamiliar situations. Ap Demonstrate partial if Show evidence of so knowledge to solve p Demonstrate little or of analytical and crit	2 - 2023 : Y h mastery at an advanced how strong analytical and cr to a wide range of complex stitl command of a broad randow evidence of analytical and situations. Apply effective orgate in the command dence of some analytical analytical command of known e coherent and logical thinkroblems. Apply limited or bar no evidence of command of ical abilities, logical and co	tical abilities and logical thi, familiar and unfamiliar sit age of knowledge and skills and critical abilities and logica anizational and presentation of knowledge and skills reducited abilities and logica nizational and presentational dedge and skills required for the control of the contr	ge and skills required for att nking, with evidence of origin tuations. Apply highly effectiv is required for attaining at least all thinking, and ability to apply nall skills. Equired for attaining most of all thinking, and ability to apply all skills. For attaining some of the course call and critical abilities. Show and presentational skills. The defor attaining the course least y little or no ability to apply	aining all the course al thought, and abilit re organizational and st most of the course knowledge to familia the course learning y knowledge to mos se learning outcomes limited ability to appl rming outcomes. Lac		
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)  Communication-intensive Course	Y 1st A B C D Fail	bemonstrate thoroug learning outcomes. Sto apply knowledge presentational skills. Demonstrate substar learning outcomes. Sto and some unfamiliar Demonstrate genera outcomes. Show evifamiliar situations. Ap Demonstrate partial if Show evidence of so knowledge to solve p Demonstrate little or of analytical and crit	2 - 2023 : Y h mastery at an advanced how strong analytical and cr to a wide range of complex stitl command of a broad randow evidence of analytical and situations. Apply effective orgate in the command dence of some analytical analytical command of known e coherent and logical thinkroblems. Apply limited or bar no evidence of command of ical abilities, logical and co	tical abilities and logical thi, familiar and unfamiliar sit age of knowledge and skills and critical abilities and logica anizational and presentation of knowledge and skills reducited abilities and logica nizational and presentational dedge and skills required for the control of the contr	ge and skills required for att nking, with evidence of origin tuations. Apply highly effectiv is required for attaining at least all thinking, and ability to apply nall skills. Equired for attaining most of all thinking, and ability to apply all skills. For attaining some of the course call and critical abilities. Show and presentational skills. The defor attaining the course least y little or no ability to apply	aining all the course al thought, and abilit re organizational and st most of the course knowledge to familia the course learning y knowledge to mos se learning outcomes limited ability to appl rming outcomes. Lac		
Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)  Communication- intensive Course Course Type Course Teaching & Learning Activities	Y 1st A B C D Fail	Demonstrate thoroug learning outcomes. Sto apply knowledge presentational skills. Demonstrate substar learning outcomes. S and some unfamiliar Demonstrate genera outcomes. Show evid familiar situations. Ap Demonstrate partial Show evidence of so knowledge to solve p Demonstrate little or of analytical and criproblems. Organizationased course	2 - 2023 : Y h mastery at an advanced how strong analytical and cr to a wide range of complex stitl command of a broad randow evidence of analytical and situations. Apply effective orgate in the command dence of some analytical analytical command of known e coherent and logical thinkroblems. Apply limited or bar no evidence of command of ical abilities, logical and co	tical abilities and logical thi, familiar and unfamiliar sit age of knowledge and skills and critical abilities and logica anizational and presentation of knowledge and skills reducited abilities and logica nizational and presentational dedge and skills required for the control of the contr	ge and skills required for att nking, with evidence of origin tuations. Apply highly effectiv is required for attaining at least all thinking, and ability to apply nall skills. Equired for attaining most of all thinking, and ability to apply all skills. For attaining some of the course call and critical abilities. Show and presentational skills. The defor attaining the course least y little or no ability to apply	aining all the course al thought, and abilit re organizational and st most of the course knowledge to familia the course learning y knowledge to mos se learning outcomes limited ability to appl rming outcomes. Lac		

	Tutorials	7 sessions		12	
	Reading / Self study			80	
Assessment Methods and Weighting			Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignments		40	CLO 1,2,3,4	
	Examination	2-hour written exam	60	CLO 1,2,3,4	
Required/recommended reading and online materials	To Measure the Sky by Frederick R. Chromey An Introduction to Modern Astrophysics by Bradley Carroll & Dale A. Ostlie				
Course Website	http://www.physics.hku.hk/~phys	s3650/			

	The physical universe (		(6 credits)	Academic Yea	r 2021		
Offering Department	Physics			Quota			
Course Co-ordinator	Dr K M L	ee, Physics (kmlee	@lily.physics.hku.hk)				
Teachers Involved	(Dr K M I	Lee,Physics)					
Course Objectives	To introd	luce basic physical	principles of astronomy and build a	foundation in modern astrophysi	cs.		
Course Contents & Topics		pics include: the sky and celestial coordinates, spherical geometry, optics and telescopes, basic celestial echanics, two-body problem, radiative transfer, and blackbody radiation.					
Course Learning	On succe	essful completion of	f this course, students should be abl	e to:			
Outcomes	CLO 1 calculate the transformation between different celestial coordinate systems						
	CLO 2 describe the formation of spectral lines and basic structures of telescopes						
	CLO 3		in two body problem from first princi	ole			
	CLO 4	CLO 4 recall the radiative transfer equation					
Pre-requisites (and Co-requisites and Impermissible combinations)		ss in PHYS1650 and (PHYS2250 or PHYS2265)					
Offer in 2021 - 2022	N Of	ffer in 2022 - 2023 :	N	Examination			
Grade Descriptors (A+ to F)	A	learning outcomes.	gh mastery at an advanced level of extens Show strong analytical and critical abilities at to a wide range of complex, familiar and	nd logical thinking, with evidence of orig	inal thought, and ability		
	В	·					
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.						
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.						
	D	Demonstrate partial Show evidence of so	but limited command of knowledge and skill ome coherent and logical thinking, but with lir	s required for attaining some of the counited analytical and critical abilities. Show			
	D Fail	Demonstrate partial Show evidence of so knowledge to solve p Demonstrate little or of analytical and cr	but limited command of knowledge and skill ome coherent and logical thinking, but with lir	s required for attaining some of the cou nited analytical and critical abilities. Show janizational and presentational skills. skills required for attaining the course let j. Show very little or no ability to app	w limited ability to apply earning outcomes. Lack		
		Demonstrate partial Show evidence of so knowledge to solve p Demonstrate little or of analytical and cr	but limited command of knowledge and skill ome coherent and logical thinking, but with lir oroblems. Apply limited or barely effective or no evidence of command of knowledge and itical abilities, logical and coherent thinking	s required for attaining some of the cou nited analytical and critical abilities. Show janizational and presentational skills. skills required for attaining the course let j. Show very little or no ability to app	w limited ability to apply earning outcomes. Lack		
intensive Course	<b>Fail</b>	Demonstrate partial Show evidence of so knowledge to solve p Demonstrate little or of analytical and cr	but limited command of knowledge and skill ome coherent and logical thinking, but with lir oroblems. Apply limited or barely effective or no evidence of command of knowledge and itical abilities, logical and coherent thinking	s required for attaining some of the cou nited analytical and critical abilities. Show janizational and presentational skills. skills required for attaining the course let j. Show very little or no ability to app	w limited ability to apply earning outcomes. Lack		
intensive Course Course Type	<b>Fail</b>	Demonstrate partial Show evidence of sc knowledge to solve p Demonstrate little or of analytical and or problems. Organizat	but limited command of knowledge and skill ome coherent and logical thinking, but with lir oroblems. Apply limited or barely effective or no evidence of command of knowledge and itical abilities, logical and coherent thinking	s required for attaining some of the cou nited analytical and critical abilities. Show janizational and presentational skills. skills required for attaining the course let j. Show very little or no ability to app	w limited ability to apply earning outcomes. Lack		
intensive Course Course Type Course Teaching	Fail N Lecture-k	Demonstrate partial Show evidence of sk knowledge to solve p Demonstrate little or of analytical and cr problems. Organizat based course	but limited command of knowledge and skill ome coherent and logical thinking, but with lir oroblems. Apply limited or barely effective or no evidence of command of knowledge and itical abilities, logical and coherent thinking ion and presentational skills are minimally eff	s required for attaining some of the cou nited analytical and critical abilities. Show janizational and presentational skills. skills required for attaining the course let j. Show very little or no ability to app	w limited ability to apply earning outcomes. Lack ly knowledge to solve		
intensive Course Course Type Course Teaching	Fail N Lecture-k Activitie	Demonstrate partial Show evidence of sc knowledge to solve Demonstrate little or of analytical and cr problems. Organizat based course	but limited command of knowledge and skill ome coherent and logical thinking, but with lir oroblems. Apply limited or barely effective or no evidence of command of knowledge and itical abilities, logical and coherent thinking ion and presentational skills are minimally eff	s required for attaining some of the cou nited analytical and critical abilities. Show janizational and presentational skills. skills required for attaining the course let j. Show very little or no ability to app	w limited ability to apply earning outcomes. Lack ly knowledge to solve		
Communication- intensive Course Course Type Course Teaching & Learning Activities	Fail  N  Lecture-t  Activitie  Lectures  Tutorials	Demonstrate partial Show evidence of sc knowledge to solve Demonstrate little or of analytical and cr problems. Organizat based course	but limited command of knowledge and skill ome coherent and logical thinking, but with lir oroblems. Apply limited or barely effective or no evidence of command of knowledge and itical abilities, logical and coherent thinking ion and presentational skills are minimally eff	s required for attaining some of the cou nited analytical and critical abilities. Show janizational and presentational skills. skills required for attaining the course let j. Show very little or no ability to app	w limited ability to apply earning outcomes. Lack ly knowledge to solve  No. of Hours  36		
intensive Course Course Type Course Teaching	Fail  N  Lecture-t  Activitie  Lectures  Tutorials	Demonstrate partial Show evidence of sc knowledge to solve p Demonstrate little or of analytical and cr problems. Organizat based course	but limited command of knowledge and skill ome coherent and logical thinking, but with lir oroblems. Apply limited or barely effective or no evidence of command of knowledge and itical abilities, logical and coherent thinking ion and presentational skills are minimally eff	s required for attaining some of the cou nited analytical and critical abilities. Show janizational and presentational skills. skills required for attaining the course let j. Show very little or no ability to app	w limited ability to apply sarring outcomes. Lack ly knowledge to solve  No. of Hours  36 12		
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail  N  Lecture-t  Activitie  Lectures  Tutorials  Reading	Demonstrate partial Show evidence of sc knowledge to solve p Demonstrate little or of analytical and cr problems. Organizat based course	but limited command of knowledge and skill ome coherent and logical thinking, but with liproblems. Apply limited or barely effective org no evidence of command of knowledge and titical abilities, logical and coherent thinking ion and presentational skills are minimally eff	s required for attaining some of the counited analytical and critical abilities. Show an initial and presentational skills. skills required for attaining the course leg. Show very little or no ability to apprective or ineffective.  Weighting in final	w limited ability to apply sarring outcomes. Lack ly knowledge to solve  No. of Hours  36  12  80  Assessment Methods		
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail  N  Lecture-t Activitie Lectures Tutorials Reading Methods	Demonstrate partial Show evidence of sc knowledge to solve p Demonstrate little or of analytical and cr problems. Organizat based course es	but limited command of knowledge and skill ome coherent and logical thinking, but with liproblems. Apply limited or barely effective org no evidence of command of knowledge and titical abilities, logical and coherent thinking ion and presentational skills are minimally eff	s required for attaining some of the counited analytical and critical abilities. Show janizational and presentational skills. skills required for attaining the course leg. Show very little or no ability to appetive or ineffective.  Weighting in final course grade (%)	w limited ability to apply sarring outcomes. Lack ly knowledge to solve  No. of Hours  36  12  80  Assessment Methods to CLO Mapping		
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail  N  Lecture-t Activitie Lectures Tutorials Reading Methods	Demonstrate partial Show evidence of sc knowledge to solve p Demonstrate little or of analytical and cr problems. Organizat based course	but limited command of knowledge and skill ome coherent and logical thinking, but with lir oroblems. Apply limited or barely effective org no evidence of command of knowledge and itical abilities, logical and coherent thinking ion and presentational skills are minimally eff	s required for attaining some of the counited analytical and critical abilities. Show janizational and presentational skills. skills required for attaining the course leg. Show very little or no ability to appective or ineffective.  Weighting in final course grade (%)	w limited ability to apply sarning outcomes. Lack ly knowledge to solve  No. of Hours  36  12  80  Assessment Methods to CLO Mapping CLO 1,2,3,4		
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail  N  Lecture-t Activitie Lectures Tutorials Reading Methods  Assignm Examina	Demonstrate partial Show evidence of sc knowledge to solve p Demonstrate little or of analytical and cr problems. Organizat based course	but limited command of knowledge and skill ome coherent and logical thinking, but with lir oroblems. Apply limited or barely effective orgono evidence of command of knowledge and titical abilities, logical and coherent thinking ion and presentational skills are minimally effective orgonometric problems.    Details	s required for attaining some of the counited analytical and critical abilities. Show janizational and presentational skills. skills required for attaining the course leg. Show very little or no ability to apprective or ineffective.  Weighting in final course grade (%)  12 60	No. of Hours 36 12 80 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4		
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail  N  Lecture-t Activitie Lectures Tutorials Reading Methods  Assignm Examina Presenta Test Lecture r Bradley V George E Frank H. A. C. Phi	Demonstrate partial Show evidence of sc knowledge to solve p Demonstrate little or of analytical and cr problems. Organizat based course es s s s s s s s s s s s s s s s s s	but limited command of knowledge and skill ome coherent and logical thinking, but with liprotolems. Apply limited or barely effective org no evidence of command of knowledge and titical abilities, logical and coherent thinking ion and presentational skills are minimally effective organizational science.    Details	weighting in final course grade (%)  Weighting in final course grade (%)  Weighting in final course grade (%)  12 60 13 15  n Astrophysics, 2nd ed. (Pearsor Astrophysics (Wiley-Interscience promy (University Science Books, 1)	No. of Hours 36 12 80 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 2,4 CLO 1,2,3,4 CLO 1,2,3,4 CLO 1,2,3,4 CLO 2,4 CLO 1,2,3,4		

PHYS3652	Principles of astronomy (6 credits)	Academic Year	2021
Offering Department	Physics	Quota	
Course Co-ordinator	Dr L X Dai, Physics (lixindai@hku.hk)		
Teachers Involved	(Dr L X Dai, Physics)		
Course Objectives	To introduce or review a number of basic physical principles, and explain ho astronomy to gain knowledge of the Universe.	w these principle	es are applied in
Course Contents & Topics	Topics include: special relativity, Doppler effect; interaction of light and m telescopes and interferometers; binary stars and stellar parameters, exoplanets;		
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 describe and explain the physical principles discussed  CLO 2 associate the correct physical principles with the observed properties of c  CLO 3 apply their understanding of the physical principle discussed to exproperties of select astronomical objects		•

Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in	PHYS1650 and (PHYS	S2250 or PHYS2265)				
Offer in 2021 - 2022	N O	Offer in 2022 - 2023 : N			Examination		
Grade Descriptors (A+ to F)	A	analytical and critical al	mastery of the knowledge and skills re bilities, clear logical thinking, evidence d unfamiliar situations using highly effe	of original thought, and	ability to apply kno		
	В	outcomes. Show evider	al command of the knowledge and s nce of analytical and critical abilities, re uations. Apply effective organizational	easoned logical thinking	, and ability to app		
	С	outcomes. Show evider	out incomplete command of knowledge nce of some analytical and critical abilit rately effective organizational and prese	ties, logical thinking, and			
	D	Show evidence of some	t limited command of knowledge and s e coherent and logical thinking, but with blems. Apply limited or barely effective	h limited analytical and c	ritical abilities. Sho		
	Fail	knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.  Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.					
Communication- intensive Course	N		·				
Course Type	Lecture-	-based course					
Course Teaching	Activiti	es	Details			No. of Hours	
& Learning Activities	Lecture	s				36	
	Tutorial	S				12	
	Reading / Self study				80		
Assessment Methods and Weighting	Method	ls	Details		ting in final grade (%)	Assessment Methods to CLO Mapping	
	Assignn	nents			35	CLO 1,2,3	
	Examin	ation	2-hour written exam		50	CLO 1,2,3	
	Test				15	CLO 2,3	
Required/recommended reading and online materials			urse Coordinator n Introduction to Modern Astrop	physics (Addison-W	esley Publishir	g Company, 2007,	

PHYS3653	Astroph	hysics (6 credits	S)			A	cademic Year	2021
Offering Department	Physics					Q	uota	
Course Co-ordinator	Dr L X Da	Dr L X Dai, Physics (lixindai@hku.hk)						
Teachers Involved	(Dr L X D	(Dr L X Dai,Physics)						
Course Objectives		rse is a beginner co						
	phenome astrophys research It is one	ny and physics, when a from first print sics, which will set .  of the core election, interested stude	nciples. The stage ves for as	nis course will a e for taking more stronomy minor ar	lso aim to o advanced as nd an electiv	develop skills trophysics co e course for	s in approachi ourses and con the astrophysi	ng problems in ducting scientifics theme. Upo
Course Contents & Topics	Topics ir astronom	nclude: celestial or ny; basics of radiati ctral lines; order-of-t	rbital dyna ve process	mics, gravitation, ses including blacl	binary syste kbody radiatio	ems; special on, emission a	relativity and i and absorption,	ts application i
Course Learning		essful completion of				a ilu Ulliel Se	siecieu iopics	
Outcomes		lescribe the fundam		,		astronomical	phenomena	
	CLO 2 a	ipply the physical alculations						ns and perform
	CLO 3 d	levelop skills to sim	plify, analy	ze and solve prob	olems in astro	physics		
and Impermissible combinations)	V 0	d Off in 00	200 2002	·V		-		INA
and Impermissible combinations) Offer in 2021 - 2022		d sem Offer in 20				1	xamination	May
and Impermissible combinations) Offer in 2021 - 2022	Y 2n	Demonstrate thorough	gh mastery a Show strong to a wide ra	: Y at an advanced level analytical and critical a ange of complex, fami	abilities and logic	owledge and skil cal thinking, with	lls required for atta	aining all the cours
and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors		Demonstrate thoroug learning outcomes. Sto apply knowledge presentational skills. Demonstrate substate learning outcomes. St	gh mastery a Show strong to a wide ra ntial commar Show evidence	at an advanced level analytical and critical a	abilities and logic iliar and unfamili f knowledge and ical abilities and	owledge and skil cal thinking, with iar situations. Ap I skills required foliogical thinking, a	Ils required for atta evidence of origina oply highly effective for attaining at leas	aining all the cours al thought, and abili e organizational an at most of the cours
and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	A	Demonstrate thorouglearning outcomes. Sto apply knowledge presentational skills.  Demonstrate substate learning outcomes. Sand some unfamiliar Demonstrate genera outcomes. Show evifamiliar situations. Agreement of the substantial structures.	gh mastery a Show strong to a wide ra Intial comman Show evidence situations. A al but incompidence of sor pply moderate	at an advanced level analytical and critical a ange of complex, fami and of a broad range of the of analytical and critical poly effective organiza plete command of kn me analytical and critical interpolytical and critical	abilities and logic iliar and unfamili f knowledge and ical abilities and tional and preser owledge and sk cal abilities and onal and present	owledge and skil cal thinking, with iar situations. Ap skills required f logical thinking, a ntational skills. ills required for logical thinking, tational skills.	Ils required for atta evidence of origina oply highly effective for attaining at leas and ability to apply attaining most of and ability to apply	aining all the cours al thought, and abili e organizational an at most of the cours knowledge to familia the course learning knowledge to most
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)	B C	Demonstrate thorous learning outcomes. So to apply knowledge presentational skills. Demonstrate substant learning outcomes. So and some unfamiliar Demonstrate genera outcomes. Show evifamiliar situations. At Demonstrate partial Show evidence of so knowledge to solve present the solution of the strategy of the solution of the solutio	gh mastery a Show strong to a wide re ntial comman Show evidence situations. A al but incomp idence of sor pply moderate but limited or ome coherent problems. App	at an advanced level analytical and critical a ange of complex, fami and of a broad range of the of analytical and crit pply effective organiza plete command of kn me analytical and criti- ely effective organization mand of knowledget and logical thinking, b ply limited or barely eff	abilities and logic iliar and unfamili f knowledge and ical abilities and tional and preser owledge and sk cal abilities and onal and present e and skills requil but with limited an fective organization	owledge and skil cal thinking, with iar situations. Ap I skills required fological thinking, a tatational skills. ills required for logical thinking, tational skills. red for attaining malytical and critional and present	Ills required for atta evidence of origina oply highly effective for attaining at leas and ability to apply attaining most of and ability to apply some of the course cal abilities. Show I tational skills.	aining all the cours all thought, and abilitie organizational and the most of the cours knowledge to familia the course learning knowledge to most e learning outcome imited ability to app
and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	A B C	Demonstrate thorous learning outcomes. So to apply knowledge presentational skills.  Demonstrate substate learning outcomes. So and some unfamiliar Demonstrate genera outcomes. Show evifamiliar situations. Ag Demonstrate partial Show evidence of so knowledge to solve premonstrate little or of analytical and cri	gh mastery a Show strong to a wide ra ntial comman Show evidenc situations. Al al but incompidence of sor pply moderat but limited come coherent problems. App no evidence no evidence	at an advanced level analytical and critical a ange of complex, famin nd of a broad range of se of analytical and criti- pply effective organiza plete command of kn me analytical and criti- ely effective organizati- ommand of knowledge and logical thinking, b	abilities and logic iliar and unfamili f knowledge and ical abilities and tional and preser owledge and sk cal abilities and onal and present e and skills requi but with limited ar fective organizatic edge and skills re tt thinking. Show	owledge and skil cal thinking, with iar situations. Ap I skills required fological thinking, a intational skills. iills required for logical thinking, tational skills. red for attaining malytical and critic onal and present equired for attain v very little or n	Ills required for atta evidence of origina opply highly effective for attaining at leas and ability to apply attaining most of and ability to apply some of the course cal abilities. Show I tattonal skills.	aining all the cours al thought, and abili e organizational an t most of the cours knowledge to familia the course learnin knowledge to mose e learning outcome imited ability to app
and Impermissible combinations)  Offer in 2021 - 2022  Grade Descriptors (A+ to F)	A B C D Fail	Demonstrate thorous learning outcomes. So to apply knowledge presentational skills. Demonstrate substal learning outcomes. So and some unfamiliar Demonstrate genera outcomes. Show evifamiliar situations. At Demonstrate partial Show evidence of so knowledge to solve pomonstrate little or of analytical and ori problems. Organizati	gh mastery a Show strong to a wide ra ntial comman Show evidenc situations. Al al but incompidence of sor pply moderat but limited come coherent problems. App no evidence no evidence	at an advanced level analytical and critical ange of complex, famind of a broad range of complex famind of a broad range of complex fective organization analytical and critical and logical thinking, bply limited or barely efforcommand of knowledge and concerned of command of knowledge of command of knowledges.	abilities and logic iliar and unfamili f knowledge and ical abilities and tional and preser owledge and sk cal abilities and onal and present e and skills requi but with limited ar fective organizatic edge and skills re tt thinking. Show	owledge and skil cal thinking, with iar situations. Ap I skills required fological thinking, a intational skills. iills required for logical thinking, tational skills. red for attaining malytical and critic onal and present equired for attain v very little or n	Ills required for atta evidence of origina opply highly effective for attaining at leas and ability to apply attaining most of and ability to apply some of the course cal abilities. Show I tattonal skills.	aining all the cours al thought, and abili e organizational an t most of the cours knowledge to familia the course learnin knowledge to mose e learning outcome imited ability to app
and Impermissible combinations)  Offer in 2021 - 2022  Grade Descriptors (A+ to F)  Communication- ntensive Course  Course Type	A B C D Fail N Lecture-b	Demonstrate thorous learning outcomes. So to apply knowledge presentational skills. Demonstrate substal learning outcomes. So and some unfamiliar Demonstrate genera outcomes. Show evifamiliar situations. At Demonstrate partial Show evidence of so knowledge to solve pomonstrate little or of analytical and ori problems. Organizationased course	gh mastery a Show strong to a wide ra ntial comman Show evidenc situations. Al al but incomp idence of sor pply moderate but limited oc ome coherent problems. App no evidence itical abilities itical abilities	at an advanced level analytical and critical a ange of complex, famind of a broad range of se of analytical and critical apply effective organiza plete command of knome analytical and critical ely effective organizationmand of knowledge and logical thinking, byly limited or barely eff of command of knowledge and coheren entational skills are minder the command of knowledge and coheren entational skills are minder the command of knowledge and coheren entational skills are minder the command of knowledge and coheren entational skills are minder the command of knowledge and coheren entational skills are minder the command of knowledge and coheren entational skills are minder the command of knowledge and coheren entational skills are minder the company that the company the company that the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entation  abilities and logic iliar and unfamili f knowledge and ical abilities and tional and preser owledge and sk cal abilities and onal and present e and skills requi but with limited ar fective organizatic edge and skills re tt thinking. Show	owledge and skil cal thinking, with iar situations. Ap I skills required fological thinking, a intational skills. iills required for logical thinking, tational skills. red for attaining malytical and critic onal and present equired for attain v very little or n	Ills required for atta evidence of origina opply highly effective for attaining at leas and ability to apply attaining most of and ability to apply some of the course cal abilities. Show I tattonal skills.	aining all the cours al thought, and abili e organizational an t most of the cours knowledge to famili- the course learnin v knowledge to mo- e learning outcome imited ability to app ning outcomes. Lac knowledge to solv	
communication- ntensive Course Course Type Course Teaching	A  B  C  D  Fail  N  Lecture-t  Activitie	Demonstrate thorous learning outcomes. Sto apply knowledge presentational skills. Demonstrate substant learning outcomes. Stone outcomes. Show evidencers is stanting to the stone of samiliar situations. At Demonstrate partial Show evidence of sok knowledge to solve problems. Organizationased course	gh mastery a Show strong to a wide ra ntial comman Show evidenc situations. Al al but incomp idence of sor pply moderate but limited oc ome coherent problems. App no evidence itical abilities itical abilities	at an advanced level analytical and critical ange of complex, famind of a broad range of complex famind of a broad range of complex fective organization analytical and critical and logical thinking, bply limited or barely efforcommand of knowledge and concerned of command of knowledge of command of knowledges.	abilities and logic iliar and unfamili f knowledge and ical abilities and tional and preser owledge and sk cal abilities and onal and present e and skills requi but with limited ar fective organizatic edge and skills re tt thinking. Show	owledge and skil cal thinking, with iar situations. Ap I skills required fological thinking, a intational skills. iills required for logical thinking, tational skills. red for attaining malytical and critic onal and present equired for attain v very little or n	Ills required for atta evidence of origina opply highly effective for attaining at leas and ability to apply attaining most of and ability to apply some of the course cal abilities. Show I tattonal skills.	aining all the cours al thought, and abili e organizational an t most of the cours knowledge to familia the course learnin y knowledge to mo e learning outcome imited ability to app ning outcomes. Lac knowledge to solv  No. of Hours
communication- ntensive Course Course Type Course Teaching	A B C D Fail N Lecture-t Activitie Lectures	Demonstrate thorous learning outcomes. Sto apply knowledge presentational skills. Demonstrate substate learning outcomes. Sto and some unfamiliar Demonstrate genera outcomes. Show evidences familiar situations. At Demonstrate partial Show evidence of so knowledge to solve problems. Organizational problems. Organizational states of sale problems. Organizational states of sale problems. Organizational states of sale problems. Organizational states of sale problems.	gh mastery a Show strong to a wide ra ntial comman Show evidenc situations. Al al but incomp idence of sor pply moderate but limited oc ome coherent problems. App no evidence itical abilities itical abilities	at an advanced level analytical and critical a ange of complex, famind of a broad range of se of analytical and critical apply effective organiza plete command of knome analytical and critical ely effective organizationmand of knowledge and logical thinking, byly limited or barely eff of command of knowledge and coheren entational skills are minder the command of knowledge and coheren entational skills are minder the command of knowledge and coheren entational skills are minder the command of knowledge and coheren entational skills are minder the command of knowledge and coheren entational skills are minder the command of knowledge and coheren entational skills are minder the command of knowledge and coheren entational skills are minder the company that the company the company that the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entation  abilities and logic iliar and unfamili f knowledge and ical abilities and tional and preser owledge and sk cal abilities and onal and present e and skills requi but with limited ar fective organizatic edge and skills re tt thinking. Show	owledge and skil cal thinking, with iar situations. Ap I skills required fological thinking, a intational skills. iills required for logical thinking, tational skills. red for attaining malytical and critic onal and present equired for attain v very little or n	Ills required for atta evidence of origina opply highly effective for attaining at leas and ability to apply attaining most of and ability to apply some of the course cal abilities. Show I tattonal skills.	aining all the cours al thought, and abili e organizational an t most of the cours knowledge to familia the course learnin y knowledge to mos e learning outcome imited ability to app ning outcomes. Lac knowledge to solv	
communication- intensive Course Course Type Course Teaching	A  B C D Fail N Lecture-b Activitie Lectures Tutorials	Demonstrate thorous learning outcomes. Sto apply knowledge presentational skills.  Demonstrate substate learning outcomes. Sto and some unfamiliar Demonstrate genera outcomes. Show evifamiliar situations. At Demonstrate partial Show evidence of so knowledge to solve pomonstrate little or of analytical and criproblems. Organizationased course	gh mastery a Show strong to a wide ra ntial comman Show evidenc situations. Al al but incomp idence of sor pply moderate but limited oc ome coherent problems. App no evidence itical abilities itical abilities	at an advanced level analytical and critical a ange of complex, famind of a broad range of se of analytical and critical apply effective organiza plete command of knome analytical and critical ely effective organizationmand of knowledge and logical thinking, byly limited or barely eff of command of knowledge and coheren entational skills are minder the command of knowledge and coheren entational skills are minder the command of knowledge and coheren entational skills are minder the command of knowledge and coheren entational skills are minder the command of knowledge and coheren entational skills are minder the command of knowledge and coheren entational skills are minder the command of knowledge and coheren entational skills are minder the company that the company the company that the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entation  abilities and logic iliar and unfamili f knowledge and ical abilities and tional and preser owledge and sk cal abilities and onal and present e and skills requi but with limited ar fective organizatic edge and skills re tt thinking. Show	owledge and skil cal thinking, with iar situations. Ap I skills required fological thinking, a intational skills. iills required for logical thinking, tational skills. red for attaining malytical and critic onal and present equired for attain v very little or n	Ills required for atta evidence of origina opply highly effective for attaining at leas and ability to apply attaining most of and ability to apply some of the course cal abilities. Show I tattonal skills.	aining all the cours al thought, and abili e organizational an t most of the cours knowledge to familia the course learnin y knowledge to mos e learning outcome imited ability to app ning outcomes. Lac knowledge to solv	
and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	A  B C D Fail N Lecture-b Activitie Lectures Tutorials	Demonstrate thorous learning outcomes. Sto apply knowledge presentational skills. Demonstrate substate learning outcomes. Sto and some unfamiliar Demonstrate genera outcomes. Show evidences familiar situations. At Demonstrate partial Show evidence of so knowledge to solve problems. Organizational problems. Organizational states of sale problems. Organizational states of sale problems. Organizational states of sale problems. Organizational states of sale problems.	gh mastery a Show strong to a wide ra ntial comman Show evidenc situations. Al al but incomp idence of sor pply moderate but limited oc ome coherent problems. App no evidence itical abilities itical abilities	at an advanced level analytical and critical a ange of complex, famind of a broad range of se of analytical and critical apply effective organiza plete command of knome analytical and critical ely effective organizationmand of knowledge and logical thinking, byly limited or barely eff of command of knowledge and coheren entational skills are minder the command of knowledge and coheren entational skills are minder the command of knowledge and coheren entational skills are minder the command of knowledge and coheren entational skills are minder the command of knowledge and coheren entational skills are minder the command of knowledge and coheren entational skills are minder the command of knowledge and coheren entational skills are minder the company that the company the company that the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entational skills are minder the coheren entation  abilities and logic iliar and unfamili f knowledge and ical abilities and tional and preser owledge and sk cal abilities and onal and present e and skills requi but with limited ar fective organizatic edge and skills re tt thinking. Show	owledge and skil cal thinking, with iar situations. Ap I skills required fological thinking, a intational skills. iills required for logical thinking, tational skills. red for attaining malytical and critic onal and present equired for attain v very little or n	ills required for atta evidence of origina opply highly effective for attaining at leas and ability to apply attaining most of and ability to apply some of the course cal abilities. Show I tational skills. hing the course lear no ability to apply	aining all the cours al thought, and abili e organizational an t most of the cours knowledge to familia the course learnin y knowledge to mos e learning outcome imited ability to app ning outcomes. Lac knowledge to solv	

and Weighting			course grade (%)	Methods to CLO Mapping
	Assignments		30	CLO 1,2,3
	Examination	2-hour written exam	50	CLO 1,2,3
	Test		20	CLO 1,2,3
Required/recommended reading and online materials	An Introduction to Modern Astroph	ysics, by Bradley Carroll & Dale A.	Ostlie	
Course Website	http://www.physics.hku.hk/~phys36	653/		

PHYS3660	Astrono	my laboratory (6 o	credits)	Academic Yea	ar 2021		
Offering Department	Physics	, ,	•	Quota	9		
Course Co-ordinator	DrSCY	Ng, Physics (ncy@asi	tro.physics.hku.hk)				
Teachers Involved	(Dr S C Y Ng,Physics)						
Course Objectives	focus is or results rai and an e	This course trains students with basics of extracting scientific information with astronomical observations. The focus is on practical experience in operating telescopes, data acquisition and reduction, and interpretation of the results rather than verification of known astronomical theories. It is one of the core electives for astronomy mind and an elective course for the astrophysics and experimental physics themes. Upon completion, interested students may apply the techniques learnt here in observational astronomy related capstone courses.					
Course Contents & Topics	and hand laboratori	This course will cover the following topics: basics working principles of optical telescopes and CCDs; setting up and hands-on operations of small optical telescopes; error analysis and basic statistics related to the astronomy laboratories; introduction to the magnitude system and celestial coordinates, the color magnitude diagram; observations and data reduction techniques in multi-wavelength astronomy; introduction to data analysis software					
Course Learning			s course, students should be able	to:			
Outcomes	CLO 1 ad	cquire astronomy obse	ervation techniques				
	CLO 2 co	onduct observations to	verify the physical principle(s) in	astronomy			
	CLO 3 ap	oply analytical method	s required to interpret and analyze	e results, and draw conclusions	s from the data		
		se of effective writter resentation	n and verbal communication ski	lls through written laboratory	reports and oral		
Pre-requisites	Pass in (F	PHYS2265 or PHYS26	550); and Pass in PHYS3650, or a	Iready enrolled in this course.			
(and Co-requisites and Impermissible combinations)							
Offer in 2021 - 2022	Y 1st	sem Offer in 2022 -		Examination	Dec		
Grade Descriptors (A+ to F)	A	learning outcomes. Show to apply knowledge to a	nastery at an advanced level of extensive wastrong analytical and critical abilities and wide range of complex, familiar and ur- olly highly effective lab skills and technique	l logical thinking, with evidence of original familiar situations. Apply highly effective familiar situations.	ginal thought, and ability ctive organizational and		
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions.						
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.						
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills. Apply partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions.						
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective. Apply minimally effective lab skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions.						
Communication- intensive Course	N						
Course Type	Lecture w	rith laboratory compon	ent course				
Course Teaching	Activities	S	Details		No. of Hours		
& Learning Activities	Lectures		Working principle of telescopes, error analysis, data analysis skills		8		
	Laborato	•	laboratories	Conduct astronomy observational and data analysis			
	Project w Reading	ork / Self study	Presentation and preparation		20 64		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Laborato	ry reports	8 reports	70	CLO 1,2,3,4		
	Presenta	tion	1 oral presentation	15	CLO 1,2,3,4		
	Test		1 in-class test	15	CLO 1,3,4		
Required/recommended	Lecture n	otes provided by Cour	se Coordinator				
Required/recommended reading and online materials	L. M. Gold	den, Laboratory Exper	se Coordinator iments in Physics for Modern Astr .aboratory: Advanced Astronomy				

PHYS3750	Laser and spectroscopy (6 credits)	Academic Year	2021
Offering Department	Physics	Quota	
Course Co-ordinator	Dr T T Luu, Physics (ttluu@hku.hk)		
Teachers Involved	(Dr T T Luu,Physics)		
Course Objectives	The course covers major types of lasers and laser spectroscopy in the advan-	nced undergradua	te level. It is an

				s also an essential course for those		
	engineeri		areas closely related to la	ser and its applications such as phy	ysics, cnemistry, and	
Course Contents		U .	enectroscony techniques	Fundamentals of optical processe	s and spectroscopic	
& Topics	techniques. Lasers as spectroscopic light sources. Components of spectroscopic instruments. Raman spectroscopy. Nonlinear spectroscopy. Nonlinear Optics. Time-resolved spectroscopy. Photoelectron spectroscopy. New developments in laser spectroscopy.					
Course Learning			course, students should b	e able to:		
Outcomes	CLO 1 re	state the properties of f	undamental optical proces	sses		
	CLO 2 de	escribe fundamental ope	eration principle of lasers			
	CLO 3 id	entify main components	of optical spectroscopic i	nstruments		
		•	broad overview of spectro	· · · · · · · · · · · · · · · · · · ·		
		erform one typical expe bserved results on input		provide physical reasoning that lead	ds to dependence of	
Pre-requisites		HYS2255 and PHYS22	•			
(and Co-requisites and Impermissible combinations)		000 a 1 0				
Offer in 2021 - 2022	Y 1st	sem Offer in 2022 - 2	023 : Y	Examination	Dec	
Grade Descriptors	Α	Demonstrate thorough ma	stery at an advanced level of	extensive knowledge and skills required for	r attaining all the course	
(A+ to F)	learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions.					
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions.					
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.					
	D					
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective. Apply minimally effective or ineffective lab skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions.					
Communication-	N					
ntensive Course						
Course Type	Lecture w	rith laboratory compone	nt course			
Course Teaching	Activitie	S	Details		No. of Hours 36	
& Learning Activities	Lectures					
	Laborato	ry			10	
	Tutorials	/ O If / I			8	
		/ Self study			80	
Assessment Methods and Weighting	Methods	i	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents		15	CLO 1,2,3,4	
	Examina	tion	2-hour exam	50	CLO 1,2,3,4	
	Laborato	ry reports		15	CLO 5	
	Test			20	CLO 1,2,3,4	
Required/recommended	Lecture N	lotes prepared by Cours	e Coordinator			
reading and online materials	Wolfgang	Demtroeder: Laser Spe	ectroscopy V1, 2, 5th Editi	on, Springer, (2014)		
Course Website	http://mod	odle.hku.hk				

PHYS3751	Physics of nanomaterials (6 credits)	Academic Year	2021			
Offering Department	Physics	Quota				
Course Co-ordinator	TBC, Physics ()					
Teachers Involved	(TBC,Physics)					
Course Objectives	This course is designed to let senior undergraduate students and fresh postgraduate students know fundamental concepts and physical properties of nanomaterials including two-dimensional quantum wells, one-dimensional quantum wires and zero-dimensional quantum dots.					
Course Contents & Topics	Introduction to nanomaterials and quantum size effect. Dimensionalities a nanomaterials. Optical and transport properties of quantum wells, superlattices Physical properties of carbon nanotubes and semiconductor nanowires. Physic nanocrystals. Fundamental principles of scanning tunneling microscopy and ad such as molecular beam epitaxy and metalorganic chemical vapor deposition.	and two-dimensional properties of q	onal electron gas. uantum dots and			
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 recall basic concepts and knowledge of dimensionality, density of states	, quantum size eff	ect			
	CLO 2 identify and compare optical and transport properties of quantum wells, superlattices and two-dimensional electron gas					
	CLO 3 recognise the fundamental principles of scanning tunneling microscopy and advanced thin-film growth techniques such as molecular beam epitaxy and metalorganic chemical vapor deposition					
	CLO 4 describe the basic physics of carbon nanotubes and semiconductor nanotubes					
	CLO 5 explain physical properties of zero-dimensional quantum dots and nanoc	crystals				
Pre-requisites (and Co-requisites and Impermissible	Pass in PHYS3351; and Pass in PHYS3551, or already enrolled in this course.					

combinations)						
Offer in 2021 - 2022	N Offer in 2022 - 2023 : N Examination					
Grade Descriptors (A+ to F)	A	learning outcomes. Sho	w strong analytical and critical	el of extensive knowledge ar al abilities and logical thinking amiliar and unfamiliar situation	, with evidence of original	ginal thought, and ability
	В	Show evidence of analy		e and skills required for attai soned logical thinking, and ab d presentation skills.		
	С	outcomes. Show evider familiar situations. Appl	nce of some analytical and c ly moderately effective organ	knowledge and skills require ritical abilities and logical thin izational and presentational s ous use of data and results to	king, and ability to a skills. Apply moderate	pply knowledge to most ely effective observation
	D	. ,				
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.					
Communication- intensive Course	N					
Course Type	Lecture-ba	ased course				
Course Teaching & Learning Activities	Activities	S	Details			No. of Hours
Assessment Methods and Weighting	Methods		Details		ghting in final rse grade (%)	Assessment Methods to CLO Mapping
Required/recommended reading and online materials	ТВС			·		

PHYS3760	Physics laborate	ry (6 credits)		Academic Year	2021	
Offering Department	Physics Quota				16	
Course Co-ordinator	Dr T T Luu, Physics (ttluu@hku.hk)					
Teachers Involved	(Dr J H C Lee,Physics) (Dr T T Luu,Physics)					
Course Objectives	physics principles vacquisition, and data electives for physics	vith measurements. The analysis by computers i major and a required co	al knowledge and skills, as we focus is on advanced la rather than verification of knowns or the experimental phase in experiment-oriented ca	ab skills and technique own physical theories. I nysics theme. Upon com	s, including data t is one of the core	
Course Contents & Topics	level physics expethermodynamics, and the way from experismall group or an in	students may apply the techniques learnt here in experiment-oriented capstone courses.  This course equips students with the necessary experimental techniques commonly used in advanced university level physics experiments drawn from classical mechanics, electromagnetism, statistical mechanics and thermodynamics, and quantum mechanics. After introducing the basics in a few lectures, students have to work all the way from experimental setup, data acquisition to data analysis, possibly with the aid of a computer, either in a small group or an individual. In addition to eight labs, they also have to conduct a small experimental project and present their result orally. Contents of the experiments and small projects may vary from year to year.				
Course Learning		etion of this course, stud		, , , ,	•	
Outcomes	CLO 2 design and level physics CLO 3 apply analyti CLO 4 make use of	courses cal methods required to	tal techniques verify the physics principle(s interpret and analyze results rbal communication skills th	s, and draw conclusions	from the data	
	bresentation					
(and Co-requisites and Impermissible combinations)	,	<u> </u>	YS3350, PHYS3351, PHYS			
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022	Pass in any two of the Y 2nd sem Of	er in 2022 - 2023 : Y		Examination	Мау	
Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)	Y 2nd sem Of  A Demonstrate learning of to apply kind presentation insightful of	er in 2022 - 2023 : Y te thorough mastery at an actomes. Show strong analytics towledge to a wide range of nal skills. Apply highly effective noclusions.	ivanced level of extensive knowle al and critical abilities and logical th complex, familiar and unfamiliar s re lab skills and techniques. Critic	<b>Examination</b> dge and skills required for at hinking, with evidence of origin situations. Apply highly effection al use of data and results to	taining all the course hal thought, and ability ve organizational and draw appropriate and	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 2nd sem Of  A Demonstrate learning of to apply king presentation insightful of B Demonstrate learning of and some	ter in 2022 - 2023 : Y the thorough mastery at an actomes. Show strong analytics towledge to a wide range of anal skills. Apply highly effective shockusions. The substantial command of a le tocmes. Show evidence of ana sunfamiliar situations. Apply effe	ivanced level of extensive knowle al and critical abilities and logical the complex, familiar and unfamiliar sive lab skills and techniques. Critic oroad range of knowledge and skillytical and critical abilities and logic	Examination  dge and skills required for at ninking, with evidence of origin ituations. Apply highly effecti al use of data and results to  lls required for attaining at lea cal thinking, and ability to apply	taining all the course nal thought, and ability we organizational and draw appropriate and ast most of the course whowledge to familian	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 2nd sem Of A Demonstrate learning of to apply king presentation in sightful of the apply king presentation of the apply king presentation in sightful of the apply king presentation in sightful of the apply king presentation of the apply king pres	ter in 2022 - 2023 : Y te thorough mastery at an actoomes. Show strong analytics towledge to a wide range of anal skills. Apply highly effective conclusions. The substantial command of a lictomes. Show evidence of anality and an infamiliar situations. Apply effective to data of results to draw app the general but incomplete co Show evidence of some anality attions. Apply moderately effective to some anality of the some anality of the some anality attions.	ivanced level of extensive knowle al and critical abilities and logical the complex, familiar and unfamiliar sive lab skills and techniques. Critic oroad range of knowledge and skillytical and critical abilities and logic	Examination  dge and skills required for at ninking, with evidence of origir situations. Apply highly effecti al use of data and results to  lls required for attaining at lea cal thinking, and ability to apply ional skills. Apply effective lab required for attaining most o cal thinking, and ability to app onal skills. Apply moderately onal skills. Apply moderately	taining all the course nal thought, and ability we organizational and draw appropriate and ast most of the course y knowledge to familia skills and techniques. If the course learning by knowledge to most	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Pass in any two of the Y 2nd sem Of A Demonstrate learning out to apply knyresentatic insightful of B Demonstrate learning out and some Correct use C Demonstrate outcomes. If amiliar sitt techniques D Demonstrate Show evide knowledge	fer in 2022 - 2023 : Y the thorough mastery at an actromes. Show strong analytication of the strong and strong and strong and strong and skills. Apply highly effective morbidities are substantial command of a litcomes. Show evidence of an anifamiliar situations. Apply effect of data of results to draw apple general but incomplete common anifoly moderately effective mostly correct but some error to partial but limited command conce of some coherent and log to solve problems. Apply limited command to solve problems.	ivanced level of extensive knowle al and critical abilities and logical the complex, familiar and unfamiliar see lab skills and techniques. Criticoroad range of knowledge and skillytical and critical abilities and logicative organizational and presentat ropriate conclusions.  Immand of knowledge and skills ydical and critical abilities and logicative organizational and presentational and presentational and presentations.	Examination  dge and skills required for at ninking, with evidence of origin situations. Apply highly effectial use of data and results to  lls required for attaining at lea cal thinking, and ability to apply ional skills. Apply effective lab required for attaining most o cal thinking, and ability to app onal skills. Apply moderately aw appropriate conclusions. for attaining some of the cour tical and critical abilities. Show hal and presentational skills. A	taining all the course nal thought, and ability we organizational and draw appropriate and ist most of the course y knowledge to familial skills and techniques. If the course learning by knowledge to most effective lab skills and se learning outcomes. I limited ability to apply	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Pass in any two of the second	fer in 2022 - 2023 : Y te thorough mastery at an actoomes. Show strong analytication and strong an actoomes. Show strong an analytication and strong an actoomes. Show evidence of an actoomes. Show evidence of an actoomes. Show evidence of an actoomes. Show evidence of some analytications. Apply effer and strong and actoomes. Apply moderately effer Mostly correct but some error are partial but limited command to solve problems. Apply limited techniques. Limited ability to te little or no evidence of come and and critical abilities, logical organization and presentational presentations.	evanced level of extensive knowled al and critical abilities and logical the complex, familiar and unfamiliar sere lab skills and techniques. Criticoroad range of knowledge and skillytical and critical abilities and logicetive organizational and presentate to proper and critical abilities and logical conclusions.  In a critical abilities and logical critical thinking and skills required iceus use of data and results to draw of knowledge and skills required iceal thinking, but with limited analyted or barely effective organization	Examination  dge and skills required for at ninking, with evidence of origin situations. Apply highly effecti al use of data and results to  lls required for attaining at lea cal thinking, and ability to apply ional skills. Apply effective lab required for attaining most o cal thinking, and ability to app onal skills. Apply moderately aw appropriate conclusions. for attaining some of the cour ical and critical abilities. Show all and presentational skills. A opriate conclusions. red for attaining the course lea rey little or no ability to apply neffective. Apply minimally effe	taining all the course nal thought, and ability we organizational and draw appropriate and draw appropriate of the course when we will be course to familiar skills and techniques. If the course learning by knowledge to most effective lab skills and see learning outcomes. I limited ability to apply pply partially effective arming outcomes. Lack whowledge to solve	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)	Pass in any two of the second	fer in 2022 - 2023 : Y te thorough mastery at an actoomes. Show strong analytication and strong an actoomes. Show strong an analytication and strong an actoomes. Show evidence of an actoomes. Show evidence of an actoomes. Show evidence of an actoomes. Show evidence of some analytications. Apply effer and strong and actoomes. Apply moderately effer Mostly correct but some error are partial but limited command to solve problems. Apply limited techniques. Limited ability to te little or no evidence of come and and critical abilities, logical organization and presentational presentations.	evanced level of extensive knowle al and critical abilities and logical the complex, familiar and unfamiliar see lab skills and techniques. Criticoroad range of knowledge and skillytical and critical abilities and logical conclusions.  In a conclusions.  In a conclusions.  In a conclusions and presentate topriate conclusions.  In a conclusions and presentative and conclusions and results to draw of knowledge and skills required ical thinking, but with limited analytical thinking, but with limited analytical thinking, but with limited analytical thinking. In a conclusion of knowledge and skills required ical thinking. Show we all skills are minimally effective or all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all	Examination  dge and skills required for at ninking, with evidence of origin situations. Apply highly effecti al use of data and results to  lls required for attaining at lea cal thinking, and ability to apply ional skills. Apply effective lab required for attaining most o cal thinking, and ability to app onal skills. Apply moderately aw appropriate conclusions. for attaining some of the cour ical and critical abilities. Show all and presentational skills. A opriate conclusions. red for attaining the course lea rey little or no ability to apply neffective. Apply minimally effe	taining all the course nal thought, and ability we organizational and draw appropriate and draw appropriate of the course when we will be course to familiar skills and techniques. If the course learning by knowledge to most effective lab skills and see learning outcomes. I limited ability to apply pply partially effective arming outcomes. Lack whowledge to solve	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)  Communication-intensive Course	Pass in any two of the Y 2nd sem Of A Demonstrate learning of to apply king presentation in sightful of the Y 2nd Sem Of A Demonstrate learning of and some Correct use C Demonstrate familiar situation outcomes. In the Composition of the Y 2nd A 2	fer in 2022 - 2023 : Y te thorough mastery at an actoomes. Show strong analytication and strong an actoomes. Show strong an analytication and strong an actoomes. Show evidence of an actoomes. Show evidence of an actoomes. Show evidence of an actoomes. Show evidence of some analytications. Apply effer and strong and actoomes. Apply moderately effer Mostly correct but some error are partial but limited command to solve problems. Apply limited techniques. Limited ability to te little or no evidence of come and and critical abilities, logical organization and presentational presentations.	evanced level of extensive knowle al and critical abilities and logical the complex, familiar and unfamiliar see lab skills and techniques. Criticoroad range of knowledge and skillytical and critical abilities and logical conclusions.  In a conclusions.  In a conclusions.  In a conclusions and presentate topriate conclusions.  In a conclusions and presentative and conclusions and results to draw of knowledge and skills required ical thinking, but with limited analytical thinking, but with limited analytical thinking, but with limited analytical thinking. In a conclusion of knowledge and skills required ical thinking. Show we all skills are minimally effective or all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all	Examination  dge and skills required for at ninking, with evidence of origin situations. Apply highly effecti al use of data and results to  lls required for attaining at lea cal thinking, and ability to apply ional skills. Apply effective lab required for attaining most o cal thinking, and ability to app onal skills. Apply moderately aw appropriate conclusions. for attaining some of the cour ical and critical abilities. Show all and presentational skills. A opriate conclusions. red for attaining the course lea rey little or no ability to apply neffective. Apply minimally effe	taining all the course nal thought, and ability we organizational and draw appropriate and draw appropriate of the course when we will be course to familiar skills and techniques. If the course learning by knowledge to most effective lab skills and see learning outcomes. I limited ability to apply pply partially effective arming outcomes. Lack whowledge to solve	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Pass in any two of the Y 2nd sem Of A Demonstrate learning of to apply king presentation in sightful of the Y 2nd Sem Of A Demonstrate learning of and some Correct use C Demonstrate familiar situation outcomes. In the Composition of the Y 2nd A 2	ter in 2022 - 2023 : Y te thorough mastery at an actomes. Show strong analytics towledge to a wide range of anal skills. Apply highly effective towledge to a wide range of an actions. Show evidence of an anfamiliar situations. Apply effective towledge to a midamiliar situations. Apply effective to act of data of results to draw apple general but incomplete co. Show evidence of some analytications. Apply moderately effective towledge to solve problems. Apply limit depending to solve problems. Apply limit detective to some coherent and log to solve problems. Apply limit detective to the commandation of the commandation o	evanced level of extensive knowle al and critical abilities and logical the complex, familiar and unfamiliar see lab skills and techniques. Criticoroad range of knowledge and skillytical and critical abilities and logical conclusions.  In a conclusions.  In a conclusions.  In a conclusions and presentate topriate conclusions.  In a conclusions and presentative and conclusions and results to draw of knowledge and skills required ical thinking, but with limited analytical thinking, but with limited analytical thinking, but with limited analytical thinking. In a conclusion of knowledge and skills required ical thinking. Show we all skills are minimally effective or all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all	Examination  dge and skills required for at ninking, with evidence of origin situations. Apply highly effecti al use of data and results to  lls required for attaining at lea cal thinking, and ability to apply ional skills. Apply effective lab required for attaining most o cal thinking, and ability to app onal skills. Apply moderately aw appropriate conclusions. for attaining some of the cour ical and critical abilities. Show all and presentational skills. A opriate conclusions. red for attaining the course lea rey little or no ability to apply neffective. Apply minimally effe	taining all the course nal thought, and ability we organizational and draw appropriate and draw appropriate of the course when we will be course to familiar skills and techniques. If the course learning by knowledge to most effective lab skills and see learning outcomes. I limited ability to apply pply partially effective arming outcomes. Lack whowledge to solve	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)  Communication-intensive Course Course Type	Pass in any two of the Pass in any two of the	ter in 2022 - 2023 : Y te thorough mastery at an actoomes. Show strong analytics towledge to a wide range of neal skills. Apply highly effective necessary of the search of a lateomes. Show evidence of an infamiliar situations. Apply effect of data of results to draw apple general but incomplete comparts of the search of th	evanced level of extensive knowle al and critical abilities and logical the complex, familiar and unfamiliar see lab skills and techniques. Criticoroad range of knowledge and skillytical and critical abilities and logical conclusions.  In a conclusions.  In a conclusions.  In a conclusions and presentate topriate conclusions.  In a conclusions and presentative and conclusions and results to draw of knowledge and skills required ical thinking, but with limited analytical thinking, but with limited analytical thinking, but with limited analytical thinking. In a conclusion of knowledge and skills required ical thinking. Show we all skills are minimally effective or all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all skills are all	Examination  dge and skills required for at ninking, with evidence of origir situations. Apply highly effecti al use of data and results to  lls required for attaining at lea cal thinking, and ability to apply ional skills. Apply effective lab required for attaining most o cal thinking, and ability to app onal skills. Apply moderately aw appropriate conclusions. for attaining some of the cour tical and critical abilities. Show hal and presentational skills. A opriate conclusions. red for attaining the course lea ery little or no ability to apply heffective. Apply minimally effe opriate conclusions.	taining all the course nal thought, and ability we organizational and draw appropriate and ast most of the course by knowledge to familian skills and techniques. If the course learning by knowledge to most effective lab skills and see learning outcomes. I limited ability to apply poply partially effective arming outcomes. Lack a knowledge to solve ective or ineffective lab	

	Project work	Presentation and preparation		20			
	Reading / Self study			64			
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Laboratory reports	8 lab reports	70	CLO 1,2,3,4			
	Presentation	1 oral presentation	15	CLO 2,3			
	Project report	1 full project report	15	CLO 1,2,3,4			
Required/recommended reading and online materials	L. Lyons, A Practical Guide to Data P. Horowitz and W. Hill, The Art of	oject report 1 full project report 15 CLO 1,2,3,4 manuals provided by Course Coordinator.  yons, A Practical Guide to Data Analysis for Physical Science Students, CUP (1991)  Horowitz and W. Hill, The Art of Electronics, CUP (1989)  hon tutorial at https://www.python.org/about/gettingstarted/					

	Physica	Academic Ye	<b>ar</b> 2021			
Offering Department	Physics Quota					
Course Co-ordinator	Dr D K K	ίi, Physics <i>(dkki</i> @hkι	ı.hk)			
Teachers Involved	(Dr D K k	Ki,Physics)				
Course Objectives	This course covers the development of modern physical optics, with particular attention to the physical properties and applications of light in the advanced undergraduate level. It is an elective course for the experimental physics theme.					
Course Contents	Wave th	neory of electromaç	gnetic radiations and light; Review o	of geometric optics; The	propagation and	
& Topics	superpos modern c	•	; Interference, Diffraction and Coherer	nce of light; Fourier option	cs; Some topics of	
Course Learning Outcomes	CLO 1 e ir CLO 2 a	On successful completion of this course, students should be able to: CLO 1 explain and calculate the fundamental properties including propagation, reflection, refraction, polarize interference and diffraction of light waves by using the theory of waves CLO 2 apply the theory of optics to design optical arrangements for measuring optical properties of mat such as refractive index				
		apply essential theor eflection-enhanceme	ries to design various optical compone ent films	ents or devices, such as	anti-reflection and	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in F	PHYS2250 and PHYS	S2255			
Offer in 2021 - 2022	Y 2n	nd sem Offer in 202	22 - 2023 : Y	Examination	May	
Grade Descriptors (A+ to F)	A	learning outcomes. She to apply knowledge to	n mastery at an advanced level of extensive knows strong analytical and critical abilities and logic of a wide range of complex, familiar and unfamili Apply highly effective lab skills and techniques. Complex is a complex of the co	cal thinking, with evidence of ori iar situations. Apply highly effe	ginal thought, and ability ctive organizational and	
	В	*				
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective observation skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.					
	D					
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective. Apply minimally effective or ineffective lab skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions.					
		N				
	N	onino ana tooriinquot.		or ineffective. Apply minimally e	ply knowledge to solve	
ntensive Course		with laboratory comp	Misuse of data and results and/or unable to draw a	or ineffective. Apply minimally e	ply knowledge to solve	
ntensive Course Course Type		with laboratory comp	Misuse of data and results and/or unable to draw a	or ineffective. Apply minimally e	ply knowledge to solve	
ntensive Course Course Type Course Teaching	Lecture v	with laboratory composes	Misuse of data and results and/or unable to draw a onent course	or ineffective. Apply minimally e	ply knowledge to solve ffective or ineffective lal	
ntensive Course Course Type Course Teaching	Lecture w	with laboratory composes	Misuse of data and results and/or unable to draw a onent course  Details	or ineffective. Apply minimally e appropriate conclusions.	ply knowledge to solve ffective or ineffective lai	
ntensive Course Course Type Course Teaching	Lecture w Activitie Lectures	with laboratory composes	Misuse of data and results and/or unable to draw a conent course    Details   12 chapters   Completing the relevant labora submitting reports	or ineffective. Apply minimally e appropriate conclusions.	ply knowledge to solve ffective or ineffective lat No. of Hours 36	
ntensive Course Course Type Course Teaching	Lecture w Activitie Lectures Laborato Tutorials	with laboratory composes	Misuse of data and results and/or unable to draw a conent course    Details   12 chapters   Completing the relevant laborary	or ineffective. Apply minimally e appropriate conclusions.  atory experiment and question solving skills	No. of Hours  36	
ntensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Lecture w Activitie Lectures Laborato Tutorials	with laboratory composes s ory s y / Self study	Misuse of data and results and/or unable to draw a conent course  Details  12 chapters  Completing the relevant labora submitting reports  Tutorials about the key points and Reading and reviewing lecture	or ineffective. Apply minimally e appropriate conclusions.  atory experiment and question solving skills	No. of Hours 36 6 8 80 Assessment Methods	
ntensive Course Course Type Course Teaching & Learning Activities  Assessment Methods	Activitie Lectures Laborato Tutorials Reading	with laboratory composes s ory s y / Self study	Misuse of data and results and/or unable to draw a conent course    Details   12 chapters   Completing the relevant labora submitting reports   Tutorials about the key points and   Reading and reviewing lecture problem-solving skills     Details   Details	or ineffective. Apply minimally eappropriate conclusions.  atory experiment and question solving skills notes and developing  Weighting in final	No. of Hours 36 6 8 80 Assessment Methods	
ntensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Lecture w Activitie Lectures Laborato Tutorials Reading Methods	with laboratory composes s pory s y / Self study s	Misuse of data and results and/or unable to draw a conent course  Details 12 chapters Completing the relevant labora submitting reports Tutorials about the key points and Reading and reviewing lecture problem-solving skills  Details	or ineffective. Apply minimally eappropriate conclusions.  atory experiment and question solving skills notes and developing  Weighting in final course grade (%)	No. of Hours 36 6 8 80 Assessment Methods to CLO Mapping	
ntensive Course Course Type Course Teaching & Learning Activities  Assessment Methods	Lecture w Activitie Lectures Laborato Tutorials Reading Methods Assignm Examina	with laboratory composes s pory s y / Self study s	Misuse of data and results and/or unable to draw a conent course    Details   12 chapters   Completing the relevant labora submitting reports   Tutorials about the key points and   Reading and reviewing lecture problem-solving skills     Details   Details	atory experiment and question solving skills notes and developing  Weighting in final course grade (%)	No. of Hours  36  6  8  80  Assessment Methods to CLO Mapping CLO 1,2,3	
Intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods	Lecture w Activitie Lectures Laborato Tutorials Reading Methods Assignm Examina	with laboratory composes s ory s y / Self study s nents ation	Misuse of data and results and/or unable to draw a conent course  Details 12 chapters Completing the relevant labora submitting reports Tutorials about the key points and Reading and reviewing lecture problem-solving skills  Details  4 assignments 2-hour written exam	atory experiment and question solving skills notes and developing  Weighting in final course grade (%)	No. of Hours  No. of Hours  36  6  8  80  Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2,3	
Communication- intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting	Lecture w Activitie Lectures Laborato Tutorials Reading Methods Assignm Examina Laborato Test	with laboratory composes sory s y / Self study s nents ation bry reports	Misuse of data and results and/or unable to draw a conent course  Details  12 chapters  Completing the relevant labora submitting reports  Tutorials about the key points and Reading and reviewing lecture problem-solving skills  Details  4 assignments 2-hour written exam  Two experiments Mid-term test	atory experiment and question solving skills notes and developing  Weighting in final course grade (%)  20 40 15	No. of Hours 36 6 8 80 Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2,3 CLO 1	
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Lecture w Activitie Lectures Laborato Tutorials Reading Methods  Assignm Examina Laborato Test Lecture N	with laboratory composes sory s y / Self study s nents ation ory reports Notes prepared by Co	Misuse of data and results and/or unable to draw a conent course  Details  12 chapters  Completing the relevant labora submitting reports  Tutorials about the key points and Reading and reviewing lecture problem-solving skills  Details  4 assignments 2-hour written exam  Two experiments Mid-term test	atory experiment and question solving skills notes and developing  Weighting in final course grade (%)  20 40 15	No. of Hours 36 6 8 80 Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2,3 CLO 1	

PHYS3851	Atomic and nuclear physics (6 credits)	Academic Year	2021
Offering Department	Physics	Quota	
Course Co-ordinator	Dr J H C Lee, Physics (jleehc @hku.hk)		
Teachers Involved	(Dr J H C Lee,Physics)		

Course Objectives	This course covers the fundamentals of atomic physics and nuclear physics and their applications in astrophysics and atomic and nuclear science in the advanced undergraduate level. Experimental topics will also be included such as detection methods and principles of experiments with hand-on experience. It is an elective course for the experimental physics theme. This is also an essential course for those who plan to pursue postgraduate studies of					
	experimental physics theme. This is also an essential course for those who plan to pursue postgraduate studies or work in atomic and nuclear physics and related disciplines.					
Course Contents & Topics	Properties gamma d	s of atoms and nuclei; ı	nuclear composition; liquid dr	op model; shell model in atoms ar astrophysics; frontier research		
Course Learning			course, students should be a	ble to:		
Outcomes		•	e basic features of atoms and			
		•		to atomic and nuclear system		
	CLO 3	make general orders of	magnitude in estimation of p	hysical effects in atoms and nucl	ei	
	CLO 4	describe nuclear decay	processes and nuclear react	ions in nucleosynthesis		
	CLO 5	apply basic experiment	al skill for radiation detection	·		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in P	HYS2265; and Pass in	PHYS3351, or already enrolle	ed in this course.		
Offer in 2021 - 2022	N Off	er in 2022 - 2023 : Y		Examination		
Grade Descriptors (A+ to F)	Α	learning outcomes. Show to apply knowledge to a	strong analytical and critical abilities wide range of complex, familiar and	ensive knowledge and skills required for and logical thinking, with evidence of or d unfamiliar situations. Apply highly efform aniques. Critical use of data and results	riginal thought, and ability ective organizational and	
	В	· ·				
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.				
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills. Apply partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions.				
	Fail	Demonstrate little or no ev of analytical and critical problems. Organization an	ridence of command of knowledge ar abilities, logical and coherent thinki	nd skills required for attaining the course ing. Show very little or no ability to a effective or ineffective. Apply minimally	pply knowledge to solve	
Communication- intensive Course	N					
Course Type	Lecture w	rith laboratory compone	nt course			
Course Teaching	Activitie	S	Details		No. of Hours	
& Learning Activities	Lectures				36	
	Laborato	ry			9	
	Tutorials				8	
	Reading	/ Self study			80	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents		20	CLO 1,2,3,4	
	Examina		2-hour written exam	40	CLO 1,2,3,4	
	Laborato	ry reports		20	CLO 1,2,3,5	
	Test			20	CLO 1,2,3,4	
Required/recommended reading and online materials	Richard A B. H. Brai T.A. Little	nsden and C. J. Joacha field & N. Thorley: Aton	on to The Physics of Nuclei and hin: Physics of Atoms and Mol nic and Nuclear Physics (Van	Nostrand Reinhold Co. Ltd, 3rd,		
			nysics (John Wiley & Sons, 19	988)		
Course Website	http://mod	odle.hku.hk				

PHYS3999	Directed studies in physics (6 credits)	Academic Year	2021				
Offering Department	Physics	Quota					
Course Co-ordinator	Dr F C C Ling, Physics (ccling@hku.hk)						
Teachers Involved	(Various teachers in the department, Physics)						
Course Objectives	This capstone course is offered to students majoring in physics, physics (intens should be taken normally in their final year of study. Students investigate a experimental or numerical, under the supervision of an academic staff using the in all years of their major studies. The available projects range from small scale and comment, and to development of university-level physics teaching tools. studies is recognized as having completed an elective in one of the four themes.	small problem, e e subject materials e research, critica Passing a pre-a	either theoretical, s they have learn I literature review				
Course Contents & Topics	contents and the nature of their projects in the coming academic year. They me prospective supervisor and the course coordinator to take this course.  Students will receive training in research literature reading and reviewing, member. For theoretical project, students may need to fill in mathematical gaps and the critically analyze the research methods used in the field. For numeric	Students interested in taking this course should contact their prospective supervisors in May to determine the contents and the nature of their projects in the coming academic year. They must get the approval from both the prospective supervisor and the course coordinator to take this course.  Students will receive training in research literature reading and reviewing, under the supervision of a staff member. For theoretical project, students may need to fill in mathematical gaps of some sophisticated derivations and the critically analyze the research methods used in the field. For numerical projects, students need to use computers to reproduce existing numerical or simulation results. For experimental projects, students have to					
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 review the knowledge of a physics or astronomy problem in depth through research journals based on what they have learnt in their majors	ugh literature revi	ew of books and				

	CLO 2	riticize existing appro	aches for solving the selected physic	cs or astronomy problem		
	CLO 3 describe and explain connections between the physical principles and the study problem					
	CLO 4 (for theoretical or computational projects) identify the key issues of the problem and solve them independently either by analytical or numerical means, and compare the results with predictions or existing solutions					
	à	inalyzė results and so	ects) propose and execute physi- urces of errors of the experiment or	observation in comparison	with predictions	
			team work) collaborate and com different culture, gender and nationa		ne team, which may	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in at least 24 credits of advanced level (3XXX level or above) disciplinary core/elective courses of the Physic Major, Physics (Intensive) Major, Mathematics/Physics Major or Astronomy Major curriculum.  This capstone course is for Astronomy, Mathematics/Physics, Physics, and Physics (Intensive) Majors student only.  The earliest that a student is allowed to take this capstone course is their year 3 study.					
Offer in 2021 - 2022	Y 1s	t sem 2nd sem Su	ımmer Offer in 2022 - 2023 : Y	Examinatio	n No Exam	
Grade Descriptors (A+ to F)	A Demonstrate thorough grasp of the subject. Show evidence of strong logical and independent thinking. Insightful use and critical analysis/evaluation of information drawn from a full range of high quality sources and to quote/reference aptly. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills. Work of A+ should show considerable additional work beyond that is required in wider areas relevant to the topic.					
	B Demonstrate substantial grasp of the subject. Show evidence of logical and independent thinking. Critical use of relevant information from sources, showing ability to make meaningful comparisons between different secondary interpretations and to quote/reference aptly. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.					
	С	Demonstrate general but incomplete grasp of the subject. Show some evidence of logical and independent thinking. Use of relevant information from sources, showing ability to make comparisons between different interpretations and to quote/reference aptly. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.				
	D					
	Fail  Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Show little or no evidence of logical and independent thinking. Limited use of secondary sources and no critical comparison of them. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective					
Communication- intensive Course	N					
Course Type	Project-b	ased course				
Course Teaching	Activitie		Details		No. of Hours 36	
& Learning Activities		with supervisor				
	Reading	/ Self study			84	
Assessment Methods and Weighting	Method	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	· .	sentation	including supervisor's comments (10%)	30	CLO 1,3,4,5	
	Researc			70	CLO 1,2,3,4,5,6	
Required/recommended reading and online materials	To be pro	ovided by individual p	roject supervisor			

PHYS4150	Computa	tional physics (6 credits	3)	Academic Year	2021		
Offering Department	Physics	· ·		Quota	24		
Course Co-ordinator	Dr Z Y Me	Dr Z Y Meng, Physics (zymeng@hku.hk)					
Teachers Involved	(Dr Z Y Meng, Physics)						
Course Objectives	of artificial traditional actual pro- course for	This course shows the power of computational approach to solving physics and related problems, which in the era of artificial intelligence and big data, is quickly becoming the new paradigm of physics research besides the traditional experimental and theoretical approaches. Students are expected to spend a significant fraction of time in actual programming. This is an elective course for the computational physics theme. This is also an essential course for those who plan to pursue postgraduate studies in fields like computational physics, condensed matter physics, astrophysics, chemistry and engineering or work in related areas.					
Course Contents & Topics	partial diff equation); chain); Mo Carlo metl	The course will cover the following problems: Introductory computational physics; interpolation and extrapolation; partial differential equations (such as the Maxwell's equations, the diffusion equation, and the Schrodinger equation); matrix methods (such as eigenvalue problems applied to Poisson's equation and diagonalization of spin chain); Monte Carlo (Metropolis algorithm for statistical physics problem and physics transitions); quantum Monte Carlo methods (for interacting electron systems); density matrix and tensor network renormalization; and other applications of machine learning and Al in physics problems; and several physics projects.					
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 demonstrate knowledge in essential methods and techniques for numerical computation in physics						
	CLO 2 apply Monte Carlo method and other simulation methods to solve small classical and quantum few-body and many-body problems						
	CLO 3 employ appropriate numerical method to interpolate and extrapolate data collected from physics experiments and use machine learning techniques to extract features from physical data						
	CLO 4 use appropriate numerical method to solve the differential equations governing the dynamics of physical systems and matrix methods for eigenvalue problem for physical systems						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in (MATH3301 or MATH3401 or MATH3403 or MATH3405 or PHYS2160 or PHYS3151) and (PHYS3350 or PHYS3351 or PHYS3450 or PHYS3550)						
Offer in 2021 - 2022	Y 1st	em Offer in 2022 - 2023 : Y		Examination	Dec		
Grade Descriptors (A+ to F)	Α	learning outcomes. Show strong and to apply knowledge to a wide rang	an advanced level of extensive knowle alytical and critical abilities and logical the e of complex, familiar and unfamiliar s ffective lab skills and techniques. Critic	hinking, with evidence of origin situations. Apply highly effective	al thought, and ability re organizational and		

	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to appl and some unfamiliar situations. Apply effective organizational and presentational skills. Apply effective lat Correct use of data of results to draw appropriate conclusions.  Demonstrate general but incomplete command of knowledge and skills required for attaining most coutcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to applantial situations. Apply moderately effective organizational and presentational skills. Apply moderately techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.				
	С					
	D	Demonstrate partial but limi Show evidence of some coh knowledge to solve problem	ted command of knowledge and ski erent and logical thinking, but with li	lls required for attaining some of the or mited analytical and critical abilities. Sh organizational and presentational skills	ourse learning outcomes. low limited ability to apply	
	Fail	of analytical and critical abproblems. Organization and	oilities, logical and coherent thinkin	d skills required for attaining the course g. Show very little or no ability to ap ffective or ineffective. Apply minimally of o draw appropriate conclusions.	oply knowledge to solve	
Communication- intensive Course	N					
Course Type	Lecture wi	th laboratory componen	t course			
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures				36	
	Laboratory				12	
	Tutorials				8	
	Reading /	Self study			80	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents		20	CLO 1,2,3,4	
	Examinat		2-hour written exam	40	CLO 1,3,4	
	Presentat	ion		15	CLO 1	
	Project re	port		25	CLO 1,2,3,4	
Required/recommended reading and online materials	Jos Thijss Tao Pang	An Introduction to Com	ics (Cambridge University Proputational Physics (Cambridge)	ess, 2012, 2nd edition) ge University Press, 2012, 2nd e physics (Cambridge University		

Academic Year 2021					
Quota					
<u>'</u>					
This course covers commonly used data analysis and computational modeling techniques in physics and related subjects with special emphasis on their uses in complex systems, nonlinear systems and adaptive systems. The focus is on the basic principles rather than blind usage of computer packages and apps although we do use packages in the course. This is an elective course for the computational physics and experimental physics themes. This is also an essential course for who plan to pursue postgraduate studies in computational physics and complex systems and work in related areas.					
Basic data analysis techniques such as linear and non-linear fittings, determination of the goodness of the fit, commonly used hypothesis testing techniques in physics; modeling physics and related systems via continuous, discrete and agent-based approaches; introduction to complex systems, complex adaptive systems and nonlinear dynamics; the use of computer packages such as Matlab and Mathematica in modeling and data analysis although the emphasis is on the basic principles and concepts behind rather than features and usage of those packages; depending on mutual interests of the course coordinator and students, illustrative examples will be drawn from conventional fields such as classical mechanics, electromagnetism and quantum mechanics as well as more recent fields like biophysics, econophysics and sociophysics.					
hysics hematical reasoning, to situations of the					
CLO 3 analyse and solve problems with the aid of computer packages such as Matlab  CLO 4 critically interpret experimental data from physics experiments					
s2160 or PHYS3150); and					
Examination					
Ige and skills required for attaining all the course inking, with evidence of original thought, and ability tuations. Apply highly effective organizational and chniques. Critical use of data and results to draw r attaining most of the course learning outcomes					
B Demonstrate substantial command of the knowledge and skills required for attaining most of the course learning outcomes. Show evidence of analytical and critical abilities, reasoned logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations using effective organizational and presentation skills. Apply effective computer modeling skills and techniques. Correct use of data of results to draw appropriate conclusions.					
C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective computer modeling skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.					
or attaining some of the course learning outcomes cal and critical abilities. Show limited ability to apply al and presentational skills. Apply partially effective ts to draw appropriate conclusions.					
computer modeling skills and techniques. Limited ability to use data and results to draw appropriate conclusions.  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective. Apply minimally effective or ineffective computer modeling skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions.					
cial te y ir					

intensive Course				
Course Type	Lecture with laboratory compone	ent course		
Course Teaching	Activities	Details	No. of Hours	
& Learning Activities	Lectures			36
	Laboratory			12
	Tutorials			8
	Reading / Self study			80
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments		10	CLO 1,2,3,4
	Examination	2-hour written exam	50	CLO 1,2,4
	Presentation		20	CLO 1,4
	Project report		20	CLO 1,2,3,4
Required/recommended reading and online materials	Lecture notes provided by Cours J. R. Taylor: An Introduction to E B. Hahn and D. Valentine: Esse L. Lam: Nonlinear Physics for Bo N. Boccara: Modeling Complex AL. Barabasi and H. E. Stanley	Error Analysis (Univ. Sci. Books, ntial Matlab for Engineers and S eginners (World Sci., 1998) Systems (Springer, 2nd ed., 20 <sup>7</sup>	Scientists (Academic Press, 5th	ed., 2013)

PHYS4350	Advanc	ed classical mechar	nics (6 credits)	Academic Yea	r 2021		
Offering Department	Physics		•	Quota			
Course Co-ordinator	Prof S Q	Shen, Physics (sshen@l	hku.hk)				
Teachers Involved	(Prof S Q	Shen, Physics)	·				
Course Objectives	mathema	Build on the advanced undergraduate level course PHYS3350, this course further discusses concepts and mathematical techniques in classical mechanics through special topics and applications. It serves as an elective course to better prepare students for their postgraduate studies in physics or other related disciplines.					
Course Contents & Topics		•	ciples, Lagrangian formulation eralized coordinates, simple ap	, ,			
Course Learning	On succe	ssful completion of this of	course, students should be able	to:			
Outcomes			veen Newtonian mechanics and				
	CLO 2 s	olve the mechanical prob	lems using Lagrangian formalis	m			
	CLO 3 d	iscuss the connection be	tween classical mechanics and	quantum mechanics from Ham	iltonian formalism		
	CLO 4 a	pply the variational princi	ple to real physical situations				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in P	HYS3350					
Offer in 2021 - 2022	N Off	fer in 2022 - 2023 : N		Examination			
Grade Descriptors (A+ to F)	A						
	B Demonstrate substantial command of the knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.						
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.						
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.						
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.						
Communication-	N						
intensive Course							
Course Type	Lecture-b	ased course					
			Details				
Course Teaching	Activitie	s	Details		No. of Hours		
Course Teaching	Activitie Lectures		Details		No. of Hours		
Course Teaching			Details				
Course Teaching	Lectures Tutorials		Details		36		
Course Teaching & Learning Activities Assessment Methods	Lectures Tutorials	/ Self study	Details  Details	Weighting in final course grade (%)	36 12 80 Assessment Methods		
Course Teaching & Learning Activities Assessment Methods	Lectures Tutorials Reading	/ Self study		0 0	36 12 80 Assessment Methods		
Course Teaching & Learning Activities Assessment Methods	Lectures Tutorials Reading Methods	/ Self study		course grade (%)	36 12 80 Assessment Methods to CLO Mapping CLO 1,2,3,4		
Course Teaching & Learning Activities Assessment Methods and Weighting	Lectures Tutorials Reading Methods Assignment	/ Self study	Details	course grade (%)	36 12 80 Assessment Methods to CLO Mapping		
Course Teaching & Learning Activities  Assessment Methods	Lectures Tutorials Reading Methods  Assignme Examina Test Lecture n	/ Self study ents tion otes provided by Course	Details  3-hour written exam	course grade (%)  20 60 20	36 12 80 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4		

PHYS4351	Advanced quantum mechanics (6 credits)	Academic Year	2021
Offering Department	Physics	Quota	
Course Co-ordinator	Dr C Xiao, Physics (congxiao@hku.hk)		
Teachers Involved	(Dr C Xiao,Physics)		
Course Objectives	Build on the advanced undergraduate level course PHYS3351, this course mathematical techniques in quantum mechanics through special topics and applications.		

	for the theoretical physics theme. This is also an essential course for those who plan to pursue postgraduate studies in physics or related disciplines.					
Course Contents & Topics	Identical particles; Pauli exclusion principle; fermion and bosons; WKB approximation; time-independent, non degenerate and degenerate perturbation theory; time dependent perturbation theory; scattering, cross section, partial waves and Born approximation; variational method.					
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 r	eview the perturbation the	neory and some other approxim	nation methods on various quar	ntum systems	
	CLO 2 a	apply physics principles	to describe the physical propert	ties of various quantum system	S	
	CLO 3 demonstrate knowledge and discuss the underlying physical concepts associated with the selected quantum systems					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in (	PHYS2155 or PHYS315	50) and PHYS3351			
Offer in 2021 - 2022	Y 2r	nd sem Offer in 2022 -	2023 : Y	Examination	May	
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.					
	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.					
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	D	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.				
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.					
Communication- intensive Course	N		· · · · · · · · · · · · · · · · · · ·			
Course Type	Lecture-l	based course				
Course Teaching	Activitie	es	Details		No. of Hours	
& Learning Activities	Lectures	S			36	
	Tutorials	3			12	
	Reading	J / Self study			80	
Assessment Methods and Weighting	Method	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignm	nents		20	CLO 1,2,3	
	Examina		3-hour written exam	60	CLO 1,2,3	
	Test			20	CLO 1,2,3	
Required/recommended reading and online materials			e Coordinator antum Mechanics (Pearson Pre	entice Hall, 2004, 2nd edition).		

	Advanc	ed electromagnetism (6 credits)	Academic Year	2021					
Offering Department	Physics		Quota						
Course Co-ordinator	Prof X D (	Prof X D Cui, Physics <i>(xdcui@hku.hk)</i>							
Teachers Involved	(Prof X D	Cui,Physics)							
Course Objectives	mathemater for the th	Build on the advanced undergraduate level course PHYS3450, this course further discusses concepts and mathematical techniques in electromagnetism through special topics and applications. This is an elective course for the theoretical physics theme. This is also an essential course for those who plan to pursue postgraduate studies in physics and related disciplines.							
Course Contents & Topics		Topics include Maxwell's Equations, Poynting theorem, wave equations, reflection and transmission of waves, wave guides, retarded potentials, gauge transformations, dipole radiation, special theory of relativity.							
Course Learning		On successful completion of this course, students should be able to:							
Outcomes		review and discuss the fundamental physics in classical electrody	namics						
		apply Maxwell's equations to analyze complicated electrostatic and		a					
		CLO 3 evaluate how special relativity is incorporated in the study of electromagnetism							
		CLO 4 formulate and solve problems in electromagnetism using appropriate mathematical techniques							
(and Co-requisites and Impermissible combinations)									
	V 4-1	Off	F	D					
Offer in 2021 - 2022		sem Offer in 2022 - 2023 : Y	Examination	Dec					
	Y 1st	Demonstrate thorough mastery at an advanced level of extensive knowledg learning outcomes. Show strong analytical and critical abilities and logical thin to apply knowledge to a wide range of complex, familiar and unfamiliar situ presentational skills.  Demonstrate substantial command of a broad range of knowledge and skills	e and skills required for att king, with evidence of original lations. Apply highly effective required for attaining at least	aining all the course al thought, and ability e organizational and at most of the course					
Offer in 2021 - 2022 Grade Descriptors	A	Demonstrate thorough mastery at an advanced level of extensive knowledg learning outcomes. Show strong analytical and critical abilities and logical thin to apply knowledge to a wide range of complex, familiar and unfamiliar situ presentational skills.  Demonstrate substantial command of a broad range of knowledge and skills learning outcomes. Show evidence of analytical and critical abilities and logical	e and skills required for att king, with evidence of originations. Apply highly effective required for attaining at least thinking, and ability to apply	aining all the course al thought, and ability e organizational and at most of the course					
Offer in 2021 - 2022 Grade Descriptors	A	Demonstrate thorough mastery at an advanced level of extensive knowledg learning outcomes. Show strong analytical and critical abilities and logical thin to apply knowledge to a wide range of complex, familiar and unfamiliar situ presentational skills.  Demonstrate substantial command of a broad range of knowledge and skills learning outcomes. Show evidence of analytical and critical abilities and logical and some unfamiliar situations. Apply effective organizational and presentation. Demonstrate general but incomplete command of knowledge and skills recontrol outcomes. Show evidence of some analytical and critical abilities and logical familiar situations. Apply moderately effective organizational and presentational	e and skills required for att king, with evidence of originations. Apply highly effective required for attaining at least thinking, and ability to apply al skills. quired for attaining most of thinking, and ability to appl skills.	aining all the course al thought, and ability e organizational and st most of the course knowledge to familiar the course learning y knowledge to most					
Offer in 2021 - 2022 Grade Descriptors	В	Demonstrate thorough mastery at an advanced level of extensive knowledg learning outcomes. Show strong analytical and critical abilities and logical thin to apply knowledge to a wide range of complex, familiar and unfamiliar situ presentational skills.  Demonstrate substantial command of a broad range of knowledge and skills learning outcomes. Show evidence of analytical and critical abilities and logical and some unfamiliar situations. Apply effective organizational and presentation: Demonstrate general but incomplete command of knowledge and skills recoutcomes. Show evidence of some analytical and critical abilities and logical familiar situations. Apply moderately effective organizational and presentational Demonstrate partial but limited command of knowledge and skills required for Show evidence of some coherent and logical thinking, but with limited analytics knowledge to solve problems. Apply limited or barely effective organizational and	e and skills required for att king, with evidence of originations. Apply highly effective required for attaining at least thinking, and ability to apply al skills. quired for attaining most of thinking, and ability to appl l skills. attaining some of the cours al and critical abilities. Show and presentational skills.	aining all the course al thought, and ability e organizational and st most of the course knowledge to familiar the course learning y knowledge to most the learning outcomes. limited ability to apply					
Offer in 2021 - 2022 Grade Descriptors	B C	Demonstrate thorough mastery at an advanced level of extensive knowledg learning outcomes. Show strong analytical and critical abilities and logical thin to apply knowledge to a wide range of complex, familiar and unfamiliar situ presentational skills.  Demonstrate substantial command of a broad range of knowledge and skills learning outcomes. Show evidence of analytical and critical abilities and logical and some unfamiliar situations. Apply effective organizational and presentations. Demonstrate general but incomplete command of knowledge and skills recoutcomes. Show evidence of some analytical and critical abilities and logical familiar situations. Apply moderately effective organizational and presentational Demonstrate partial but limited command of knowledge and skills required for Show evidence of some coherent and logical thinking, but with limited analytics	e and skills required for att king, with evidence of originations. Apply highly effective required for attaining at least thinking, and ability to apply al skills.  autient for attaining most of thinking, and ability to appl I skills.  attaining some of the coursel and critical abilities. Show and presentational skills.  d for attaining the course leal little or no ability to apply	aining all the course al thought, and ability e organizational and st most of the course knowledge to familiar the course learning y knowledge to most be learning outcomes. limited ability to apply rrning outcomes. Lack					

intensive Course				
Course Type	Lecture-based course			
Course Teaching & Learning Activities	Activities	Details		No. of Hours
	Lectures			36
	Tutorials			12
	Reading / Self study			80
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments		20	CLO 1,2,3,4
	Examination	3-hour written exam	60	CLO 1,2,3,4
	Test		20	CLO 1,2,3,4
Required/recommended reading and online materials		Course Coordinator to Electrodynamics, 3rd ed., (Prentice	e-Hall, 1999).	

PHYS4550	Advan	Advanced statistical mechanics (6 credits)  Academic Ye					
Offering Department	Physics		,	Quota			
Course Co-ordinator	Dr Y J T	u, Physics (yanjuntu@	Dhku.hk)				
Teachers Involved	(Dr Y J	Tu,Physics)	•				
Course Objectives	mathem	uild on the advanced undergraduate level course PHYS3550, this course further discusses concepts and nathematical techniques in statistical mechanics through special topics and applications. It serves as an elective ourse to better prepare students for their postgraduate studies in physics or other related disciplines.					
Course Contents & Topics				stems. Equilibrium fluctuations. ( gas, quantum ideal gas. Quantur			
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1	describe and explain t	he fundamental physical principle	es			
	CLO 2	apply these principles	, together with logical and mather	matical reasoning, to situations of	the physical world		
	CLO 3	analyses and solve pr	oblems with the aids of mathema	tics			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in	Pass in PHYS3550					
Offer in 2021 - 2022	N O	offer in 2022 - 2023 : N		Examination			
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.						
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.						
	С						
	D						
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.						
Communication- intensive Course	N						
Course Type	Lecture-	based course					
Course Teaching	Activiti	es	Details		No. of Hours		
& Learning Activities	Lecture	S			36		
	Tutorial	S			12		
	Reading	g / Self study			80		
Assessment Methods and Weighting	Method	ls	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignn	nents		20	CLO 1,2,3		
	Examin	ation	3-hour written exam	50	CLO 1,2,3		
	Test			30	CLO 1,2,3		
Required/recommended reading and online materials			urse Coordinator le: Statistical Mechanics, 3rd edit	ion (Academic Press, 2011)			

PHYS4551	Solid state physics (6 credits)	Academic Year	2021
Offering Department	Physics	Quota	
Course Co-ordinator	Prof M H Xie, Physics (mhxie@hku.hk)		
Teachers Involved	(Prof M H Xie,Physics)		
Course Objectives	This course covers a broad introduction to modern theory of the solid state properties will also be discussed. This is an elective course for the theoretical and is also an essential course for those who plan to pursue postgraduate studies physics and material science or to work in related industries.	experimental phys	ics themes. This
Course Contents & Topics	Crystal structures and symmetry; the reciprocal lattice and X-ray diffraction; lattice free electron of metals; band structures and Bloch theory; nearly free electrons semi-classical model of electron dynamics; Boltzmann equation, transport an semiconductors; interaction and collective excitations. If time permits, magnetism covered.	and tight binding d optical propertie	approximations; es of metals and
Course Learning	On successful completion of this course, students should be able to:		

Required/recommended	Test		l' '	cture notes provided by course coordinator.  Kittel: Introduction to solid state physics (John Wiley, 1996).  V. Ashcroft and D.N. Mermin: Solid state physics (Holt, Rinehart and Winston, 1987).					
				20	CLO 1,2,3,4				
	Examina	ation	2-hour written exam	60	CLO 1,2,3,4				
	Assignm			20	CLO 1,2,3,4				
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping				
	Reading / Self study				80				
	Tutorials				12				
& Learning Activities	Lectures				36				
Course Teaching	Activitie		Details		No. of Hours				
Course Type		pased course							
Communication- Intensive Course	N								
	Fail	knowledge to solve p Demonstrate little or of analytical and cr	problems. Apply limited or barely effective no evidence of command of knowledge a	e organizational and presentational skills. and skills required for attaining the course iking. Show very little or no ability to a	learning outcomes. Lack				
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes.  Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply								
	С	outcomes. Show ev		lge and skills required for attaining mos pilities and logical thinking, and ability to a and presentational skills					
	В	learning outcomes. S and some unfamiliar	Show evidence of analytical and critical ab situations. Apply effective organizational		pply knowledge to familiar				
Grade Descriptors (A+ to F)	A	learning outcomes.	Show strong analytical and critical abilitie to a wide range of complex, familiar ar	tensive knowledge and skills required for se and logical thinking, with evidence of or nd unfamiliar situations. Apply highly effe	iginal thought, and ability				
Offer in 2021 - 2022	Y 1s		22 - 2023 : Y	Examination	Dec				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in (		S2261) and PHYS3351						
	CLO 4 discuss the physics of metals, semiconductors, and superconductivity								
				s to discuss the physical propertie	s of materials				
	CLO 2 describe the behavior of solid matter and explain the underlying physical concepts								
Outcomes	CLO 1 demonstrate knowledge for crystal structures and characterization								

PHYS4650	Stellar	physics (6 credits)			Academic Year	2021		
Offering Department	Physics	,			Quota			
Course Co-ordinator	Dr S C Y	Dr S C Y Ng, Physics (ncy@astro.physics.hku.hk)						
Teachers Involved	(Dr S C Y	(Dr S C Y Ng, Physics)						
Course Objectives	stresses	To introduce the basic theory of stellar structure and evolution. It follows a vigorous mathematical treatment that stresses on the underlying physical processes. Knowledge in quantum mechanics and statistical mechanics will be advantageous.						
Course Contents & Topics	stellar ransequence explosion and plane	Topics include: Definition of stars. The H-R diagram. Stellar structure equations. Polytropic model. Elementary stellar radiation processes. Simple stellar nuclear processes. Saha equation. Stability of stars. Zero-age main sequence stars and their evolution. The solar neutrino problem. Late stage evolution of stars. Supernova explosion. If time permits, special topics selected from below will be briefly mentioned: star formation, brown dwarfs and planets, AGB stars and planetary nebulae, binary stars and their evolution, Cepheid variables and theory of stellar pulsation, and introduction to helioseismology.						
Course Learning	On succe	ssful completion of this	course, students should	be able to:				
Outcomes	CLO 1 d	escribe what is stars an	d to classify different type	es of stars				
	st	ellar structure equation	•					
	CLO 3 critically examine the physical processes occurring in stars and how these processes affect the evolution of stars							
			h papers in the field of sto	ellar astrophysics				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in P	HYS3351 and PHYS36	351					
Offer in 2021 - 2022	N Of	er in 2022 - 2023 : N			Examination			
Grade Descriptors (A+ to F)	A	learning outcomes. Show	astery at an advanced level o strong analytical and critical al wide range of complex, famili	oilities and logical thinking, v	with evidence of origina	al thought, and ability		
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the co- learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to fan and some unfamiliar situations. Apply effective organizational and presentational skills.						
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course le outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar situations. Apply moderately effective organizational and presentational skills.						
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcome Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to app knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.							
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.							
		problems. Organization an	id presentational skills are mini	many enecuve or menecuve.				

Course Type	Lecture-based course					
Course Teaching	Activities	Details		No. of Hours		
& Learning Activities	Lectures			36		
	Tutorials			12		
	Reading / Self study			80		
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments		10	CLO 1,2,3,4		
	Examination	2-hour written exam	60	CLO 1,2,3		
	Project reports		10	CLO 1,2,3,4		
	Test		20	CLO 1,2,3		
Required/recommended reading and online materials	Lecture notes provided by Course Coordinator  Prialnik, D.: An introduction to the theory of stellar structure and evolution, 2nd ed. (CUP, 2010)  A. C. Phillips, The Physics of Stars (John Wiley & Sons, 1999)  Bowers, R. & Deeming, T.: Astrophysics I. Stars (Jones and Bartlett, 1984)  Francis, LeBlanc, An Introduction to Stellar Astrophysics (Wiley, 2010)					
Course Website	http://www.physics.hku.hk/~p	1 3 1 3 1	,			

PHYS4651	Selecte	d topics in astrop	hysics (6 credits)	A	cademic Year	2021
Offering Department	Physics			Q	uota	
Course Co-ordinator	Prof K S	Cheng, Physics (hrsp	ksc@hku.hk)			
Teachers Involved		Cheng, Physics)	•			
Course Objectives	To introd	uce students some	current topics in astrophys	ics. It may be taken as	a self-contair	ned course or as
•		nd to research work in		,		
Course Contents & Topics	of shock	wave. Properties of 0 stars and quark stars.	thermodynamical equilibriu Cosmic rays. Physics of cor Elements of cosmology: cl	mpact stellar objects incl	luding black ho	les, white dwarfs
Course Learning	On succe	ssful completion of th	nis course, students should b	oe able to:		
Outcomes	CLO 1 a	pply physics principle	s to describe the physical pr	roperties of various astro	physical syster	ns
	CLO 2 e	xplain the observed p	henomena of some selected	d astrophysical objects		
	CLO 3 d	emonstrate knowledg	e and discuss the underlyi	ing physical concepts as	ssociated with	the astrophysical
	S	ystems and their dyna	amic interactive processes			. ,
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in P	HYS3351 or PHYS34	450 or PHYS3550 or PHYS3	3651		
Offer in 2021 - 2022	N Of	fer in 2022 - 2023 : N		E	xamination	
Grade Descriptors	Α		mastery at an advanced level of			
(A+ to F)		to apply knowledge to presentational skills.	ow strong analytical and critical abi a wide range of complex, familia	r and unfamiliar situations. A	pply highly effective	e organizational and
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.					
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.				
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.					
Communication-	N	1 3	<u> </u>	,		
intensive Course						
Course Type	Lecture w	ith laboratory compo	nent course			
Course Teaching	Activitie	S	Details			No. of Hours
& Learning Activities	Lectures					36
-	Laborato					8
	Tutorials					
		/ Self study				8 80
Assessment Methods and Weighting	Methods	•	Details		ng in final grade (%)	Assessment Methods to CLO Mapping
	Assignments				8	CLO 1,2,3
	Examination			5	50	CLO 1,2,3
	Laboratory reports				7	
		rv reports			/	ULU 1.2.3
	Laborato	• •			15	CLO 1,2,3 CLO 1,2,3
	Laborato Presenta	• •		1	15	CLO 1,2,3
Paguirad/racommondad	Laborato Presenta Test	tion	urse Coordinator	1		
Required/recommended	Laborato Presenta Test Lecture n	ition otes provided by Cou		1 2	15 20	CLO 1,2,3 CLO 1,2,3
Required/recommended reading and online materials	Laborato Presenta Test Lecture n S. L. Sha	ition otes provided by Cou piro and S. A. Teukol rroll & D. A. Ostlie: Ar	urse Coordinator sky: Black Holes, White Dwa n Introduction to Modern As	arfs and Neutron Stars (	15 20 John Wiley, 19	CLO 1,2,3 CLO 1,2,3

PHYS4652	Planetary science (6 credits)	Academic Year	2021
Offering Department	Physics	Quota	
Course Co-ordinator	Dr M H Lee, Physics (mhlee @hku.hk)		

learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to family and some unfamiliar situations. Apply effective organizational and presentational skills.  C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.  D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcome Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.  Fail Demonstrate little or no evidence of command of knowledge and skills required for attaining some of the course learning outcomes. Lead of analytical and critical abilities. Show limited abilities of analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.  Communication- intensive Course  Course Type  Lecture-based course  Course Teaching & Learning Activities  Activities  Details  No. of Hours  Lectures  3.6  Tutorials  Reading / Self study  Methods  Methods  Methods  Methods  Methods	Teachers Involved	(Dr M H L	.ee,Physics)			
Course Learning Outcomes  Clo 1 describe key aspects of our Solar System and extrasolar planetary systems acquired through observation and experiments  CLO 1 describe key aspects of our Solar System and extrasolar planetary systems acquired through observation and experiments  CLO 2 explain essential elements of the processes governing the properties of planetary bodies  CLO 3 apply physical principles to construct models for some basic aspects of the structure, formation are evolution of planetary bodies  Pre-requisites and Impermissible combinations  Offer in 2021 - 2022  Y 2nd sem Offer in 2022 - 2023 : N  Examination  May  Pended Descriptors  (A+ to F)  Demonstrate through mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show widened or avoid the course learning outcomes. Show widened and presentational skills.  By the contract of the course learning outcomes. Show widened or showledge and skills required for attaining and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply effective organizational and presentational skills.  By the complex of the course learning outcomes. Show widened or showledge and skills required for attaining most of the course learning outcomes. Show widened or showledge and skills required for attaining most of the course learning outcomes. Show widened or showledge and skills required for attaining some of the course learning outcomes. Show widened or showledge and skills required for attaining some of the course learning outcomes. Show widened or showledge and skills required for attaining some of the course learning outcomes. Show widened or showledge and skills required for attaining some of the course learning outcomes. Show widened or showledge and skills required for attaining some of the course learning outcomes. It of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to show problems. Organizati	Course Objectives	and plane them. Th	etary systems around of its is an elective course	other stars and of the physica for the astrophysics theme. T	al, chemical, and geological pro	ocesses that govern
Outcomes  On successful completion of this course, students should be able to:  CLO 1 describe key aspects of our Solar System and extrasolar planetary systems acquired through observation and experiments  CLO 2 explain essential elements of the processes governing the properties of planetary bodies  CLO 3 apply physical principles to construct models for some basic aspects of the structure, formation are evolution of planetary bodies  Pre-requisites (and Co-requisites and Impermissible combinations)  Offer in 2021 - 2022  Y 2nd sem Offer in 2022 - 2023 : N  Examination  A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational appresentational skills.  Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to missing structure general situations. Apply promoters the return outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to missing structure.  C observative general situations. Apply moderately effective organizational and presentational skills.  D Demonstrate general situations. Apply promoterated presentational skills.  D Demonstrate general situations. Apply promoterated presentational skills.  D Demonstrate little or no evidence of command of knowledge and skills required for attaining and ability to apply knowledge to missing structure.  Fall Demonstrate little or no evidence of command of knowledge and skills required for attaining and ability to apply knowledge to sol problems. Opparization and presentational skills.  Fall Demonstrate little or no evidence of command						y dynamics; energy
and experiments CLO 2 explain essential elements of the processes governing the properties of planetary bodies CLO 3 apply physical principles to construct models for some basic aspects of the structure, formation are evolution of planetary bodies Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2021 - 2022  Y 2nd sem Offer in 2022 - 2023: N  Examination May Grade Descriptors (A+ to F)  A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the cour learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar  Course Learning	On succe	ssful completion of this	course, students should be ab	ole to:		
CLO 3 apply physical principles to construct models for some basic aspects of the structure, formation are evolution of planetary bodies  Pass in PHYS3651 or PHYS3653 or (PHYS3550)  Pass in PHYS3651 or PHYS3653 or (PHYS3350 and PHYS3550)  Pass in PHYS3653 or (PHYS3350 and PHYS3550)  Pass in PHYS3653 or (PHYS3350 and PHYS3550)  Pass in PHYS3653 or (PHYS3350 and PHYS3550)  Pass in PHYS3653 or (PHYS3350 and PHYS3550)  Pass in PHYS3653 or (PHYS3350 and PHYS3550)  Pass in PHYS3653 or (PHYS3653 or details in pass and skills required for attaining all teactors	Outcomes			our Solar System and extrasol	ar planetary systems acquired t	hrough observations
evolution of planetary bodies						
Pre-requisites and Co-requisites and Impermissible combinations) Offer in 2021 - 2022  Y 2nd sem Offer in 2022 - 2023: N  A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the cour learning outcomes. Show strong analytical and critical abilities and legical thinking, with evidence of original thought, and abil to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational a presentational skills.  B Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the cour learning outcomes. Show widence of analytical and critical abilities and logical thinking, with evidence of original thought, and abil to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply implerately effective organizational and presentational skills.  B Demonstrate plant all command of a broad range of knowledge and skills required for attaining and all seast most of the cour and some unfamiliar situations. Apply implerately effective organizational and presentational skills.  D D Demonstrate partial but limited command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to me familiar situations. Apply immired prefervice organizational and presentational skills.  D D Demonstrate partial but limited command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to me familiar situations. Apply moderately effective organizational and presentational skills.  D D Demonstrate there are applied to the course of some other and logical thinking, and ability to apply knowledge to associate the course of some other and some analytical and critical abilities and logical thinkin					me basic aspects of the struc	ture, formation and
A   Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course problems. As a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational abilities and logical thinking, and ability to apply knowledge to familiar situations. Apply effective organizational ad presentational skills.	(and Co-requisites and Impermissible	Pass in P	HYS3651 or PHYS365	3 or (PHYS3350 and PHYS35	50)	
learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply highly effective organizational a presentational skills.    B	Offer in 2021 - 2022	Y 2n	d sem Offer in 2022 -	2023 : N	Examination	May
learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiand and some unfamiliar situations. Apply effective organizational and presentational skills.    Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to me familiar situations. Apply moderately effective organizational and presentational skills.    Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to a knowledge to solve problems. Organizational and presentational skills.    Fail	•	A	learning outcomes. Show to apply knowledge to a	strong analytical and critical abilities a	and logical thinking, with evidence of or	iginal thought, and ability
outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to me familiar situations. Apply moderately effective organizational and presentational skills.  Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcome. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to ap knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.  Fail Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Le of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to sol problems. Organization and presentational skills are minimally effective or ineffective.  Communication- intensive Course  Course Teaching & Lecture-based course  Course Teaching & Lecture-based course  Activities Details No. of Hours  Lectures 36  Activities No. of Hours  Activities No. of Hours  Lectures 36  Activities No. of Hours  Lecture 36  Activities No. of Hours  Lecture 36  Activities No. of Hours  Lecture 36  Activities No. of Hours  Lecture 47  Activities No. of Hours  Activities N		learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar				
Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to ap knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.    Fail   Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Le of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to sol problems. Organization and presentational skills are minimally effective or ineffective.    N		outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most				
of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to sol problems. Organization and presentational skills are minimally effective or ineffective.  N    N		Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply				
Communication- intensive Course Course Type Course Teaching & Lecture-based course  Course Teaching & Lectures		of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve				
Course Teaching & Learning Activities  Lectures Tutorials Reading / Self study  Assessment Methods and Weighting  Methods  Essay  Essay  Examination Test  Required/recommended reading and online materials  Activities Details  No. of Hours 36  Assessment Methods to CLO Mappir Methods to CLO Mappir 2-hour written exam 50 CLO 1,2,3 CLO 1,2		N	The state of the s	,		
& Learning Activities       Lectures       36         Tutorials       12         Reading / Self study       80         Assessment Methods and Weighting       Methods       Weighting in final course grade (%)       Assessment Methods to CLO Mappir         Assignments       20       CLO 1,2,3         Essay       15       CLO 1,2,3         Examination       2-hour written exam       50       CLO 1,2,3         Test       15       CLO 1,2,3         Required/recommended reading and online materials       Lecture notes provided by Course Coordinator I. de Pater and J. J. Lissauer: Planetary Sciences (Cambridge Univ. Press, 2010, 2nd Ed.)         D. A. Rothery, N. McBride and I. Gilmour: An Introduction to the Solar System (Cambridge University Press, 2010)	• • • • • • • • • • • • • • • • • • • •	Lecture-b	ased course			
Tutorials Reading / Self study  Assessment Methods and Weighting  Methods  Assignments Essay  Assignments  Essay  Assignments  Essay  Assignments  Essay  Assignments  Essay  Assignments  Essay  Assignments  Essay  Assignments  Essay  Assignments  Essay  Assignments  Essay  Assignments  Essay  Assignments  Essay  Assignments  Essay  Assignments  Essay  Assignments  Essay  Assignments  CLO 1,2,3	Activitie	S	Details			
Reading / Self study  Methods and Weighting  Methods  Details  Weighting in final course grade (%)  Assessment Methods to CLO Mappir  Assignments  Essay  Assignments  Essay  20  CLO 1,2,3  Examination  Test  CLO 1,2,3  Examination  Test  Required/recommended reading and online materials  D. A. Rothery, N. McBride and I. Gilmour: An Introduction to the Solar System (Cambridge University Press, 207-	& Learning Activities					
Assessment Methods and Weighting  Methods  Details  Weighting in final course grade (%)  Assessment Methods to CLO Mappir  Assignments  Essay  Details  Weighting in final course grade (%)  Assessment Methods  CLO 1,2,3  CLO 1,2,3  Examination  Test  Details  Weighting in final course grade (%)  Methods  CLO 1,2,3  CLO 1,2,3  CLO 1,2,3  Test  Details  Weighting in final course grade (%)  Methods  to CLO 4,2,3  CLO 1,2,3  CLO 1,2,3  CLO 1,2,3  Test  Details  Nethods  CLO 1,2,3  CLO						
Assignments Essay Examination Test  Required/recommended reading and online materials  Assignments  Curse grade (%)  Methods to CLO Mappin  20  CLO 1,2,3  Examination 2-hour written exam 50  CLO 1,2,3  CLO 1,2,3  Test 15  CLO 1,2,3		•				
Essay  Examination  Test  Required/recommended reading and online materials  Essay  2-hour written exam  50  CLO 1,2,3  Tot  15  CLO 1,2,3  CLO		Methods	•	Details		Assessment Methods to CLO Mapping
Examination 2-hour written exam 50 CLO 1,2,3 Test 15 CLO 1,2,3  Required/recommended reading and online materials		Assignments			20	CLO 1,2,3
Examination 2-hour written exam 50 CLO 1,2,3 Test 15 CLO 1,2,3  Required/recommended reading and online materials					15	
Test 15 CLO 1,2,3  Required/recommended reading and online materials 15 D. A. Rothery, N. McBride and I. Gilmour: An Introduction to the Solar System (Cambridge University Press, 2010).				2-hour written exam	50	
reading and I. de Pater and J. J. Lissauer: Planetary Sciences (Cambridge Univ. Press, 2010, 2nd Ed.) D. A. Rothery, N. McBride and I. Gilmour: An Introduction to the Solar System (Cambridge University Press, 2010)		Test			15	
Zna Ea.)	reading and	I. de Pate D. A. Rot	r and J. J. Lissauer: Pla	anetary Sciences (Cambridge I		iversity Press, 2011,
Course Website http://moodle.hku.hk			مالم اماري امار			

PHYS4653	Cosmolo	ogy (6 credits)	Academic Year	2021				
Offering Department	Physics		Quota					
Course Co-ordinator	Dr K M Lee	e, Physics (kmlee@lily.physics.hku.hk)						
Teachers Involved	(Dr K M Le	ee,Physics)						
Course Objectives	mathemati	The aim of the course is to offer an advanced introduction to cosmology, to familiarize students with the mathematical formulation used to model the evolution and dynamics of the universe, and to provide an up to date discussion of the big bang theory and structure and galaxy formation.						
Course Contents & Topics	bang mod	ude: The visible universe. Empirical basis for cosmological theories. els. Thermodynamics of the early universe. Primordial nucleosy models. The cosmological constant problem. Structure and galaxy	nthesis. The very					
Course Learning	On succes	sful completion of this course, students should be able to:						
Outcomes	CLO 1 ap	ply physics principles to describe the observational/experimental asp	ects of cosmology					
	CLO 2 explain the observed phenomena of cosmology							
		CLO 3 demonstrate knowledge and discuss the underlying physical concepts associated with the cosmological evolution of the universe and with the dynamic interactive processes that take place in the universe						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Ph	IYS3651 or PHYS3652						
Offer in 2021 - 2022	N Offe	er in 2022 - 2023 : Y	Examination					
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.							
	В	Demonstrate substantial command of a broad range of knowledge and skills requilearning outcomes. Show evidence of analytical and critical abilities and logical think and some unfamiliar situations. Apply effective organizational and presentational ski	ing, and ability to apply					
	С	Demonstrate general but incomplete command of knowledge and skills required outcomes. Show evidence of some analytical and critical abilities and logical think familiar situations. Apply moderately effective organizational and presentational skills	king, and ability to apply					

Communication-	Show evide knowledge  Fail Demonstration of analytical	Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to a knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to sproblems. Organization and presentational skills are minimally effective or ineffective.					
intensive Course	IN .						
Course Type	Lecture-based cours	e					
Course Teaching	Activities	Details		No. of Hours			
& Learning Activities	Lectures			36			
	Tutorials			12			
	Reading / Self study	'		80			
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignments		20	CLO 1,2,3			
	Examination		50	CLO 1,2,3			
	Test		30	CLO 1,2,3			
Required/recommended reading and online materials	M. Lachieze-Rey: Co M. Rowan-Robinson	ed by Course Coordinator osmology: A First Course (Cambridg : Cosmology (Clarendon Press, Oxf ity, Gravitation & Cosmology - A Bas					
Course Website	http://moodle.hku.hk	, ,	, , , , , , , ,				

PHYS4654	General	relativity (6 cred	dits)	Academic Ye	ear 2021		
Offering Department	Physics	- ,	•	Quota			
Course Co-ordinator	Dr K M Le	e, Physics (kmlee@	@lily.physics.hku.hk)				
Teachers Involved	(Dr K M Le	ee,Physics)					
Course Objectives	astrophysi theoretical	This is an introductory course on general relativity. It provides conceptual skills and analytical tools necessary for astrophysical and cosmological applications of the theory. This is an elective course for the astrophysics and theoretical physics themes. This is also an essential course for those who plan to pursue postgraduate studies in astrophysics or theoretical physics.					
Course Contents & Topics	transport a	pics include: the principle of equivalence; inertial observers in a curved space-time; vectors and tensors; parallel nsport and covariant differentiation; the Riemann tensor; the stress-energy tensor; the Einstein gravitational field uations; the Schwarzschild solution; black holes; gravitational waves detected by LIGO, and Freidmann					
Course Learning	On succes	successful completion of this course, students should be able to:					
Outcomes	sy	stems in astrophysi	ics and cosmology	theory of general relativity for the	,		
	gra	avity from a genera	I relativistic point of view	Solar System that cannot be desc			
	ge	neral relativistic ap	proach	teractive physical processes in ast	rophysics by using a		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Ph	HYS2055 and PHY	S3350				
Offer in 2021 - 2022	Y 1st	sem Offer in 2022	2 2023 · V	Examination	Dec		
Grade Descriptors	A 15t						
(A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.						
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.						
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.						
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.						
	Fail	of analytical and criti		e and skills required for attaining the course inking. Show very little or no ability to a lly effective or ineffective.			
Communication- intensive Course	N						
Course Type	Lecture-ba	ased course					
Course Teaching	Activities	•	Details		No. of Hours		
& Learning Activities	Lectures						
	Tutorials						
	Reading /	Self study			80		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments			20	CLO 1,2,3		
	Examination		2-hour written exam	60	CLO 1,2,3		
	Test			20	CLO 1,2,3		
Required/recommended		tes provided by Co	ourse Coordinator		020 1,2,0		
reading and online materials	R. M. Wale T. A. Moor J. B. Hartle	d: General Relativit re: A General Relat e: Gravity: An Introd	y (University of Chicago Press, ivity Workbook (Univ Science E	Books, 2012) elativity (Addison-Wesley 2003)			

PHYS4655	Interste	llar medium (6	credits)	Academic Y	ear 2021			
Offering Department	Physics			Quota				
Course Co-ordinator	Dr M H L	ee, Earth Science	s (mhlee @hku.hk)					
Teachers Involved	(Dr M H I	(Dr M H Lee,Earth Sciences)						
Course Objectives	This course provides students with an advanced-level understanding of the processes responsible for the absorption and emission of continuum and line radiation from gas and dust in stellar atmospheres and interstella space, and their astrophysical applications and implications. This is an elective course for the astrophysics theme. This is also an essential course for those who plan to pursue postgraduate studies in astronomy and astrophysics.							
Course Contents	Gas, du	st, atoms, molec	ules, radiation; physical and ra	adiative properties of hydrogen,	helium and heavie			
& Topics	elements	; hydrogen clouds	, molecular clouds; HII regions, n	nebulae, supernovae.				
Course Learning		•	of this course, students should be					
Outcomes			s between stars in spiral and ellip					
		pply physical prir	ciples to describe excitation/ion	ization and de-excitation/recombi	nation of atoms and			
		ecognize which p nedium	rocess or processes occur or o	dominate in which object or phas	se of the interstellar			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in F	PHYS3651 or PHY	S3653 or (PHYS3351 and PHY3	5550)				
Offer in 2021 - 2022	N Of	N Offer in 2022 - 2023 : Y <b>Examination</b>						
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.							
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.							
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.						
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply							
	Fail  Knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.							
Communication- intensive Course	N							
Course Type	Lecture-k	pased course						
Course Teaching	Activitie		Details	Details				
& Learning Activities	Lectures	i						
	Tutorials							
	Reading	/ Self study			80			
Assessment Methods and Weighting	Methods	5	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignm	ents		20	CLO 1,2,3			
	Essay			15	CLO 1,2,3			
	Examina	ition	2-hour written exam	50	CLO 1,2,3			
	Test			15	CLO 1,2,3			
Required/recommended reading and online materials			Course Coordinator mistry of the Interstellar Medium (	(University Sciences Book, 2007)				

PHYS4656	Advanced astrophysics (6 credits)	Academic Year	2021				
Offering Department	Physics	Quota					
Course Co-ordinator	Dr S C Y Ng, Physics (ncy@astro.physics.hku.hk)						
Teachers Involved	(Dr S C Y Ng,Physics)						
Course Objectives	objects. It follows a vigorous mathematical treatment that stresses on	include high energy processes, basic theory of stellar structure and evolution, and introduction to compact objects. It follows a vigorous mathematical treatment that stresses on the underlying physical processes. This is an elective course for the astrophysics theme. This is also an essential course for those who plan to pursue postgraduate studies in astrophysics.					
Course Contents & Topics	Topics include: radiation mechanisms; stellar structure equations; polytropic model; elementary stellar radia processes; simple stellar nuclear processes; stellar formation; late stage of stellar evolution; supernova explosion compact stellar; cosmic rays; if time permits, additional selected topics will be covered.						
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 describe what is stars and to classify different types of stars						
	CLO 2 analytically calculate and solve problems related to the structure and evolution of stars including the use of stellar structure equations and Saha equations						
	CLO 3 critically examine the physical processes occurring in stars and how these processes affect the evolution of stars						
	CLO 4 apply physics principles to describe the physical properties of various astrophysical systems						
	CLO 5 demonstrate knowledge and discuss the underlying physical concepts associated with the astrophysical systems and their dynamic interactive processes						
	CLO 6 assess selected research papers in the field of stellar astrophysics						
Pre-requisites	Pass in PHYS3651 or PHYS3653 or (PHYS3351 and PHYS3450)						

(and Co-requisites and Impermissible combinations)							
Offer in 2021 - 2022	Y 2n	d sem Offer in 2022 -	- 2023 : Y	Examination	May		
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.					
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familial and some unfamiliar situations. Apply effective organizational and presentational skills.					
	С	outcomes. Show evidence		and skills required for attaining most ies and logical thinking, and ability to a presentational skills.			
	D	Show evidence of some		ills required for attaining some of the co imited analytical and critical abilities. Sh rganizational and presentational skills.			
	Fail	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.					
Communication- intensive Course	N	· ·					
Course Type	Lecture-b	ased course					
Course Teaching	Activities		Details	Details			
& Learning Activities	Lectures			36			
	Tutorials				12		
	Reading / Self study			80			
Assessment Methods and Weighting	Methods	<b>S</b>	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignm	ents		10	CLO 1,2,3,4,5		
	Examina	tion	2-hour written exam	60	CLO 1,2,3,4,5		
	Presenta	ition		10	CLO 1,2,3,4,5,6		
	Test			20	CLO 1,2,3,4,5		
Required/recommended reading and online materials	Prialnik, I Shapiro a	resture notes provided by Course Coordinator Prailnik, D.: An introduction to the theory of stellar structure and evolution, 2nd ed. (CUP, 2010) Shapiro and S. A. Teukolsky Longair High Energy Astrophysics 3rd ed Francis, LeBlanc, An Introduction to Stellar Astrophysics (Wiley, 2010)					

PHYS4750	Experime	ental physics (6 c	redits)		Academic Year	2021		
Offering Department	Physics				Quota			
Course Co-ordinator	TBC, Phys	C, Physics ()						
Teachers Involved	(TBC,Phys	sics)						
Course Objectives	TBC							
Course Contents & Topics	TBC	3C						
Course Learning Outcomes	On succes	n successful completion of this course, students should be able to:						
Pre-requisites (and Co-requisites and Impermissible combinations)	TBC							
Offer in 2021 - 2022	N Offe	er in 2022 - 2023 : N			Examination			
Grade Descriptors	Α							
(A+ to F)	В							
	С							
	D							
	Fail							
Communication- intensive Course	N							
Course Type	Lecture wit	th laboratory compone	ent course					
Course Teaching	Activities		Details			No. of Hours		
& Learning Activities								
Assessment Methods and Weighting	Methods		Details		eighting in final urse grade (%)	Assessment Methods to CLO Mapping		
Required/recommended reading and online materials	TBC			·				

PHYS4850	Particle physics (6 credits)	Academic Year	2021				
Offering Department	Physics	Quota					
Course Co-ordinator	Dr Y J Tu, Physics (yanjuntu@hku.hk)						
Teachers Involved	(Dr Y J Tu,Physics)						
Course Objectives	This course covers both theoretical and experimental aspects of particle physics at the advanced undergraduate level. This is an elective course for the theoretical physics and experimental physics themes. This is also an essential course for those who plan to pursue postgraduate studies or work in high energy particle physics.						
Course Contents & Topics	Topics include: fundamental particles and interactions; symmetry and conservation law; the Standard Model; particle accelerator; particle detection; frontier particle experiments; Large Hadron Collider data analyses.						
Course Learning Outcomes							
Outcomes	CLO I describe and explain the fundamental physical principles for the standard	u model of particle	priysics.				

	CLO 2 apply these principles, together with logical and mathematical reasoning, to analyze particle physics processes.						
	CLO 3 capture the frontier and progress of particle physics.						
			ntal skill in particle physics				
Pre-requisites (and Co-requisites and Impermissible combinations)		Pass in PHYS3351					
Offer in 2021 - 2022	N O	offer in 2022 - 2023 : \	(	Examination			
Grade Descriptors (A+ to F)	Α	learning outcomes. She to apply knowledge to	n mastery at an advanced level of exte now strong analytical and critical abilities o a wide range of complex, familiar an Apply highly effective lab skills and tech	and logical thinking, with evidence of or d unfamiliar situations. Apply highly effe	riginal thought, and ability ective organizational and		
	В	learning outcomes. She and some unfamiliar s	ial command of a broad range of knowl ow evidence of analytical and critical abi ituations. Apply effective organizational results to draw appropriate conclusions.	lities and logical thinking, and ability to a	pply knowledge to familia		
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.						
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills. Apply partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions.						
	Fail	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective. Apply minimally effective or ineffective lab skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions.					
Communication- Intensive Course	N						
Course Type	Lecture	with laboratory compo	onent course				
Course Teaching	Activitie		Details	Details			
& Learning Activities	Lectures	S			36		
	Laborat	ory			9		
	Tutorials	S			8		
	Reading	g / Self study			80		
Assessment Methods and Weighting	Method	ls	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments			10	CLO 1,2,3		
	Examina	ation	3-hour written exam	50	CLO 1,2,3		
	Laborat	ory reports		20	CLO 1,2,4		
	Test	• •		20	CLO 1,2,3		
Required/recommended reading and online materials	F. Halze	n and A.D. Martin: Qı	urse Coordinator uarks and leptons: an introductor on to High Energy Physics (Caml				

(NIL,Physics) This capstone should be ta experience in their majors i of the four the Students will government of be arranged the commend	e course is offered to students majoring in physics, physics (in ken normally in the summer immediately before their final the field of physics or astronomy through intern placement. In this intern. Passing a pre-approved internship is recognized emes. work as an intern for at least 160 hours within the University department or NGO. The work nature must be related to phys by the Department or obtained by students themselves. In the	year of study. Stude They should use what the I as having completed or outside the Universics or astronomy. The	nts gain working hey have learnt ir an elective in one ity in a company				
(NIL,Physics) This capstone should be ta experience in their majors i of the four the Students will government of be arranged the commend	e course is offered to students majoring in physics, physics (in ken normally in the summer immediately before their final the field of physics or astronomy through intern placement. In this intern. Passing a pre-approved internship is recognized emes.  work as an intern for at least 160 hours within the University department or NGO. The work nature must be related to phys by the Department or obtained by students themselves. In the	year of study. Stude They should use what the I as having completed or outside the Universics or astronomy. The	nts gain working hey have learnt in an elective in one ity in a company				
This capstoneshould be ta experience in their majors i of the four the Students will government of the commence arranged the commence	e course is offered to students majoring in physics, physics (in ken normally in the summer immediately before their final the field of physics or astronomy through intern placement. In this intern. Passing a pre-approved internship is recognized emes. work as an intern for at least 160 hours within the University department or NGO. The work nature must be related to phys by the Department or obtained by students themselves. In the	year of study. Stude They should use what the I as having completed or outside the Universics or astronomy. The	nts gain working hey have learnt i an elective in on ity in a company				
should be ta experience in their majors i of the four the Students will government of be arranged the commend	ken normally in the summer immediately before their final in the field of physics or astronomy through intern placement. In this intern. Passing a pre-approved internship is recognized emes.  work as an intern for at least 160 hours within the University department or NGO. The work nature must be related to physics by the Department or obtained by students themselves. In the	year of study. Stude They should use what the I as having completed or outside the Universics or astronomy. The	nts gain working hey have learnt in an elective in one ity in a company				
government of be arranged l the commend	department or NGO. The work nature must be related to phys by the Department or obtained by students themselves. In the	ics or astronomy. The	, ,				
	zement of the internship.	Students will work as an intern for at least 160 hours within the University or outside the University in a company government department or NGO. The work nature must be related to physics or astronomy. The internship should be arranged by the Department or obtained by students themselves. In the latter case, it must be approved before the commencement of the internship.					
On successfu	ul completion of this course, students should be able to:						
CLO 1 apply physics or astronomy knowledge that students have learnt in their majors to real working environment CLO 2 help to create, propose or design part of the project that they are working on during the internship CLO 3 employ effective technical and inter-personal communication skills to people of different background,							
Pass in at least 24 credits of advanced level (3XXX level or above) disciplinary core/elective courses of the Physic Major, Physics (Intensive) Major, Mathematics/Physics Major or Astronomy Major curriculum.  This capstone course is for Astronomy, Mathematics/Physics, Physics, and Physics (Intensive) Majors students only.							
		Examination	No Exam				
Distincti on	incti Demonstrates excellent ability in applying knowledge to solve problems in the workplace. Demonstrates excellent performance in handling and carrying out the work required in the job or assigned by supervisor(s). Establishes highly effective collaboration and communication with supervisor(s), colleagues, and clients in the job. Successfully fulfills the requirements set out in the Course Description regarding working hours, with excellent performance in written and oral report, and excellent evaluation by supervisor(s), etc.						
Pass	Able to apply knowledge to solve problems in the workplace. Successfully handles and carries out the work required in the job or assigned by supervisor(s). Establishes effective collaboration and communication with supervisor(s), colleagues, and clients in the job. Successfully fulfills the requirements set out in the Course Description regarding working hours, written and oral report, and evaluation by supervisor(s), etc. Students demonstrating excellent performance in the above would be						
() () () () () () () () () () () () () (	CLO 1 apply envir CLO 2 help to CLO 3 emplocultur Pass in at lea Major, Physic This capston only. The earliest to Summ Distinction	environment  CLO 2 help to create, propose or design part of the project that they are well call the project that they are well call the project that they are well call the project that they are well call the project that they are well call the project that they are well call the project that they are well call the project that they are well call the project that they are well call the project that they are well call they are well call they are well call they are well call they are well call they are well call they are well call they are well call they are well call they are well call they are well call they are well call they are they are well call they are they are they are well call they are t	CLO 1 apply physics or astronomy knowledge that students have learnt in their majors environment  CLO 2 help to create, propose or design part of the project that they are working on during the int cLO 3 employ effective technical and inter-personal communication skills to people of differ culture, gender and nationality  Pass in at least 24 credits of advanced level (3XXX level or above) disciplinary core/elective cours Major, Physics (Intensive) Major, Mathematics/Physics Major or Astronomy Major curriculum.  This capstone course is for Astronomy, Mathematics/Physics, Physics, and Physics (Intensive) only.  The earliest that a student is allowed to take this capstone course is their year 3 study.  Y Summer Offer in 2022 - 2023 : Y  Distincti  Demonstrates excellent ability in applying knowledge to solve problems in the workplace. Den performance in handling and carrying out the work required in the job or assigned by supervisor(s) etc.  Pass  Able to apply knowledge to solve problems in the workplace. Successfully handles and carries out the wor assigned by supervisor(s), etc.  Able to apply knowledge to solve problems in the workplace. Successfully handles and carries out the wor assigned by supervisor(s), etc.  Able to apply knowledge to solve problems in the workplace. Successfully handles and carries out the wor assigned by supervisor(s). Establishes effective collaboration and communication with supervisor clients in the job. Successfully fulfills the requirements set out in the Course Description regarding working oral report, and evaluation by supervisor(s), etc. Students demonstrating excellent performance in valuation by supervisor(s), etc.				

	Fail		<ol> <li>Fails to establish effective collaboration of satisfy the requirements set out in the Cou upervisor(s), etc.</li> </ol>		
Communication- intensive Course	N				
Course Type	Internship				
Course Teaching	Activities		Details		No. of Hours
& Learning Activities	Internship w	ork	It is expected that students are to (or the equivalent of 4 weeks full-		160
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Written repo	rt	Written report, employer's feedback and oral presentation	100	CLO 1,2,3
Required/recommended reading and online materials	To be provide	ed by individual proje	ct supervisor		
Additional Course Information	be recorded interested to Enrolment of	on the student's tra enrol in this course s this course is not co	urse can be counted towards the C nscript. This course will be asset hould contact the Department to ob nducted via the online course sele after approval has been obtained	ssed on "Pass/Fail" basis. otain the approval. ction system and should b	Students who are the made through the

PHYS4999	Physics I	project (12 credits)	Academic Yea	r 2021				
Offering Department	Physics		Quota					
Course Co-ordinator	Dr F C C Li	ing, Physics (ccling@hku.hk)						
Teachers Involved		achers in the department,Physics)						
Course Objectives	is designed taken norm or numeric their majo	This capstone course is offered to students majoring in physics, physics (intensive), math/physics or astronomy. is designed for those who are interested in tackling a research project in physics and/or astronomy. It should be taken normally in their final year of study. Students investigate a specific problem, either theoretical, experiments or numerical, under the supervision of an academic staff using the knowledge the student gained in all years of their major studies. The available projects are close to postgraduate level research in physics and/or astronomy. Passing a pre-approved project is recognized as having completed an elective in one of the four themes.						
Course Contents & Topics	contents ar	nterested in taking this course should contact their prospective supend the nature of their projects in the coming academic year. They me supervisor and the course coordinator to take this course.						
	and make student ma derivations	cical and numerical projects: Students will receive training in research investigation which is close to research work in nature, under the suay need to perform some original calculations, to fill in mathemat, or a combination of both. For numerical projects, students also or simulation results.	upervision of a stical gaps of s	staff member. The ome sophisticated				
	member. To preparation laser, high-	mental projects: Students will carry out experiments in research laber. The student will receive a comprehensive training in advanced experiments, determination of physical properties, measurement of evacuum and low-temperature techniques and so on. Wide reading lity in experimental design are expected.	kperimental tec small signals o	hniques, including obscured by noise,				
Course Learning	On success	sful completion of this course, students should be able to:						
Outcomes	CLO 1 plan and execute a theoretical, numerical or experimental research project on a topic in physics or astronomy  CLO 2 review the knowledge of a physics or astronomy problem in depth through literature review of books and research journals based on what they have learnt in their majors							
	CLO 3 criticize existing approaches for solving the selected physics or astronomy problem							
	CLO 4 describe and explain connections between the physical principles and the study problem							
	CLO 5 (for theoretical or computational projects) identify the key issues of the problem and solve them independently either by analytical or numerical means, and compare the results with predictions or existing solutions							
	CLO 6 (for experimental projects) propose and execute physics experiments or astronomical observations, analyze results and sources of errors of the experiment or observation in comparison with predictions							
	cor	projects involving team work) collaborate and communicate effe nprise of people of different culture, gender and nationality						
Pre-requisites (and Co-requisites and Impermissible combinations)	Major, Phys This capsto only.	· ·						
Offer in 2021 - 2022	The earliest that a student is allowed to take this capstone course is their year 3 study.  Y Year long Offer in 2022 - 2023 : Y  Examination No Exam							
Grade Descriptors (A+ to F)	A	Demonstrate thorough grasp of the subject. Show strong analytical and critical ability original thought. Insightful use and critical analysis/evaluation of information drawn frow to quote/reference aptly. Critical use of data and results to draw appropriate and insorganizational and presentational skills. Work of A+ should show considerable additional areas relevant to the topic.	ties and logical thir om a full range of h sightful conclusions onal work beyond t	nking, with evidence of igh quality sources and Apply highly effective hat is required in wider				
	В	Demonstrate substantial grasp of the subject. Evidence of analytical and critical ab relevant information from sources, showing ability to make meaningful comparisons b and to quote/reference aptly. Correct use of data of results to draw appropriate concipresentational skills.	etween different se lusions. Apply effec	condary interpretations tive organizational and				
	С	Demonstrate general but incomplete grasp of the subject. Evidence of some analytic Use of relevant information from sources, showing ability to make comparisons quote/reference aptly. Mostly correct but some erroneous use of data and results moderately effective organizational and presentational skills.	between different	interpretations and to				
	D							

	Fail De an the	logical thinking, but with limited analytical and critical abilities. Demonstrate use and reference of several sources, be through summary rather than analysis and comparison. Limited ability to use data and results to draw appropriate co Apply limited or barely effective organizational and presentational skills.  Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little analytical and critical abilities, logical and coherent thinking. Limited use of secondary sources and no critical comp them. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational minimally effective or ineffective.					
Communication- intensive Course	N						
Course Type	Project-based	course					
Course Teaching	Activities		Details	No. of Hours			
& Learning Activities	Meeting with supervisor				54		
	Reading / Self study				126		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Oral presentation		Including supervisor's comments (10%)	30	CLO 2,4,5,6		
	Research rep	ort		70	CLO 1,2,3,4,5,6,7		
Required/recommended reading and online materials	To be provide	d by individual pr	oject supervisor				

PHYS7350	Graduat	Graduate classical mechanics (6 credits)  Academic Year 2				2021		
Offering Department	Physics				Quota			
Course Co-ordinator	TBC, Phys	TBC, Physics ()						
Teachers Involved	(TBC,Phys	sics)						
Course Objectives	TBC	TBC						
Course Contents & Topics	TBC	TBC						
Course Learning Outcomes	On succes	On successful completion of this course, students should be able to:						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Pl	ass in PHYS4350						
Offer in 2021 - 2022	N Offe	er in 2022 - 2023 : N			Examination			
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.							
	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.							
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.							
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.							
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.							
Communication- intensive Course	N	·						
Course Type	Lecture-ba	ased course						
Course Teaching & Learning Activities	Activities	3	Details			No. of Hours		
Assessment Methods and Weighting	Methods		Details		ting in final e grade (%)	Assessment Methods to CLO Mapping		
Required/recommended reading and online materials	TBC							

PHYS7351	Gradua	te quantum mechanics (6 credits)  Acad	lemic Year	2021				
Offering Department	Physics	Quota	а					
Course Co-ordinator	Prof S Q	Shen, Physics (sshen@hku.hk)						
Teachers Involved	(Prof S C	of S Q Shen,Physics)						
Course Objectives		nis graduate level course covers the theory and advanced techniques in quantum mechanics, and their oplications to select topics in condensed matter physics. This is an elective course for the theoretical physics eme.						
Course Contents & Topics	and con	The course will cover the following topics: Dirac notation, quantum dynamics, the second quantization, symmetry and conservation laws, permutation symmetry and identical particles, perturbation and scattering theory, introduction of relativistic quantum mechanics.						
Course Learning	On successful completion of this course, students should be able to:							
Outcomes	CLO 1 formulate and solve problems in quantum mechanics using Dirac notation							
	CLO 2 examine and predict the properties of identical quantum particles							
	CLO 3	CLO 3 argue the importance of symmetry and conservation laws in quantum mechanics						
	CLO 4 explain physical phenomena in the modern language of quantum mechanics							
	CLO 5 analyse physical system in a quantum mechanical way							
	CLO 6 recognise the connection between relativity and quantum mechanics							

Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in F	PHYS3150 and PHYS43	51			
Offer in 2021 - 2022	Y 1s	t sem Offer in 2022 - 2	2023 : Y		Examination	Dec
Grade Descriptors (A+ to F)	A	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.				
	В	B Demonstrate substantial command of the knowledge and skills required for attaining most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.				
	С	outcomes. Show evidence	incomplete command of knowled e of some analytical and critical al noderately effective organizational	bilities and logical thinkin		
	D	familiar situations. Apply moderately effective organizational and presentational skills.  Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.				
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.					
Communication- intensive Course	N	· ·				
Course Type	Lecture-l	pased course				
Course Teaching	Activitie	es	Details			No. of Hours
& Learning Activities	Lectures	S				36
	Tutorials	3				12
	Reading	/ Self study				80
Assessment Methods and Weighting	Method	s	Details		ting in final e grade (%)	Assessment Methods to CLO Mapping
	Assignm	nents			40	CLO 1,2,3,4,5,6
	Examina	ation	3-hour written exam		60	CLO 1,2,3,4,5,6
Required/recommended reading and online materials	J. J. Sak	notes provided by Cours urai: Modern Quantum M iff: Quantum Mechanics	Mechanics (Addison-Wesley	v, 1994)		

PHYS7450	Gradua	te electromagnetis	sm (6 credits)	Academic Yea	r 2021
Offering Department	Physics		<u> </u>	Quota	
Course Co-ordinator	Prof Z D	Wang, Physics (zwang	g@hku.hk)		
Teachers Involved		Wang,Physics)			
Course Objectives			vers the theory of classical ele physics problems. This is an elec		
Course Contents & Topics	Function	method; electrostatics	discuss the following topics: bous of media; magnetostatics; Ma c waves and wave guides.		
Course Learning	On succe	essful completion of this	s course, students should be able	e to:	
Outcomes	CLO 1 a	nalyse and solve vario	us electrostatic and magnetostat	ic problems with Green's Function	on
	CLO 2 co	omprehend and explain	n many electromagnetic phenom	ena	
			end the important concepts of co or doing research in future	nservation laws and gauge trans	sformations, whicl
Pre-requisites and Co-requisites and Impermissible combinations)	Pass in P	PHYS3150 and PHYS4	450		
Offer in 2021 - 2022	N Off	fer in 2022 - 2023 : Y		Examination	
Grade Descriptors (A+ to F)	Α	learning outcomes. Show	nastery at an advanced level of extensive strong analytical and critical abilities are wide range of complex, familiar and under the strong strong that the strong	nd logical thinking, with evidence of original	nal thought, and abilit
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.				
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.				
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.				
	D	Show evidence of some of	coherent and logical thinking, but with lin	nited analytical and critical abilities. Show	
	Fail	Show evidence of some of knowledge to solve problet Demonstrate little or no e of analytical and critical	coherent and logical thinking, but with lin	nited analytical and critical abilities. Shown anizational and presentational skills. skills required for attaining the course le . Show very little or no ability to appl	v limited ability to app
		Show evidence of some of knowledge to solve problet Demonstrate little or no e of analytical and critical	coherent and logical thinking, but with lin ems. Apply limited or barely effective org evidence of command of knowledge and abilities, logical and coherent thinking	nited analytical and critical abilities. Shown anizational and presentational skills. skills required for attaining the course le . Show very little or no ability to appl	v limited ability to applearning outcomes. Lac
ntensive Course Course Type	Fail N	Show evidence of some of knowledge to solve problet Demonstrate little or no e of analytical and critical	coherent and logical thinking, but with lin ems. Apply limited or barely effective org evidence of command of knowledge and abilities, logical and coherent thinking	nited analytical and critical abilities. Shown anizational and presentational skills. skills required for attaining the course le . Show very little or no ability to appl	v limited ability to applearning outcomes. Lac
ntensive Course Course Type Course Teaching	Fail N	Show evidence of some of knowledge to solve proble Demonstrate little or no of analytical and critical problems. Organization and organization	coherent and logical thinking, but with lin ems. Apply limited or barely effective org evidence of command of knowledge and abilities, logical and coherent thinking	nited analytical and critical abilities. Shown anizational and presentational skills. skills required for attaining the course le . Show very little or no ability to appl	v limited ability to app
ntensive Course Course Type Course Teaching	Fail N Lecture-b	Show evidence of some of knowledge to solve proble Demonstrate little or no of analytical and critical problems. Organization and organization	coherent and logical thinking, but with lin ems. Apply limited or barely effective org evidence of command of knowledge and abilities, logical and coherent thinking ind presentational skills are minimally effe	nited analytical and critical abilities. Shown anizational and presentational skills. skills required for attaining the course le . Show very little or no ability to appl	v limited ability to app varning outcomes. Lac y knowledge to solv
ntensive Course Course Type Course Teaching	Fail  N  Lecture-b  Activitie	Show evidence of some of knowledge to solve proble Demonstrate little or not of analytical and critical problems. Organization and assed course	coherent and logical thinking, but with lin ems. Apply limited or barely effective org evidence of command of knowledge and abilities, logical and coherent thinking ind presentational skills are minimally effe	nited analytical and critical abilities. Shown anizational and presentational skills. skills required for attaining the course le . Show very little or no ability to appl	v limited ability to appearing outcomes. Lac y knowledge to solve
ntensive Course Course Type Course Teaching	Fail  N  Lecture-b  Activitie  Lectures  Tutorials	Show evidence of some of knowledge to solve proble Demonstrate little or not of analytical and critical problems. Organization and assed course	coherent and logical thinking, but with lin ems. Apply limited or barely effective org evidence of command of knowledge and abilities, logical and coherent thinking ind presentational skills are minimally effe	nited analytical and critical abilities. Shown anizational and presentational skills. skills required for attaining the course le . Show very little or no ability to appl	v limited ability to appearing outcomes. Lac y knowledge to solv  No. of Hours  36
ntensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail  N  Lecture-b  Activitie  Lectures  Tutorials	Show evidence of some of knowledge to solve proble Demonstrate little or no e of analytical and critical problems. Organization at passed course	coherent and logical thinking, but with lin ems. Apply limited or barely effective org evidence of command of knowledge and abilities, logical and coherent thinking ind presentational skills are minimally effe	nited analytical and critical abilities. Shown anizational and presentational skills. skills required for attaining the course le . Show very little or no ability to appl	No. of Hours  36  12  80  Assessment Methods
Communication- ntensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting	Fail  N  Lecture-b  Activitie  Lectures  Tutorials  Reading	Show evidence of some of knowledge to solve proble Demonstrate little or no e of analytical and critical problems. Organization and problems of the course o	coherent and logical thinking, but with linems. Apply limited or barely effective or gividence of command of knowledge and abilities, logical and coherent thinking nd presentational skills are minimally effective.  Details	nited analytical and critical abilities. Show anizational and presentational skills. skills required for attaining the course le. Show very little or no ability to apple active or ineffective.  Weighting in final	No. of Hours  36  12  80  Assessment

reading and	L.D. Landau and E.M. Lifshitz: Classical Theory of Fields (Pergamon, 1982)
online materials	

PHYS7550	Graduate	statistical m	echanics (6 credits)	Academic Ye	ar 2021	
Offering Department	Physics			Quota		
Course Co-ordinator	Dr G Chen,	Physics (gange	chen @hku.hk)			
Teachers Involved	(Dr G Chen	,Physics)				
Course Objectives		ate level course cal physics ther	covers advanced topics in equilibr me.	ium statistical physics. This is a	n elective course for	
Course Contents & Topics	quantum m	echanical ensei	ro-canonical ensemble, the canon mble theory; theory of simple gases /stems; some topics in the theory of	, ideal Bose systems, ideal Ferm	ni systems; statistica	
Course Learning			of this course, students should be a	•		
Outcomes	CLO 1 dis	cuss the variou	s classical ensembles and quantum	ensembles		
	CLO 2 sol	ve the statistica	ll mechanics problems using ensem	ble theory		
	CLO 3 exp	plain the connec	ction between classical statistical m	echanics and quantum statistical	mechanics	
	CLO 4 exp	olain the concep	ot of density matrix			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in (PF	IYS3550 and Pi	HYS4351) or PHYS4550			
Offer in 2021 - 2022	Y 2nd s	sem Offer in 2	022 - 2023 : Y	Examination	May	
Grade Descriptors (A+ to F)		learning outcomes. to apply knowledge	ugh mastery at an advanced level of exte Show strong analytical and critical abilities e to a wide range of complex, familiar and	and logical thinking, with evidence of or	iginal thought, and ability	
	В	presentational skills.  Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar				
	С	and some unfamiliar situations. Apply effective organizational and presentational skills.  Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most				
	D	Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply				
	Fail  Knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.					
Communication- intensive Course	N	,	,			
Course Type	Lecture-bas	sed course				
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials				12	
	Reading / S	Self study			80	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignmen	ts		40	CLO 1,2,3,4	
	Examinatio	n	3-hour written exam	60	CLO 1,2,3,4	
Required/recommended reading and online materials	Kerson Hua R.K. Pathria	ng: Statistical Ma : Statistical Me	Mechanics (2nd Edition, Wiley)			

PHYS7551	Gradua	te solid state physics (6 credits)	Academic Yea	2021			
Offering Department	Physics		Quota				
Course Co-ordinator	Prof J Wa	ing, Physics (jianwang@hku.hk)					
Teachers Involved							
Course Objectives	To provid	e students with an understanding of more advanced topic	s in selected areas of solid sta	ite physics.			
Course Contents & Topics		Bloch theory. Nearly free electrons and tight binding model. Band structure calculations for realistic systems. The semi-classical model of electron dynamics. Ab initio total energy calculations and other advanced topics.					
Course Learning	On succe	ssful completion of this course, students should be able to	):				
Outcomes		CLO 1 discuss various methods to calculate the band structures and the major approximations that have been used					
	CLO 2 di	scuss various minimization methods					
	CLO 3 discuss the concepts of density functional theory						
	CLO 4 explain the concept of first principle calculation and various approximations used						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in P	HYS3551 and PHYS4351					
Offer in 2021 - 2022	N Off	er in 2022 - 2023 : N	Examination				
Grade Descriptors (A+ to F)	Α	Demonstrate thorough mastery at an advanced level of extensive learning outcomes. Show strong analytical and critical abilities and Ic to apply knowledge to a wide range of complex, familiar and unfa presentational skills.	ogical thinking, with evidence of origi	nal thought, and ability			
	В	<u> </u>					
	С	.,,,					

		skills and techniques	S.			
	D	Show evidence of se	but limited command of knowledge and skil ome coherent and logical thinking, but with lip problems using limited or barely effective org	mited analytical and critical abilities. Sh		
	Fail	of analytical and ci	no evidence of command of knowledge and itical abilities, logical and coherent thinking ion and presentational skills are minimally ef	g. Show very little or no ability to ap		
Communication- intensive Course	N					
Course Type	Lecture-b	pased course				
Course Teaching	Activities		Details	Details		
& Learning Activities	Lectures				36	
	Tutorials				12	
	Reading / Self study				80	
Assessment Methods and Weighting	Methods	5	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignm	ents		15	CLO 1,2,3,4	
	Examina	ition	3-hour written exam	70	CLO 1,2,3,4	
	Test			15	CLO 1,2,3,4	
Required/recommended reading and online materials	C. Kittel:	Introduction to Sol	Course Coordinator id State Physics (John Wiley, 1996) min: Solid State Physics (Holt, Rine			

PHYS7650	Stellar atmospheres (6 credits)  Academic Y					2021		
Offering Department	Physics				Quota			
Course Co-ordinator	TBC, Phy	vsics ()						
Teachers Involved	(TBC,Phy	BC,Physics)						
Course Objectives	TBC							
Course Contents & Topics	TBC							
Course Learning Outcomes	On succe	On successful completion of this course, students should be able to:						
Pre-requisites (and Co-requisites and Impermissible combinations)	TBC	BC						
Offer in 2021 - 2022	N Off	fer in 2022 - 2023 : N			Examination			
Grade Descriptors (A+ to F)	A	learning outcomes. Show st	tery at an advanced level o crong analytical and critical ab ide range of complex, famili	oilities and logical thinking, w	ith evidence of origin	al thought, and ability		
	B Demonstrate substantial command of the knowledge and skills required for attaining most of the course learning outcomes. Show evidence of analytical and critical abilities, reasoned logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations using effective organizational and presentation skills.							
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and resentational skills. Apply moderately effective observation skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.							
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems using limited or barely effective organizational and presentational skills.							
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.							
Communication- intensive Course	N							
Course Type	Lecture-b	ased course						
Course Teaching & Learning Activities	Activitie	s	Details			No. of Hours		
Assessment Methods and Weighting	Methods	3	Details		ting in final e grade (%)	Assessment Methods to CLO Mapping		
Required/recommended reading and online materials	ТВС			·	,	0		

PHYS7750	Nanophysics (6 credits)	<b>Academic Year</b>	2021
Offering Department	Physics	Quota	
Course Co-ordinator	Dr D K Ki, Physics (dkki@hku.hk)		
Teachers Involved	(Dr D K Ki,Physics)		
Course Objectives	This course is designed to let fresh postgraduate students know fundamenta physics, such as two-dimensional electron gas, quantum Hall effects, one-dimensional electron systems, single electron effects	ensional electron	system, quantum
Course Contents & Topics	Introduction to nano physics and quantum size effect. Dimensionalities and den properties of two-dimensional electron gas formed at heterostructures and with external fields. Quantum Hall Effects. Physics of one-dimensional electron sy and semiconductor nanowires. Fundamental physics of zero-dimensional electron Quantum dots and nanocrystals. Fundamental principles and applications of sc study of nano physics. If time permits, the making and application aspects of nanocrystals.	in novel graphene stems including c on systems. Single anning tunneling	monolayers with arbon nanotubes e electron effects microscopy in the
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 recall basic concepts and knowledge of dimensionality, density of states		

Assessment Methods and Weighting	Assignn Essay Examina	g / Self study s nents	Details	Weighting in final course grade (%)  10 20 70	12 80 Assessment Methods to CLO Mapping CLO 1,2,3,4,5 CLO 1,2,3,4,5 CLO 1,2,3,4,5		
	Method  Assignment Essay	g / Self study <b>s</b> nents	Details	course grade (%)  10 20	Assessment Methods to CLO Mapping CLO 1,2,3,4,5 CLO 1,2,3,4,5		
	Reading Method Assignn	g / Self study Is	Details	course grade (%)	Assessment Methods to CLO Mapping CLO 1,2,3,4,5		
	Reading Method	g / Self study Is	Details	course grade (%)	Assessment Methods to CLO Mapping		
	Reading	g / Self study	Details		80 Assessment		
	Reading	g / Self study			80		
Ū		-	_				
& Learning Activities		S					
	Lectures				36		
Course Teaching	Activitie		Details		No. of Hours		
Course Type		based course					
Communication- intensive Course	N						
	Fail	<b>Fail</b> Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.					
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
		Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
		B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.					
Grade Descriptors (A+ to F)	A	learning outcomes. Show to apply knowledge to a presentational skills.	strong analytical and critical abi wide range of complex, familia	extensive knowledge and skills required fo illities and logical thinking, with evidence of our and unfamiliar situations. Apply highly efforms	riginal thought, and ability ective organizational and		
Offer in 2021 - 2022	-	ffer in 2022 - 2023 : Y		Examination			
Pre-requisites (and Co-requisites and Impermissible combinations)		Pass in PHYS3551 and PHYS4351					
			,	al quantum dots and nanocrystals, si	ngle electron effects		
		semiconductor nanowire	S	, ,			
	CLO 4 describe the basic physics of one-dimensional electron systems including carbon nanotubes and						
	CLO 3 recognize the fundamental principles and important applications of scanning tunneling microscopy in the study of nano physics						

	Environmental radiation (6	6 credits) Academic Yea	ar 2021				
Offering Department	Physics	Quota					
Course Co-ordinator	Dr J K C Leung, Physics (jkcleui	ng@hku.hk)					
Teachers Involved	(Dr J K C Leung, Physics)						
Course Objectives	to detect them, the methods to	In this course, students will learn about various kinds of radiations in the environment, the experimental technique to detect them, the methods to trace them and to assess their hazard to the environment, and the ways to reduct the hazard in events of nuclear accidents or incidents.					
Course Contents & Topics	The course will cover naturally occurring radiation sources and man-made radiation sources including nuclear power plants; transport models for radionuclides in the environment; nuclear accidents and its impact to the environment; radiation risk assessment and emergency preparedness; techniques for measuring low level radioactivities; nuclear techniques in ecology; concept of radiation protection to human species and non-human species.						
Course Learning	On successful completion of this	course, students should be able to:					
Outcomes	CLO 1 realise sources and tran	nsport of radionuclides in the environment					
	CLO 2 explain and assess the	impact to the environment from the use of nuclear energies					
	CLO 3 detect and measure low level radioactivities in environmental samples						
	CLO 4 justify, optimize, and assess the risk of using radiation and nuclear technologies						
	CLO 5 compare and contrast t	he environmental impacts from nuclear energy and other forms	of energy				
Pre-requisites	Pass in CHEM2041 or ENVS200	01 or ENVS2002 or PHYS2265					
(and Co-requisites and Impermissible	Pass in CHEM2041 or ENVS200	01 or ENVS2002 or PHYS2265					
(and Co-requisites and Impermissible combinations)	Pass in CHEM2041 or ENVS200  N Offer in 2022 - 2023 : N	01 or ENVS2002 or PHYS2265  Examination					
Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)	N Offer in 2022 - 2023 : N  A Demonstrate thorough m learning outcomes. Show to apply knowledge to a		ginal thought, and ability ctive organizational and				
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	N Offer in 2022 - 2023 : N  A Demonstrate thorough m learning outcomes. Show to apply knowledge to a presentational skills. App insightful conclusions.  B Demonstrate substantial learning outcomes. Show and some unfamiliar situa Correct use of data of res	examination astery at an advanced level of extensive knowledge and skills required for strong analytical and critical abilities and logical thinking, with evidence of ori, wide range of complex, familiar and unfamiliar situations. Apply highly effect ly highly effective lab skills and techniques. Critical use of data and results to command of a broad range of knowledge and skills required for attaining at levidence of analytical and critical abilities and logical thinking, and ability to ap tions. Apply effective organizational and presentational skills. Apply effective lab ults to draw appropriate conclusions.	ginal thought, and ability tive organizational and o draw appropriate and east most of the course ply knowledge to familia ab skills and techniques				
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	N Offer in 2022 - 2023 : N  A Demonstrate thorough m learning outcomes. Show to apply knowledge to a presentational skills. App insightful conclusions.  B Demonstrate substantial learning outcomes. Show and some unfamiliar situat Correct use of data of res  C Demonstrate general but outcomes. Show evidenc familiar situations. Apply	Examination astery at an advanced level of extensive knowledge and skills required for strong analytical and critical abilities and logical thinking, with evidence of ori, wide range of complex, familiar and unfamiliar situations. Apply highly effect ly highly effective lab skills and techniques. Critical use of data and results to command of a broad range of knowledge and skills required for attaining at l evidence of analytical and critical abilities and logical thinking, and ability to ap itions. Apply effective organizational and presentational skills. Apply effective la ults to draw appropriate conclusions. Lincomplete command of knowledge and skills required for attaining most e of some analytical and critical abilities and logical thinking, and ability to a moderately effective organizational and presentational skills. Apply moderately	ginal thought, and ability tive organizational and o draw appropriate and east most of the course bly knowledge to familia ab skills and techniques of the course learning opply knowledge to mosi				
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	N Offer in 2022 - 2023 : N  A Demonstrate thorough m learning outcomes. Show to apply knowledge to a presentational skills. App insightful conclusions.  B Demonstrate substantial learning outcomes. Show and some unfamiliar situa Correct use of data of res  C Demonstrate general but outcomes. Show evidence familiar situations. Apply techniques. Mostly correct but outcomes. Show evidence familiar situations. Apply techniques Mostly correct but outcomes. Show evidence familiar situations apply techniques of some considerations of the constraint of t	astery at an advanced level of extensive knowledge and skills required for strong analytical and critical abilities and logical thinking, with evidence of originate of complex, familiar and unfamiliar situations. Apply highly effective lab skills and techniques. Critical use of data and results to the command of a broad range of knowledge and skills required for attaining at levidence of analytical and critical abilities and logical thinking, and ability to apply the companies of the complete conclusions. It incomplete command of knowledge and skills required for attaining most end some analytical and critical abilities and logical thinking, and ability to apply the companies of some analytical and critical abilities and logical thinking, and ability to a process of some analytical and critical abilities and logical thinking, and ability to a process of some analytical and critical abilities and logical thinking, and ability to a process of the companies of the	ginal thought, and ability tive organizational and o draw appropriate and east most of the course obly knowledge to familia b skills and techniques of the course learning oply knowledge to mos y effective lab skills and urse learning outcomes w limited ability to apply				

	problems. Organizat	itical abilities, logical and coherent thinking ion and presentational skills are minimally eff . Misuse of data and results and/or unable to	ective or ineffective. Apply minimally			
Communication- intensive Course	N					
Course Type	Lecture with laboratory component course					
Course Teaching	Activities	Details		No. of Hours		
& Learning Activities	Lectures			36		
	Laboratory			2		
	Field work			8		
	Tutorials			8		
	Reading / Self study			80		
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments		20	CLO 1,2,4,5		
	Examination	2-hour written exam	60	CLO 1,2,4,5		
	Laboratory reports		10	CLO 2,3		
	Presentation		10	CLO 2,4,5		
Required/recommended reading and online materials	(Academic Press, 1997) Robert C. Morris: The Enviro	as Gesell: Environmental Radioactive	aragon House, 2000)	,		
Course Website	http://moodle.hku.hk	nergy - Principles, Practices and Pro	specis (American institute of F	11y51c5 F1655, 1990)		

A# 1 B	<b>Sustain</b>	able energy and env	vironment (6 credits)	Academic Ye	ar 2021			
Offering Department	Physics		•	Quota				
Course Co-ordinator	Prof A B [	Djurisic, Physics <i>(dalek</i> @	Dhku.hk)					
Teachers Involved	(Prof A B	Djurisic, Physics)						
Course Objectives	technolog technolog	n this course, the students will learn about sustainability and environmental impact of different energy echnologies, including conventional energy sources as well as renewable and/or clean energy sources. The echnological challenges, potential for future development, and environmental impacts (community, regional, and plobal) will be discussed.						
Course Contents & Topics	making th	nem more sustainable, c	duction and use, environmental impa slean fuels, electricity generation, re ly), hydrogen, energy storage, and e	newable energy technolo				
Course Learning	On succes	ssful completion of this	course, students should be able to:	- 0,				
Outcomes	CLO 1	define the concept of su	stainable development					
	CLO 2	explain the challenges a	and potential for development of vari	ous energy technologies				
	CLO 3	compare the environme	ntal impact of conventional and new	energy technologies				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in C	HEM2041 or ENVS2001	1 or ENVS2002 or PHYS2260					
Offer in 2021 - 2022	Y 2nd	d sem Offer in 2022 - 2	2023 : Y	Examination	May			
Grade Descriptors (A+ to F)	Α	learning outcomes. Show s	stery at an advanced level of extensive kno trong analytical and critical abilities and logic ride range of complex, familiar and unfamili	cal thinking, with evidence of ori	ginal thought, and ability			
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.							
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.							
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.							
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	Fail	Show evidence of some col knowledge to solve problem Demonstrate little or no evid of analytical and critical al	herent and logical thinking, but with limited an is. Apply limited or barely effective organizati dence of command of knowledge and skills r bilities, logical and coherent thinking. Shov	nalytical and critical abilities. Sho onal and presentational skills. equired for attaining the course or very little or no ability to ap	ow limited ability to apply learning outcomes. Lack			
	Fail N	Show evidence of some col knowledge to solve problem Demonstrate little or no evid of analytical and critical al	herent and logical thinking, but with limited and s. Apply limited or barely effective organization and command of knowledge and skills received.	nalytical and critical abilities. Sho onal and presentational skills. equired for attaining the course or very little or no ability to ap	ow limited ability to apply learning outcomes. Lack			
intensive Course Course Type	N	Show evidence of some col knowledge to solve problem Demonstrate little or no evid of analytical and critical al	herent and logical thinking, but with limited an is. Apply limited or barely effective organizati dence of command of knowledge and skills r bilities, logical and coherent thinking. Shov	nalytical and critical abilities. Sho onal and presentational skills. equired for attaining the course or very little or no ability to ap	ow limited ability to apply learning outcomes. Lack			
intensive Course Course Type Course Teaching	N	Show evidence of some col knowledge to solve problem Demonstrate little or no evi of analytical and critical a problems. Organization and ased course	herent and logical thinking, but with limited an is. Apply limited or barely effective organizati dence of command of knowledge and skills r bilities, logical and coherent thinking. Shov	nalytical and critical abilities. Sho onal and presentational skills. equired for attaining the course or very little or no ability to ap	ow limited ability to apply learning outcomes. Lack			
intensive Course Course Type Course Teaching	N Lecture-ba	Show evidence of some col knowledge to solve problem Demonstrate little or no evi of analytical and critical a problems. Organization and ased course	herent and logical thinking, but with limited an s. Apply limited or barely effective organizati dence of command of knowledge and skills re bilities, logical and coherent thinking. Show I presentational skills are minimally effective of	nalytical and critical abilities. Sho onal and presentational skills. equired for attaining the course or very little or no ability to ap	ow limited ability to apply learning outcomes. Lack ply knowledge to solve			
intensive Course Course Type Course Teaching	N Lecture-ba	Show evidence of some col knowledge to solve problem Demonstrate little or no evi of analytical and critical a problems. Organization and ased course	herent and logical thinking, but with limited an s. Apply limited or barely effective organizati dence of command of knowledge and skills re bilities, logical and coherent thinking. Show I presentational skills are minimally effective of	nalytical and critical abilities. Sho onal and presentational skills. equired for attaining the course or very little or no ability to ap	ow limited ability to apply learning outcomes. Lack ply knowledge to solve			
intensive Course Course Type Course Teaching	N Lecture-ba Activities Lectures Tutorials	Show evidence of some col knowledge to solve problem Demonstrate little or no evi of analytical and critical a problems. Organization and ased course	herent and logical thinking, but with limited an s. Apply limited or barely effective organizati dence of command of knowledge and skills re bilities, logical and coherent thinking. Show I presentational skills are minimally effective of	nalytical and critical abilities. Sho onal and presentational skills. equired for attaining the course or very little or no ability to ap	ow limited ability to apply learning outcomes. Lack ply knowledge to solve			
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture-ba Activities Lectures Tutorials	Show evidence of some col knowledge to solve problem Demonstrate little or no evid of analytical and critical a problems. Organization and ased course s	herent and logical thinking, but with limited an s. Apply limited or barely effective organizati dence of command of knowledge and skills re bilities, logical and coherent thinking. Show I presentational skills are minimally effective of	nalytical and critical abilities. Sho onal and presentational skills. equired for attaining the course or very little or no ability to ap	ow limited ability to apply learning outcomes. Lack ply knowledge to solve  No. of Hours  36 12			
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture-ba Activities Lectures Tutorials Reading	Show evidence of some colknowledge to solve problem Demonstrate little or no evid of analytical and critical a problems. Organization and ased course  S / Self study	herent and logical thinking, but with limited an ss. Apply limited or barely effective organization dence of command of knowledge and skills ribilities, logical and coherent thinking. Show presentational skills are minimally effective or Details	nalytical and critical abilities. Sho onal and presentational skills. equired for attaining the course of very little or no ability to ap or ineffective.  Weighting in final	No. of Hours  36  12  80  Assessment Methods			
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture-ba Activities Lectures Tutorials Reading Methods	Show evidence of some colknowledge to solve problem Demonstrate little or no evid of analytical and critical alproblems. Organization and ased course  S / Self study	herent and logical thinking, but with limited an s. Apply limited or barely effective organizati dence of command of knowledge and skills ribilities, logical and coherent thinking. Show presentational skills are minimally effective of the presentational skills are minimally effective of the presentational skills are minimally effective of the presentational skills are minimally effective of the presentation of the presenta	nalytical and critical abilities. Sho onal and presentational skills. equired for attaining the course v very little or no ability to ap or ineffective.  Weighting in final course grade (%)	No. of Hours  36  12  80  Assessment  Methods  to CLO Mapping			
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture-ba Activities Lectures Tutorials Reading Methods Assignment	Show evidence of some colknowledge to solve problem Demonstrate little or no evid of analytical and critical alproblems. Organization and ased course  S / Self study ents tion	herent and logical thinking, but with limited an s. Apply limited or barely effective organizati dence of command of knowledge and skills ribilities, logical and coherent thinking. Show presentational skills are minimally effective of the command	nalytical and critical abilities. Sho onal and presentational skills. equired for attaining the course wery little or no ability to ap or ineffective.  Weighting in final course grade (%)	No. of Hours  36 12 80 Assessment Methods to CLO Mapping CLO 1,2,3			
Communication- intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	N Lecture-ba Activities Lectures Tutorials Reading Methods  Assignme Examinat Presentat Lecture no Godfrey B G. Boyle, Open Univ	Show evidence of some colknowledge to solve problem Demonstrate little or no evid of analytical and critical a problems. Organization and ased course  S  / Self study  ents tion tion otes provided by Course Boyle: Renewable Energ B. Everett, and J. Ranversity, 2003)	herent and logical thinking, but with limited an s. Apply limited or barely effective organizati dence of command of knowledge and skills ribilities, logical and coherent thinking. Show presentational skills are minimally effective of the presentational skills are minimally effective of the presentational skills are minimally effective of the presentational skills are minimally effective of the presentational skills are minimally effective of the presentational skills are minimally effective of the presentational skills are minimally effective of the presentation of the presentat	weighting in final course grade (%)  Weighting in final course grade (%)  Weighting in Sinal course grade (%)  10  50  40  Dxford University Press, 2 ability: Power for a Susta	No. of Hours  36 12 80 Assessment Methods to CLO Mapping CLO 1,2,3 CLO 2,3			

ENTR2001	Profession	nal and leadership o	development (6 credits)	Academic Year	2021		
Offering Department	Faculty			Quota	24		
Course Co-ordinator	Dr R Law, F	aculty (rockylaw@hku.hi	k)				
Teachers Involved	(Dr R Law,F	aculty of Science)					
	(Ms J Lloyd,						
Course Objectives	Students environme     Students i     Students i	This course is to provide opportunity for:  1. Students to develop an entrepreneurial mindset and be better prepared for entering into any entrepreneurial environment  2. Students to further sharpen their communication skills, such as presentation and pitching of ideas  3. Students to further enhance their networking skills, such as in social events					
Course Contents		tudents to understand how different personalities and working / leadership styles fit into team work					
& Topics	with platform One of the o	This course aims at increasing students' awareness of some important entrepreneurial skills and providing them with platforms to hone essential skills necessary to succeed as a leader in operating an entrepreneurial venture One of the course components will also allow students to self-reflect and develop practical sense on how differen personalities and work styles can help build leadership capacity as well as foster stronger team collaboration.					
Course Learning	On successf	ful completion of this cou	ırse, students should be able to:				
Outcomes	CLO 2 gain CLO 3 shar netw	CLO 1 acquire basic knowledge about how different personalities and working / leadership styles fit into team working 2 gain insight into the fundamentals of starting and operating a business by meeting industry practitioners sharpen their communication and career preparation skills in CV and cover letter writing, intervied networking, presentation, negotiation, group discussion, case analysis and problem solving recognize and adapt work style differences to establish stronger relationships at workplace in a start					
Pre-requisites (and Co-requisites and Impermissible combinations)		undergraduate course					
Offer in 2021 - 2022	Y 1st se	m Offer in 2022 - 2023	3 : Y	Examination	No Exam		
Grade Descriptors Distinction/Pass/Fail	Distincti						
Distinction/Pass/Fail	on	communication with supervi	isor(s) and team members in the course.	ainer(s). Establishes highly effe Successfully fulfills the require	ctive collaboration an ements set out in the		
Distinction/Pass/Fail	Pass	communication with supervicourse Description regarding. Able to apply knowledge to teacher(s) and external profemembers in the course. Sassignments, reports, and every communication of the course of		ainer(s). Establishes highly effe Successfully fulfills the require iluation by teacher(s), external t suffered to state the suffered to suffered to the suffered to suffered br>suffered to suffered to suffered	ctive collaboration and ements set out in the rainer(s), etc. the work assigned by the teacher(s) and team regarding attendance		
	Pass	communication with supervicourse Description regardin. Able to apply knowledge to teacher(s) and external profimembers in the course. Stassignments, reports, and evicant external professional transcriptions. Fails to satisfy the	isor(s) and team members in the course. g attendance, assignments, reports, and eva solve problems in the course work. Succes essional trainers. Establishes effective collat uccessfully fulfills the requirements set ouvaluation by teacher(s) and external professi	ainer(s). Establishes highly effe Successfully fulfills the require iluation by teacher(s), external t ssfully handles and carries out coration and communication wit tit in the Course Description ronal trainer(s), etc. handle or carry out the work a ation or communication with si	ctive collaboration and ments set out in the rainer(s), etc. the work assigned by the teacher(s) and tean regarding attendance assigned by teacher(s upervisor(s) and tean		
Communication- intensive Course	Pass Fail	communication with superv. Course Description regardin. Able to apply knowledge to teacher(s) and external prof. members in the course. Si assignments, reports, and ex Very limited or no ability to and external professional tr members. Fails to satisfy th evaluation by teacher(s) and	isor(s) and team members in the course. g attendance, assignments, reports, and eve solve problems in the course work. Successional trainers. Establishes effective collat uccessfully fulfills the requirements set ouvaluation by teacher(s) and external professi solve problems in the course work. Fails to eight of the course work. Fails to establish effective collabor e requirements set out in the Course Descr	ainer(s). Establishes highly effe Successfully fulfills the require iluation by teacher(s), external t ssfully handles and carries out coration and communication wit tit in the Course Description ronal trainer(s), etc. handle or carry out the work a ation or communication with si	ctive collaboration and ments set out in the rainer(s), etc. the work assigned by the teacher(s) and tean regarding attendance assigned by teacher(s upervisor(s) and tean		
Communication- intensive Course Course Type	Pass Fail N Lecture-base	communication with superv. Course Description regardin. Able to apply knowledge to teacher(s) and external prof. members in the course. S assignments, reports, and ex Very limited or no ability to and external professional tr. members. Fails to satisfy th evaluation by teacher(s) and	isor(s) and team members in the course, gattendance, assignments, reports, and eve solve problems in the course work. Succesessional trainers. Establishes effective collat uccessfully fulfills the requirements set ouvaluation by teacher(s) and external professi solve problems in the course work. Fails to einer(s). Fails to establish effective collabor e requirements set out in the Course Descri external professional trainer(s), etc.	ainer(s). Establishes highly effe Successfully fulfills the require iluation by teacher(s), external t ssfully handles and carries out coration and communication wit tit in the Course Description ronal trainer(s), etc. handle or carry out the work a ation or communication with si	ctive collaboration an ements set out in the rainer(s), etc. the work assigned b th teacher(s) and tear regarding attendance assigned by teacher(s upervisor(s) and tear signments, reports, c		
Communication- intensive Course Course Type Course Teaching	Pass Fail N Lecture-base Activities	communication with superv. Course Description regardin. Able to apply knowledge to teacher(s) and external prof. members in the course. S assignments, reports, and ex Very limited or no ability to and external professional tr. members. Fails to satisfy th evaluation by teacher(s) and	isor(s) and team members in the course. g attendance, assignments, reports, and eve solve problems in the course work. Successional trainers. Establishes effective collat uccessfully fulfills the requirements set ouvaluation by teacher(s) and external professi solve problems in the course work. Fails to eight of the course work. Fails to establish effective collabor e requirements set out in the Course Descr	ainer(s). Establishes highly effe Successfully fulfills the require iluation by teacher(s), external t ssfully handles and carries out coration and communication wit tit in the Course Description ronal trainer(s), etc. handle or carry out the work a ation or communication with si	ctive collaboration an ements set out in the rainer(s), etc. the work assigned b th teacher(s) and tear regarding attendance assigned by teacher(s upervisor(s) and tean signments, reports, c		
Communication- intensive Course Course Type Course Teaching	Pass Fail  N Lecture-base Activities Lectures	communication with superv. Course Description regardin. Able to apply knowledge to teacher(s) and external prof. members in the course. S assignments, reports, and ex Very limited or no ability to and external professional tr. members. Fails to satisfy th evaluation by teacher(s) and	isor(s) and team members in the course, gattendance, assignments, reports, and eve solve problems in the course work. Succesessional trainers. Establishes effective collat uccessfully fulfills the requirements set ouvaluation by teacher(s) and external professi solve problems in the course work. Fails to einer(s). Fails to establish effective collabor e requirements set out in the Course Descri external professional trainer(s), etc.	ainer(s). Establishes highly effe Successfully fulfills the require iluation by teacher(s), external t ssfully handles and carries out coration and communication wit tit in the Course Description ronal trainer(s), etc. handle or carry out the work a ation or communication with si	nective collaboration and the collaboration		
Communication- intensive Course Course Type Course Teaching	Pass Fail  N Lecture-base Activities Lectures Tutorials	communication with superv. Course Description regardin. Able to apply knowledge to teacher(s) and external prof. members in the course. S. assignments, reports, and ex Very limited or no ability to and external professional tr. members. Fails to satisfy th evaluation by teacher(s) and	isor(s) and team members in the course, gattendance, assignments, reports, and eve solve problems in the course work. Succesessional trainers. Establishes effective collat uccessfully fulfills the requirements set ouvaluation by teacher(s) and external professi solve problems in the course work. Fails to einer(s). Fails to establish effective collabor e requirements set out in the Course Descri external professional trainer(s), etc.	ainer(s). Establishes highly effe Successfully fulfills the require iluation by teacher(s), external t ssfully handles and carries out coration and communication wit tit in the Course Description ronal trainer(s), etc. handle or carry out the work a ation or communication with si	nective collaboration and ments set out in the rainer(s), etc. the work assigned bith teacher(s) and tear egarding attendance assigned by teacher(supervisor(s) and tear signments, reports, collaboration of the work and tear signments, reports, collaboration of the work and the		
Communication- intensive Course Course Type Course Teaching	Pass Fail  N Lecture-base Activities Lectures Tutorials Project worl	communication with superv. Course Description regardin. Able to apply knowledge to teacher(s) and external prof. members in the course. S assignments, reports, and ex Very limited or no ability to and external professional tr. members. Fails to satisfy th evaluation by teacher(s) and	isor(s) and team members in the course, gattendance, assignments, reports, and eve solve problems in the course work. Succesessional trainers. Establishes effective collat uccessfully fulfills the requirements set ouvaluation by teacher(s) and external professi solve problems in the course work. Fails to einer(s). Fails to establish effective collabor e requirements set out in the Course Descri external professional trainer(s), etc.	ainer(s). Establishes highly effe Successfully fulfills the require iluation by teacher(s), external t ssfully handles and carries out coration and communication wit tit in the Course Description ronal trainer(s), etc. handle or carry out the work a ation or communication with si	nements set out in the rainer(s), etc. the work assigned by the teacher(s) and tear regarding attendance assigned by teacher(s) and tear regarding attendance assigned by teacher(supervisor(s) and tear signments, reports, comments, reports,		
Communication- intensive Course Course Type Course Teaching & Learning Activities	Pass Fail  N Lecture-base Activities Lectures Tutorials Project work Reading / S	communication with superv. Course Description regardin. Able to apply knowledge to teacher(s) and external prof. members in the course. S assignments, reports, and ex Very limited or no ability to and external professional tr. members. Fails to satisfy th evaluation by teacher(s) and ed course  C elf study	isor(s) and team members in the course. g attendance, assignments, reports, and eve solve problems in the course work. Successional trainers. Establishes effective collat uccessfully fulfills the requirements set ou valuation by teacher(s) and external professi solve problems in the course work. Fails to ainer(s). Fails to establish effective collabor e requirements set out in the Course Descriptional external professional trainer(s), etc.	ainer(s). Establishes highly effe Successfully fulfills the require iluation by teacher(s), external t suffered to the state of the state of the state of the sofully handles and carries out poration and communication with it in the Course Description real trainer(s), etc. handle or carry out the work a ration or communication with si iption regarding attendance, as	nements set out in the rainer(s), etc. the work assigned bith teacher(s) and tear regarding attendance assigned by teacher(s) and tear regarding attendance assigned by teacher(supervisor(s) and tear signments, reports, co		
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ENTR3001	Science-based innovation development (6 credits)	Academic Year	2021				
Offering Department	Faculty	Quota	24				
Course Co-ordinator	Dr M Kotaka, Biomedical Sciences (masayo@hku.hk)						
Teachers Involved	(Dr B B H Yuen,Biomedical Sciences) (Dr M Kotaka,Biomedical Sciences) (Mr J E Broer,Biomedical Sciences)						
Course Objectives	1. Stimulate students to contemplate how business opportunities can be generated from science and technology. 2. Teach students the process of translating scientific ideas to commercial products and/or services and the challenges therein. 3. Help students to understand the different regulatory requirements for science and technology based business opportunities, including the different stages of clinical trial required for biomedical-related products/ services. 4. Inspire students to identify potential business ideas from science and technology research and to synthesise a feasible action plan for a start-up company.						
Course Contents & Topics	Topics will include identification of business opportunities from science and technology, the stages involved in translation of science into a commercial product, understanding the challenges of translating scientific ideas into products, understanding the regulatory requirements for technology-based products.						
Course Learning	On successful completion of this course, students should be able to:						

	CLO 1 demonstrate an understanding on how science and technology can generate business opportunities					
	CLO 2 acquire knowledge of the process and stages involved in translating a scientific idea into a commercial product					
		entify the challenges enterate solutions to thos	ncountered in translating scientific ic e challenges	deas into product and u	nderstand how to	
	CLO 4 ha	ave a clear understand	ding of the different regulatory req different stages of clinical trials required			
		emonstrate the ability to	critically evaluate cases of science-ba	ased business success o	r failures in written	
	CLO 6 ev	valuate cutting-edge scie	ence and technology research to ider asible action plan to bring the scie digital aid			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in III	MT1611 and ENTR2001	, or already enrolled in these courses			
Offer in 2021 - 2022	Y 2nd	l sem Offer in 2022 - 2	2023 : Y	Examination	No Exam	
Grade Descriptors (A+ to F)	A	outcomes. S/he has shown	demonstrated a thorough understanding and the ability to apply knowledge to a wide range re organizational and presentation skills.			
	В	Candidate frequently demonstrated a substantial understanding and skills required for attaining at least most of the cour learning outcomes. S/he has shown the ability to apply knowledge to familiar and unfamiliar situations. S/he has demonstrate effective organizational and presentation skills.				
	С					
	Candidate demonstrated partial but limited understanding and skills required for attaining some of the course learning outcomes. Solutions to questions and problems contain unstructured but relevant observations. Candidate has shown marginal interest in the subject. S/he has demonstrated limited or barely effective organizational and presentation skills.					
		the subject. S/he has demor	nstrated limited or barely effective organization	al and presentation skills.	wn marginal interest in	
	Fail	the subject. S/he has demor	nstrated limited or barely effective organization no evidence of basic familiarity with the subject	al and presentation skills. t, nor demonstration of sufficier	wn marginal interest in	
	Fail N	the subject. S/he has demor	nstrated limited or barely effective organization	al and presentation skills. t, nor demonstration of sufficier	wn marginal interest in	
intensive Course	N	the subject. S/he has demor	nstrated limited or barely effective organization no evidence of basic familiarity with the subject	al and presentation skills. t, nor demonstration of sufficier	wn marginal interest in	
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intensive Course Course Type Course Teaching	N Lecture-ba	the subject. S/he has demoi Candidate showed little or r and course requirement. On ased course	nstrated limited or barely effective organizations no evidence of basic familiarity with the subject ganizational and presentation skills are minima	al and presentation skills. t, nor demonstration of sufficier	wn marginal interest in  at effort to basic project  No. of Hours	
intensive Course Course Type Course Teaching	N Lecture-ba Activities Lectures Project we	the subject. S/he has demoi Candidate showed little or r and course requirement. On ased course	nstrated limited or barely effective organizations no evidence of basic familiarity with the subject ganizational and presentation skills are minima	al and presentation skills. t, nor demonstration of sufficier	wn marginal interest in at effort to basic project No. of Hours 36	
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture-ba Activities Lectures Project we	the subject. S/he has demoi Candidate showed little or r and course requirement. On ased course ork	nstrated limited or barely effective organizations no evidence of basic familiarity with the subject ganizational and presentation skills are minima	al and presentation skills. t, nor demonstration of sufficier	No. of Hours 36 40 45 Assessment Methods to CLO	
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture-ba Activities Lectures Project w Reading /	the subject. S/he has demoi Candidate showed little or r and course requirement. On ased course	nstrated limited or barely effective organizations to evidence of basic familiarity with the subject ganizational and presentation skills are minima	al and presentation skills. t, nor demonstration of sufficier illy effective or ineffective.  Weighting in final	No. of Hours 36 40 45 Assessment Methods	
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	N Lecture-ba Activities Lectures Project w Reading / Methods  Assignme Entrepren Winning a	the subject. S/he has demoi Candidate showed little or r and course requirement. On ased course ork / Self study	nstrated limited or barely effective organizations or evidence of basic familiarity with the subject ganizational and presentation skills are minima    Details	al and presentation skills. t, nor demonstration of sufficier illy effective or ineffective.  Weighting in final course grade (%)  100  tures by Marc H. Meyer rt G. Cooper	No. of Hours 36 40 45 Assessment Methods to CLO Mapping CLO 1,2,3,4,5,6	
Communication- intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	N Lecture-ba Activities Lectures Project we Reading / Methods  Assignment Entreprent Winning a Regulator Online Art	the subject. S/he has demoi Candidate showed little or r and course requirement. On ased course  s  ork / Self study  ents  eurship: An Innovator's t New Products: Creatin y Affairs for Biomaterials ticles	nstrated limited or barely effective organizations to evidence of basic familiarity with the subject ganizational and presentation skills are minima    Details	al and presentation skills. t, nor demonstration of sufficier illy effective or ineffective.  Weighting in final course grade (%)  100  tures by Marc H. Meyer rt G. Cooper	No. of Hours 36 40 45 Assessment Methods to CLO Mapping CLO 1,2,3,4,5,6	

ENTR3002	Customer analysis and strategic marketing (6 credits)	Academic Year	2021			
Offering Department	Faculty	Quota	24			
Course Co-ordinator	Dr R Law, Faculty (rockylaw@hku.hk)					
Teachers Involved	(Dr R Law,Faculty of Science)					
Course Objectives	This course is to provide opportunity for:  1. Students to master techniques to identify customers' needs and market situations.  2. Students to learn how to define strategies to satisfy customers' needs and to capture market shares  3. Students to learn how to develop systematic approaches for commercializing an innovation from the result of analyzing the current market condition and customers' need.  4. Students to evaluate local and international cases on disruptive/market driven innovation.  5. Students to synthesize and implement their own approaches to invent for the need and develop a business proposal to commercialize such an innovation.					
Course Contents & Topics	This course focuses on data collection and analysis of market and customers' need, through which innovation and commercial opportunities could be identified together with systematic approaches addressing them. The students will learn about practical way of data collection and analysis and about how data-driven business decision will be made wisely. Local and international case studies on disruptive/market driven innovation will also be analyzed and evaluated.					
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 to master techniques of data collection and analysis particular for market and customer analysis					
	CLO 2 to acquire knowledge of interpretation of the result of market and customer analysis, and then to define a solution to address the need by an innovative idea/new product					
	CLO 3 to synthesize systematic approaches to commercialize an innovation with regard to the existing market condition and customers' need					
	CLO 4 to analyze local and international cases on disruptive/market driver	n innovation				
	CLO 5 to integrate principles discussed in this course via synthesizing and implementing systematic approaches to commercialize an innovation					

	CLO 6 t	6 to draft a business proposal				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in IIMT1611 and ENTR2001, or already enrolled in these courses					
Offer in 2021 - 2022	Y 2r	Y 2nd sem Offer in 2022 - 2023 : Y Examination No Exam				
Grade Descriptors (A+ to F)	A	outcomes. S/he has show	ntly demonstrated a thorough uwn the ability to apply knowledge ctive organizational and presenta	to a wide range of complex, fan		
	В		monstrated a substantial under has shown the ability to apply land presentation skills.			
	С	outcomes. Some of the	I general but incomplete unders responses are well organized, a more satisfactory level. S/he l	clear but with insufficient elab	oration - there	is significant room for
	D	Candidate demonstrated partial but limited understanding and skills required for attaining some of the course learning outcomes. Solutions to questions and problems contain unstructured but relevant observations. Candidate has shown marginal interest in the subject. S/he has demonstrated limited or barely effective organizational and presentation skills.				
	Fail					
Communication- intensive Course	N					
Course Type	Lecture-	based course				
Course Teaching	Activitie	es	Details			No. of Hours
& Learning Activities	Lectures	S				36
	Project work					48
	Reading	g / Self study				40
Assessment Methods and Weighting	Method	ls	Details	Weightin course g		Assessment Methods to CLO Mapping
	Assignm	nents		2	0	CLO 1,2,3,4
	Presenta			3	0	CLO 1,2,3,4,5,6
	Project r	reports	report	5	0	CLO 1,2,3,4,5,6
Required/recommended reading and	Business	n Start-Up by Eric Reis s Model Generation by	Alex Osterwalder			
online materials		, ,	n Thinking Transforms Org	ganizations and Inspires In	novation by	Tim Brown
Course Website	http://mc	oodle.hku.hk				

	Entrepre	neurship internship (6 credits) Acad	demic Year	2021			
Offering Department	Faculty	Quot	ta	24			
Course Co-ordinator	Dr R Law, F	aculty (rockylaw@hku.hk)					
Teachers Involved	(All academic staff in Faculty of Science,)						
Course Objectives	This course is to provide opportunity for students:  1. To practice what they learned related to entrepreneurship through prior university coursework in real-life work environment.  2. To acquire first-hand experience in industries for the preparation of their own business ventures.						
Course Contents & Topics	Students taking this course will work as an intern for at least 160 hours in at least 20 working days within the University or outside the University in a company (preferably technology based startup company). The internship may be arranged by the Faculty or obtained by students themselves.  1. Within the university: The student will be supervised by a staff member (Supervisor), working on a project or various tasks as instructed by the Supervisor.  2. Outside the university: The student will be supervised under a staff member of the external agency (the External Supervisor) and a staff member of the Faculty/School /Department of the student (the Internal Supervisor).						
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 to integrate and apply knowledge gained in coursework in a real-life setting  CLO 2 to experience the culture of a real organization and challenges encountered in entrepreneurship  CLO 3 to further improve problem-solving and collaborative skills in a real-life setting  CLO 4 to gain hand-on experience from external startup companies or internal research group about their daily operation and special activities that will help them to prepare for their own startup venture in the near future						
Pre-requisites and Co-requisites	Pass in ENTR3001 and ENTR3002 Students must be in their Year 3 study or beyond, as well as minoring in Science Entrepreneurship.						
and Impermissible		ade pe in their real of stady of peyona, as well as hillioning in econoc Eliac	cpronoursin	J.			
and Impermissible combinations)	Y Sum	, , ,	nination	No Exam			
and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors Distinction/Pass/Fail	Y Sum Distincti on	mer Offer in 2022 - 2023 : Y  Demonstrates excellent ability in applying knowledge to solve problems in the wighter performance in handling and carrying out the work required in the job or assigned by effective collaboration and communication with supervisor(s), colleagues, and clients in requirements set out in the Course Description regarding working hours, with excellent per and excellent evaluation by supervisor(s), etc.	mination orkplace. Den by supervisor(s in the job. Su erformance in w	No Exam nonstrates excellent ). Establishes highly ccessfully fulfills the ritten and oral report			
and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Distincti	Demonstrates excellent ability in applying knowledge to solve problems in the weperformance in handling and carrying out the work required in the job or assigned by effective collaboration and communication with supervisor(s), colleagues, and clients i requirements set out in the Course Description regarding working hours, with excellent per and excellent evaluation by supervisor(s), etc.  Able to apply knowledge to solve problems in the workplace. Successfully handles and car or assigned by supervisor(s). Establishes effective collaboration and communication we clients in the job. Successfully fulfills the requirements set out in the Course Description roral report, and evaluation by supervisor(s), etc. Students demonstrating excellent per awarded a grade of "Distinction".	nination orkplace. Den y supervisor(s in the job. Su rformance in w rries out the w with supervisor egarding worki rformance in to	No Exam nonstrates excellent ). Establishes highly ccessfully fulfills the ritten and oral report, ork required in the job (s), colleagues, and ng hours, written and the above would be			
and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Distincti on	mer Offer in 2022 - 2023 : Y  Demonstrates excellent ability in applying knowledge to solve problems in the well-defective collaboration and carrying out the work required in the job or assigned by effective collaboration and communication with supervisor(s), colleagues, and clients in requirements set out in the Course Description regarding working hours, with excellent per and excellent evaluation by supervisor(s), etc.  Able to apply knowledge to solve problems in the workplace. Successfully handles and carry or assigned by supervisor(s). Establishes effective collaboration and communication we clients in the job. Successfully fulfills the requirements set out in the Course Description or oral report, and evaluation by supervisor(s), etc. Students demonstrating excellent per supervisor(s).	mination orkplace. Den by supervisor(s in the job. Su orformance in w orries out the wo with supervisor egarding worki orformance in to out the work in h supervisor(s)	No Exam nonstrates excellent ). Establishes highly ccessfully fulfills the ritten and oral report ork required in the job (s), colleagues, and ng hours, written and the above would be equired in the job or other colleagues, or			
and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors Distinction/Pass/Fail	Distincti on Pass	Demonstrates excellent ability in applying knowledge to solve problems in the weperformance in handling and carrying out the work required in the job or assigned by effective collaboration and communication with supervisor(s), colleagues, and clients i requirements set out in the Course Description regarding working hours, with excellent per and excellent evaluation by supervisor(s), etc.  Able to apply knowledge to solve problems in the workplace. Successfully handles and car or assigned by supervisor(s). Establishes effective collaboration and communication we clients in the job. Successfully fulfills the requirements set out in the Course Description roral report, and evaluation by supervisor(s), etc. Students demonstrating excellent per awarded a grade of "Distinction".  Very limited or no ability to solve problems in the workplace. Fails to handle or carry of assigned by supervisor(s). Fails to establish effective collaboration or communication with clients in the job. Fails to satisfy the requirements set out in the Course Description regarders.	mination orkplace. Den by supervisor(s in the job. Su orformance in w orries out the wo with supervisor egarding worki orformance in to out the work in h supervisor(s)	No Exam nonstrates excellent ). Establishes highly ccessfully fulfills the ritten and oral report ork required in the job (s), colleagues, and ng hours, written and the above would be equired in the job or other colleagues, or			
and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors Distinction/Pass/Fail	Distincti on Pass Fail	Demonstrates excellent ability in applying knowledge to solve problems in the weperformance in handling and carrying out the work required in the job or assigned by effective collaboration and communication with supervisor(s), colleagues, and clients i requirements set out in the Course Description regarding working hours, with excellent per and excellent evaluation by supervisor(s), etc.  Able to apply knowledge to solve problems in the workplace. Successfully handles and car or assigned by supervisor(s). Establishes effective collaboration and communication we clients in the job. Successfully fulfills the requirements set out in the Course Description roral report, and evaluation by supervisor(s), etc. Students demonstrating excellent per awarded a grade of "Distinction".  Very limited or no ability to solve problems in the workplace. Fails to handle or carry of assigned by supervisor(s). Fails to establish effective collaboration or communication with clients in the job. Fails to satisfy the requirements set out in the Course Description regarders.	mination orkplace. Den by supervisor(s in the job. Su orformance in w orries out the wo with supervisor egarding worki orformance in to out the work in h supervisor(s)	No Exam nonstrates excellent ). Establishes highly ccessfully fulfills the ritten and oral report ork required in the job (s), colleagues, and ng hours, written and the above would be equired in the job or other colleagues, or			
and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Distincti on  Pass  Fail	Demonstrates excellent ability in applying knowledge to solve problems in the weperformance in handling and carrying out the work required in the job or assigned by effective collaboration and communication with supervisor(s), colleagues, and clients i requirements set out in the Course Description regarding working hours, with excellent per and excellent evaluation by supervisor(s), etc.  Able to apply knowledge to solve problems in the workplace. Successfully handles and car or assigned by supervisor(s). Establishes effective collaboration and communication we clients in the job. Successfully fulfills the requirements set out in the Course Description roral report, and evaluation by supervisor(s), etc. Students demonstrating excellent per awarded a grade of "Distinction".  Very limited or no ability to solve problems in the workplace. Fails to handle or carry of assigned by supervisor(s). Fails to establish effective collaboration or communication with clients in the job. Fails to satisfy the requirements set out in the Course Description regarders.	mination orkplace. Den by supervisor(s in the job. Su orformance in w orries out the wo with supervisor egarding worki orformance in to out the work in h supervisor(s)	No Exam nonstrates excellent ). Establishes highly ccessfully fulfills the ritten and oral report ork required in the job (s), colleagues, and ng hours, written and the above would be equired in the job or other colleagues, or			

	Internship work (or the equivalent of 4 weeks fulltime)	)	160			
	Reading / Self study			20		
	Assessment	Presentation		5		
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Oral presentation		30	CLO 1,2,3,4		
	Supervisor's feedback	A Standardized evaluation form will be provided to internal/external supervisor	20	CLO 1,2,3,4		
	Written report		50	CLO 1,2,3,4		
Required/recommended reading and online materials		Students will be briefed with materials appropriate to the individual internship assignment by the internship supervisor(s) and/or the corresponding Faculty members.				
Course Website	http://moodle.hku.hk					
Additional Course Information		udents are expected to work for at least 160 hours, supervised by a Faculty member.				

ENTR4999	Entrepre	eneurship projec	t (6 credits)	Academic Ye	ar 2021		
Offering Department	Faculty		,	Quota	24		
Course Co-ordinator		Faculty (rockylaw@	hku.hk)	, 3, 3 3			
Teachers Involved		mic staff in Faculty					
Course Objectives			ortunity for students to:				
	gained from proposals 2. Studer	<ol> <li>Apply entrepreneurship-related knowledge gained through prior university coursework and hand-on experiences gained from prior Internship course to carry out in-depth business potential evaluation and to develop start-up proposals.</li> <li>Students to further develop leadership and teamwork experience via collaboration in multi-disciplinary environments.</li> </ol>					
Course Contents & Topics	the super years of s and produ result from	This course is offered to students as the final course in the minor programme in Science Entrepreneurship. Under the supervision and guidance of an academic staff, students are to use the knowledge they have gained in all years of study to practice entrepreneurship. This can be achieved by conducting technology trend, market analysis and product identification for defining market-product fit solutions. Students are expected to participate, with the result from their hands-on experience in projects, competitions (such as the HKU DreamCatchers initiative, various Hackathon activities and "Challenge Cup" National Competition etc.) and to develop start-up companies					
Course Learning	On succes	ssful completion of the	his course, students should be ab	le to:			
Outcomes	CLO 1 to	integrate and apply	theoretical knowledge in a real-li	fe setting			
			ools to analyze real-life entreprer				
	CLO 4 to	build a team, with r	sentation, problem-solving and con members from different specialize usiness plan that is ready for fund	d areas, that is ready for busine			
Pre-requisites	Pass in El	NTR3001 and ENTR	3002	-			
(and Co-requisites and Impermissible combinations)	Students	must be in their Yea	r 3 study or beyond, as well as m	inoring in Science Entrepreneurs	ship.		
Offer in 2021 - 2022	Y 1st	sem Offer in 2022	! - 2023 : Y	Examination	No Exam		
Grade Descriptors	Α		ently demonstrated a thorough understa	anding and skills required for attaining	all the course learning		
(A+ to F)	outcomes. S/he has shown the ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. S/he has demonstrated highly effective organizational and presentation skills.  Candidate frequently demonstrated a substantial understanding and skills required for attaining at least most of the course learning outcomes. S/he has shown the ability to apply knowledge to familiar and unfamiliar situations. S/he has demonstrated effective organizational and presentation skills.  Candidate demonstrated general but incomplete understanding and skills required for attaining most of the course learning outcomes. Some of the responses are well organized, clear but with insufficient elaboration – there is significant room for improvement to achieve a more satisfactory level. S/he has demonstrated moderately effective organizational and presentation						
	skills.  Candidate demonstrated partial but limited understanding and skills required for attaining some of the course learning outcomes.  Solutions to questions and problems contain unstructured but relevant observations. Candidate has shown marginal interest in the subject. S/he has demonstrated limited or barely effective organizational and presentation skills.						
	rine subject. S/ne has demonstrated limited or barely effective organizational and presentation skills.  Fail Candidate showed little or no evidence of basic familiarity with the subject, nor demonstration of sufficient effort to basic project						
		and course requiremen	t. Organizational and presentation skills a	re minimally effective or ineffective.			
Communication- intensive Course	N						
Course Type		ised course	D. 4. 11.				
Course Teaching	Activities	3	Details		No. of Hours		
& Learning Activities	Meeting v	vith supervisor	Supervisor meet students in the beginning, middle and the end of this course for briefing and coaching purpose.		15		
		Self study	Students will be working on their projects with guidance from the supervisor to build a business proposal		120		
	Assessm	ent	Presentation		5		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Dissertati	on	Research report	60	CLO 1,2,3,4,5		
	Oral pres	entation		40	CLO 1,2,3,4,5		
Required/recommended	Students	Oral presentation 40 CLO 1,2,3,4,5 students will be briefed with materials appropriate to the project by the project supervisor(s).					
reading and online materials Course Website	http://moo	dle.hku.hk					

Students are to submit a written report or a business proposal of no more than 10,000 words, together with a presentation about their project.

SCNC1111		ic method and reaso	oning (6 credits)	Academic Yea	r 2021	
Offering Department	Faculty			Quota		
Course Co-ordinator		Lui, Faculty (lui2012@h	ku.hk)			
Teachers Involved		V Lui,Faculty of Science)				
Course Objectives	The objectives are to give students a holistic view of the science discipline in terms of its nature, concepts and impact on civilization and society; to equip students with basic skills of logical and quantitative reasoning; and to introduce to students mathematical and statistical methods for science studies and research.					
Course Contents & Topics	<ul><li>Demarc</li><li>Shared</li><li>Scientifi</li></ul>	e nature and methodolog ation between science ar features of the sciences c method				
	Part II: Q Topics se a. Mather - Foundar - Mathem - Guesstii - Differen - Linear a - Calculus - Fractals b. Statisti - Probabi - Probabi - Statistic - Confide - Hypothe - Decision - Statistic	uantitative reasoning elected from the following matics tion of mathematics latics and advancement clatical modelling - an introduction of mathematics and matrices and differential equation and Chaos  cs lity rules listic methods al inference nce intervals estimation esis testing naking with statistics al modelling, and use and malysis and Programming	ones, which are grouped under three of science - an introduction oduction as	e categories:		
		ing operations by using fo				
	- Managir					
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1 describe key aspects of scientific methodology  CLO 2 describe the key elements of the foundation of mathematics and statistics  CLO 3 identify the mathematics that underlies scientific problems  CLO 4 apply logical and quantitative reasoning to re-formulate both real life and scientific problems in mathematical terms, and to interpret their solutions					
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL (This cou	rse is compulsory for all	students taking a Science major offe dents should take this course in their		ence, except those	
Offer in 2021 - 2022	Y 1st	t sem 2nd sem Offer i	n 2022 - 2023 · Y	Examination	Dec May	
Grade Descriptors (A+ to F)	A					
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Carry out computations mostly in a careful and correct way, but commit some minor computational errors. Apply effective organizational and presentational skills.				
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Commit a number of minor computational errors. Apply moderately effective organizational and presentational skills.				
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcome. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to application of solve problems. Commit some substantial computational errors. Apply limited or barely effective organizational appresentational skills.			v limited ability to apply	
	Fail	of analytical and critical ab	ence of command of knowledge and skills rec illities, logical and coherent thinking. Show omputational errors. Organization and present	very little or no ability to app	ly knowledge to solve	
Communication- intensive Course	N					
Course Type		ased course	Dataila	ı	No. of the	
Course Teaching	Activitie		Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials				12	
	Reading	/ Self study			100	
Assessment Methods and Weighting	Methods	3	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignm		course work includes group projects (project plans, presentations and essays)	50	CLO 1,2,3,4	
	Examina	tion	2-hour examination	50	CLO 1,2,4	

Required/recommended reading and online materials	TBC
Additional Course Information	Candidates who have been admitted to Year 1 in 2020-21 (and thereafter) and have achieved any one of the following qualifications are exempted from taking SCNC1111. It is optional for them to take this course. Those who do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.  - Level 4 or above in Mathematics Extended Part Module 1 or 2 in the Hong Kong Diploma of Secondary Education (HKDSE)  - Level 5 or above in Mathematics Higher Level in International Baccalaureate (IB)  - Grade B or above in Mathematics and Further Mathematics in General Certificate of Education Advanced Level (GCEAL)  - Mathematics qualification in Gao Kao will be considered on a case-by-case basis

SCNC1112	Fundamentals of modern science	(6 credits)	Academic Year	-
Offering Department	Faculty		Quota	
Course Co-ordinator	Dr J C S Pun, Physics (jcspun@hku.hk)			
Teachers Involved	(Dr C Zheng,Biological Sciences) (Dr E K M Leung,Faculty of Science) (Dr H Y Au-Yeung,Chemistry) (Dr J C S Pun,Physics) (Dr L Ashton,Biological Sciences) (Dr M H Lee,Earth Sciences)			
Course Objectives	This course aims to provide students ar course adopts an integrated approach a biology, and focuses on the general pri describe the diverse phenomena and ob historical developments and the modern be introduced and highlighted. This cours activities to enhance the oral and writ developments of science.	and encompasses physics, astronor nciples and unifying concepts of sci- jects in the natural world. The funda frontiers, and the interconnectedness e is also designed as a Communicat ten literacy of students in effective	ny, earth sciences ence used in varion amental laws of ea is of different scien ion-intensive Cours	s, chemistry, and bus disciplines to ach discipline, the ce disciplines will se which includes
Course Contents & Topics	(1) Universal principles and unifying concount of Motion, force and gravity - Energy and Heat - Entropy and Order (2) Important reactions for the physical and Atoms and Molecules - Electronic configuration - Chemical bonds - Chemical reactions: acid-base, and reduced commended in the modynamics (3) The living world - Definition and origin of life - Molecules of life - Genomics and DNA; Genetics and inhered cells and systems - Evolution - Ecology and environment (4) Evolution in the physical world - Solid Earth, Earth's atmosphere and hyder carthy's motion in space - Planets and the Solar system	d the living world  x  itance  rosphere		
Course Learning Outcomes	Cosmology     On successful completion of this course, so CLO 1 acquire an understanding of the scientific inquiry methods, and the CLO 2 understand and be familiar with appreciate the diversity of difference perspectives on scientific issues CLO 4 critically and creatively appraise rection of the course	historical development of modern strole of science in the advancement of efundamental scientific principles and scientific disciplines and develop nucleotive dideas and established knowled an appreciation of sciences as related	of civilization over to d concepts nultidisciplinary and edge through writing to different Science	ime d interdisciplinary g ce Majors and as
Dro roquicitos		princing of a topic in science unough	aroup bresentation	10
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL (This course is compulsory for all student who are eligible for exemption. Students s	, ,	,	nce, except those
Offer in 2021 - 2022	Y 1st sem 2nd sem Offer in 2022	- 2023 : Y	Examination	Dec May
Grade Descriptors (A+ to F)	strong analytical and critical abilities wide range of complex, familiar and conclusions Apply highly effective org Demonstrate substantial command of learning outcomes. Show evidence of and some unfamiliar situations. Correpresentational skills.  C Demonstrate general but incomplete outcomes. Show evidence of some familiar situations. Mostly correct but effective organizational and presental D Demonstrate partial but limited common Show evidence of some coherent and	f a broad range of knowledge and skills requi analytical and critical abilities and logical think ct use of data of results to draw appropriate co command of knowledge and skills required analytical and critical abilities and logical think some erroneous use of data and results to dra	thought, and ability to a dresults to draw appropriate for attaining at leasing, and ability to apply inclusions. Apply effectiff for attaining most of king, and ability to apply w appropriate conclusioning some of the cours critical abilities. Show	apply knowledge to a opriate and insightful st most of the course knowledge to familiar rive organizational and the course learning y knowledge to most ons. Apply moderately se learning outcomes. limited ability to apply

	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning ou of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowle problems. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentation minimally effective or ineffective.						
Communication- intensive Course	Υ						
Course Type	Lecture-b	ased course					
Course Teaching	Activitie	s	Details		No. of Hours		
& Learning Activities	Lectures				33		
	Tutorials				10		
	Reading	/ Self study			102		
	Assessm	nent	3 hour in-class quiz		3		
Assessment Methods and Weighting	Methods	5	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignm	ents	tutorials and homework	20	CLO 1,2,3,4,5,6		
	Examination			45	CLO 1,2,3,4		
	Presenta	ation	project presentation	20	CLO 1,2,3,4,5,6		
	Test		3 quizzes	15	CLO 1,2,3,4		
Required/recommended reading and online materials	Reference Biology: 0 Chemistr	Textbook: Sciences: An Integrated Approach by Trefil & Hazen 7th Edition (2013, Wiley) References: Integrated Science by Tillery, Enger, & Ross 5th Edition (2011, McGrawHill) Biology: Concepts and Connections by Campbell, Mitchell, & Reece 2nd Edition (1999, Benjamin/Cummings) Chemistry: An Atoms First Approach by Zumdahl & Zumdahl (2012 Cengage)					
Additional Course Information	following do not tal - Level 4 - Level 5 - Grade (GCEAL)	Candidates who have been admitted to Year 1 in 2021-22 (and thereafter) and have achieved any one of t following qualifications are exempted from taking SCNC1112. It is optional for them to take this course. Those we do not take this course should take a 6-credit disciplinary elective course of the science major in lieu.  - Level 4 or above in Biology, Chemistry, and Physics in the Hong Kong Diploma of Secondary Education (HKDS)  - Level 5 or above in Biology, Chemistry, and Physics Higher Level in International Baccalaureate (IB)  - Grade B or above in Biology, Chemistry, and Physics in General Certificate of Education Advanced Level					

SCNC1113	The big history of our planet: a scientific perspective on everything that has ever happened (6 credits)	Academic Year	2021		
Offering Department	Faculty	Quota	50		
Course Co-ordinator	Dr W M Y Cheung, Faculty (willmyc@hku.hk)	4.0.0			
Teachers Involved	(Dr H F Yu,Physics) (Dr W M Y Cheung,Faculty of Science) (Prof Q A Parker,Physics)				
Course Objectives	By exploring the Big History of our planet: from the Big Bang of the Univer substances, through the evolution of various species on Earth, to the establ course aims to:  (1) discuss the process of scientific discovery, and how our current be established;  (2) develop students' understanding of the multi-disciplinary nature of science (3) develop students' understanding of the importance of science and tec policies in the society, and solving the future problems of our planet;  (4) increase scientific literacy.	ishment of modern hu dy of knowledge ab e;	uman society, the		
Course Contents & Topics	Part I: From the Cosmos to the Atom Main theme: How fundamental interactions between the building blocks of n know it; Topics include: Big bang, nucleosynthesis, cosmic expansion, cooling of the equilibrium of our planet Earth.  Part II: From the Atom to Life Main theme: How we understand the transition from non-living matter to the of Topics include: Origin of life, evolution, natural selection and tree of life.  Part III: From Life to Mind to Society Main theme: How our modern civilised society emerges through the develop of knowledge; how science, technology, human society and environment influ Topics include: Neural network and the emergence of intelligence, historica role of science in human civilisation and the contemporary world.	e universe, star formativersified biosphere of the original original	tion, and thermaton earth today;		
Course Learning	Part IV: Looking into the Future Main theme: Outlook on the future of science, technology, human society a faced by humankind that could be addressed by science and technology; Topics include: Students will attend one of several parallel modules on topic technology, climate change, energy crisis, bioethics and artificial intelligence. On successful completion of this course, students should be able to:	s that suit their intere	· ·		
Outcomes	CLO 1 appreciate and elaborate on the significance of major events in the development and formation of our Universe, our Earth system and our modern society				
	<ul> <li>CLO 2 explain, with some level of depth and details, how a number of major theories allows us to understand the workings of the world</li> <li>CLO 3 understand how different science disciplines fit and emerge from one another as a collective effort of the humankind to understand Nature</li> <li>CLO 4 critically assess the mutual influence between science and human society, the role of science in our society as well as the making of science policy in our local region</li> <li>CLO 5 evaluate some of the major challenges faced by humankind, and discuss solutions from a multi-disciplinary perspective</li> <li>CLO 6 test claims and engage in historical analysis based on theories and practices from multiple disciplines</li> </ul>				

Pre-requisites (and Co-requisites and Impermissible	Level 3 or above in at least one science subject at the pre-university level (HKDSE Physics, Chemistry, Biology Combined/Integrated Science or equivalent)  This course is not offered to students in the 6901 BSc or 6119 BEd&BSc programmes.					
combinations)	THIS COU	ise is not offered to sit	denis in the 0001 Bod of 0113 Beddboc p	orogrammos.		
Offer in 2021 - 2022	N O	ffer in 2022 - 2023 : Y		Examination		
Grade Descriptors (A+ to F)	A	strong analytical and crit	nastery of extensive knowledge and skills required fo ical abilities and logical thinking, and ability to apply k aputations carefully and correctly. Apply highly effective	nowledge to a wide range of	familiar and unfamilia	
	В	, , , , , , , , , , , , , , , , , , , ,				
	С					
	D	Show evidence of some	limited command of knowledge and skills required for coherent and logical thinking, but with limited analytic lems. Commit some substantial computational errors.	cal and critical abilities. Show	limited ability to apply	
	Fail	of analytical and critica	evidence of command of knowledge and skills require I abilities, logical and coherent thinking. Show ven us computational errors. Organization and presentatio	y little or no ability to apply	knowledge to solve	
Communication- intensive Course	N			,		
Course Type	Lecture-	based course				
Course Teaching	Activities Details			No. of Hours		
& Learning Activities	Lectures	3			36	
	Tutorials				12	
	Reading	g / Self study			100	
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignn	nents	About 3 reading assignments will be given. Students will then be assessed in various forms such as drawing mind maps, short quizzes or reflective journals.	40	CLO 1,2,3,4,5,6	
	Present	ation	Tutorial participation	10	CLO 1,2,3,4,5,6	
	Project	reports		30	CLO 1,3,4,5,6	
	Test			20	CLO 1,2,3,4,6	
Required/recommended reading and online materials	Charles Eric R. k Fred Spi David C Humanit					

SCNC2121	Sustainable food production (6 credits)	Academic Year	2021
Offering Department	Faculty	Quota	32
Course Co-ordinator	Dr H S El-Nezami, Biological Sciences (elnezami@hku.hk)		
Teachers Involved	(Dr DeLisa Lewis,UBC Faculty of Land and Food Systems) (Dr H S El-Nezami,Biological Sciences)		
Course Objectives	This course is designed to provide students with the opportunity to exper campus farming operation, and to make connections between the eco communities surrounding the farm. Students will participate in plenary so lecturers from the UBC Faculty of Land and Food Systems, in guided campus, and in a variety of seasonal, hands-on farming activities.	systems that nourish the ssions with course instr	e thriving, urban uctors and guest
Course Contents & Topics	The MacMillan building, home of the UBC Faculty of Land and Food sessions, guest speaker lectures, and morning group discussion session site of the majority of farming activities, including afternoon group di Saturdays. Students will have a chance to explore the UBC campus sorchard garden, the world-class CIRS green building, Place Vanier, hor Golieb, and the wiggle worm project in the Student Union Building/SUB. two the Vancouver Farmers' Market and to Granville Island Public M marketing systems and the regionally grounded food system context.	ns. The south campus fa iscussions, harvest Frid ustainability hot-spots, ii me of an innovative car Students will also ventu	rm in UBC is the ays and market ncluding the LFS npus chef, Steve ure off-campus to
	The main approach to learning with this course is student-centered lear course learning objectives, students are expected to attend and particip discussions and the group oral presentation, and to complete a series main course themes-soils, biodiversity, seeds, marketing.	ate in all sessions, to co	ntribute to group
Course Learning	On successful completion of this course, students should be able to:		
Outcomes	CLO 1 connect underlying agroecosystem concepts and soil science ful of sustainable farming	ndamentals with principl	es and practices
	CLO 2 observe and compare multiple models of agricultural food product	tion in an urban and cam	pus farm setting
	CLO 3 identify multiple strategies for creating on-farm biodiversity		
	CLO 4 demonstrate a basic understanding of composting fundamentals		
	CLO 5 demonstrate the ability to perform a select set of basic crop main techniques in a sustainable campus farm setting	ntenance, harvest, wash	ing, and packing
	CLO 6 demonstrate best practices with post-harvest handling and food s	afety protocols	

Pre-requisites	Students	are expected to have	passed at least 30 credits of level 1 and/	or level 2 science cou	rses. Students will	
(and Co-requisites	also need	d to pass an interview ir	n order to be enrolled in the course.			
and Impermissible						
combinations)	N 01	r : 0000 0000 V		F		
Offer in 2021 - 2022		fer in 2022 - 2023 : Y		Examination		
Grade Descriptors (A+ to F)	A	Ability to perform crop maintenance, harvest, washing, and packing in a sustainable campus farm setting. Ability to demonstrate solid team-based skills for performance of fieldwork, and distinct performance in different assessment components. Ability to synthesize the lessons learned during the course and articulate individual learning objectives for further studies in agriculture, food and human health.				
	В	Clear understanding of the basics from sustainable farming to marketing strategies used by sustainable farming operations. Ability to perform crop maintenance, harvest, washing, and packing in a sustainable campus farm setting. Ability to demonstrate solid team-based skills for performance of fieldwork, and distinct performance in different assessment components.				
	С	Understanding of the basics from sustainable farming to marketing strategies used by sustainable farming operations. Ability to perform crop maintenance, harvest, washing, and packing in a sustainable campus farm setting. Satisfactory demonstration of team-based skills for performance of fieldwork, and satisfactory performance in different assessment components.				
	D	different assessment com			• .	
	Fail	Fail to follow the basics of	sustainable farming as demonstrated by unsatisfact	tory performance in assignment	ents and/or fieldwork.	
Communication-	N					
intensive Course	E: 1:					
Course Type	Field can	•				
Course Teaching	Activitie		Details		No. of Hours	
& Learning Activities	Lectures				20	
	Field work		One on discounting / Desired		50 10	
	Presentation Reading / Self study		Group discussion / Project		50	
	Assessm	•			30	
Assessment Methods	Methods		Details	Mainhtine in final		
and Weighting	Wiethous	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignm	ents	To be announced by UBC Faculty of Land and Food Systems	40	CLO 1,2,4,5	
	Report		Students will divided into groups of 3-4. Each group will submit a 7-10 pages report (not including the references). Please refer to Remarks for format requirements.	60	CLO 3,5,6	
Required/recommended	UBC Fac	ulty of Land and Food	Systems will give reading materials to stud	lents.		
reading and online materials		•				
Course Website	http://ww	w.scifac.hku.hk/news/b	sc/ubc-summer-course			
Additional Course Information	(prices to This cour Enrolmer manually This cour Remarks Students	be announced). se will be offered subject of this course is not by the Faculty after appears is taught by staff in the subject of the subject	cover their own travel costs and course out to a minimum enrollment number and a st conducted via the online course selector proval has been obtained from the course UBC and the end of trip report is graded be sof 3-4. Each group will submit a 7-10 page (12 points), single space and 2 cm markets.	availability of teachers. ction system. Students coordinator. y Dr H S El-Nezami. ges report (not includir	s will be enrolled	
	summariz food safe	ze the group HACCP pl ety issues. The marking	an, issues, problems and approaches and gritteria are the scientific quality and clear esenting 12-15 minutes on the topic of the	I suggestions to addres ir identification of the is	ss any farm related	

SCNC2122	Marine life science: a North East Pacific perspective (6 credits)	Academic Year	2021
Offering Department	Faculty	Quota	32
Course Co-ordinator	Dr T Vengatesen, Biological Sciences (rajan@hku.hk)		
Teachers Involved	(Dr T Vengatesen,Biological Sciences) (Prof G A Williams,Biological Sciences) (Prof R S S Wu,Biological Sciences) (Prof S Kwok,Earth Sciences)		
Course Objectives	Marine Life Science is an integrated study of how the oceans influence large biology through biophysical interactions. By studying the temperate cold waters will learn marine habitats as habitable planet, to appreciate the dynamics or interactions between the physical and biological components, fishery, and the sto human. This course will provide an excellent opportunity for students to expet the other side of the Pacific.	s of the NE Pacific f marine biodivers services the coasta	Ocean, students ity, the complex oceans provide
Course Contents & Topics	Lectures from both HKU and UBC teachers will introduce 'marine life sciena bundance and distribution of species, productivity, coastal pollution, fisheries. The course will also introduce the commercial aspects of marine life, i.e. a change mitigation through management of coastal ecosystems. All these lectory series of field observations, presentations from guest lecturers and group discopportunity to touch and learn about Canada's wonderful marine life diversity northern Vancouver Fish Hatchery. Students will be learning Canada's coastal the Marina (Reed point marina) and the Sea-grass habitat. There will also be intertidal zone, exposed and protected coastal habitats, sandy beaches and Marine biodiversity survey techniques and methods of studying marine life in the will be exposed to a different learning environment involving not only HKU te teachers and students, bringing diverse range of expertise, cultures, and learning	s, aquaculture and eel-grass, aquacultures will be disc ussions. There will y in the Vancouve plankton biodivers several opportuniti estuaries in the V e field will be emphachers and studer	climate change. ture and climate ussed through a I be an excellent r Aquarium, and ity through vising es to explore the ancouver Island. hasized. Students to the state of the

	On succe		e diversity, dynamic interactions and course, students should be able to:				
Course Learning Outcomes				nahitahle nlanet			
outoomoo		CLO 1 understand the basics of marine life science and the marine habitable planet CLO 2 explain the major types, causes, and effects of marine threats such as pollution, overfishing, global					
			dification, and invasive species, as				
			unities and ecosystem services				
			etween coastal marine biodiversity a	and harbors in Hong Kong	and Canada		
			y marine biodiversity and ecosystem	0 0			
		the North Pacific coastal ecosystems					
Pre-requisites	Students	are expected to have	passed at least 30 credits of level 1	and/or level 2 science co	ourses. Students wil		
(and Co-requisites and Impermissible combinations)	also need	so need to pass an interview in order to be enrolled in the course.					
Offer in 2021 - 2022	N Off	er in 2022 - 2023 : Y		Examination			
Grade Descriptors (A+ to F)	A	tropical Hong Kong is diff their particular environment why the diversity of marine	wledge in basics of marine science and clea erent from the North Pacific coastal areas. A its. Showing strong abilities, and logical thinki e life and their habitats are so important to hur ange, pollution and habitat change will affect i	Ability to explain how marine orging, with evidence of original thoman society. Independent critiqu	ganisms have adapted to ought, to examine reasons ue on how human induced		
	В	Clear understanding of the environments. Knowing the human society. Knowing	e basics of marine science. Ability to explain e common views on the reasons why the div the common views on how human induced ife, its diversity and their ecosystem services.	n how marine organisms have a ersity of marine life and their ha If threats such as climate chan	adapted to their particular bitats are so important to		
	С	Demonstrate partial and coastal ecosystem service Knowing the common view Knowing the common view	all and limited command of knowledge and understanding of the basics of marine science, biodiversity and services. Develop little ability to explain how marine organisms have adapted to their particular environments. non views on the reasons why the diversity of marine life and their habitats are so important to human society. mon views on how human induced threats such as climate change, pollution and habitat change will affect risity and their ecosystem services.				
	Mowing some of the basics of marine science. Developing ability to explain how marine organisms have adapted to their particular environments.						
	Fail	Fail to follow the basics of	marine science and/or how marine organisms	s have adapted to their particular	r environments.		
Communication- intensive Course	N	·					
		iold comps					
Course Type	Field cam	ps					
Course Type Course Teaching	Field cam  Activities	•	Details		No. of Hours		
Course Type Course Teaching		•	Details 10 sessions x 2.5 hours		No. of Hours 25		
Course Type Course Teaching	Activities	S		t 5 to 6 field study			
Course Type Course Teaching	Activities Lectures	k	10 sessions x 2.5 hours	,	25		
Course Type Course Teaching	Activities Lectures Field wor	k	10 sessions x 2.5 hours Field observation and work: about Group discussion / Project:	,	25 36		
Course Type Course Teaching & Learning Activities Assessment Methods	Activities Lectures Field wor	k tion / Self study	10 sessions x 2.5 hours Field observation and work: about Group discussion / Project:	,	25 36 10		
Course Type Course Teaching & Learning Activities Assessment Methods	Activities Lectures Field wor Presenta	k tion / Self study	10 sessions x 2.5 hours Field observation and work: about Group discussion / Project: 1 presentation	1 group project with  Weighting in final	25 36 10 70 Assessment Methods		
Course Type Course Teaching & Learning Activities Assessment Methods	Activities Lectures Field wor Presenta Reading Methods	k tion / Self study	10 sessions x 2.5 hours Field observation and work: about Group discussion / Project: for presentation  Details  Group project work (30-mins	1 group project with  Weighting in final course grade (%)	25 36 10 70 Assessment Methods to CLO Mapping		
Course Type Course Teaching & Learning Activities Assessment Methods	Activities Lectures Field wor Presenta Reading Methods	k tion / Self study	10 sessions x 2.5 hours Field observation and work: about Group discussion / Project: for presentation  Details  Group project work (30-mins presentation)	Weighting in final course grade (%)	25 36 10 70 Assessment Methods to CLO Mapping		
Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Activities Lectures Field wor Presenta Reading Methods  Assignme Report Test	k tion / Self study	10 sessions x 2.5 hours Field observation and work: about Group discussion / Project: or presentation  Details  Group project work (30-mins presentation) 2-hour written examination Field observation (group activities & reports)	Weighting in final course grade (%)  25 50	25 36 10 70 Assessment Methods to CLO Mapping CLO 2 CLO 1,4		
Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	Activities Lectures Field wor Presenta Reading Methods  Assignme Report Test Reference	k tion / Self study ents e reading materials will	10 sessions x 2.5 hours Field observation and work: about Group discussion / Project: or presentation  Details  Group project work (30-mins presentation) 2-hour written examination Field observation (group activities & reports)	Weighting in final course grade (%)  25 50	25 36 10 70 Assessment Methods to CLO Mapping CLO 2 CLO 1,4		
Course Type Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials Course Website Additional Course	Activities Lectures Field wor Presenta Reading Methods  Assignme Report Test Reference	k tion / Self study ents e reading materials will v.scifac.hku.hk/news/ba	10 sessions x 2.5 hours Field observation and work: about Group discussion / Project: operation  Details  Group project work (30-mins presentation) 2-hour written examination Field observation (group activities & reports) be put on Moodle.	Weighting in final course grade (%)  25  50  25	25 36 10 70 Assessment Methods to CLO Mapping CLO 2 CLO 1,4 CLO 3,4		

SCNC3111	Frontiers of science honours seminar course (6 credits)	Academic Year	2021
Offering Department	Faculty	Quota	120
Course Co-ordinator	Dr R K W Lui, Faculty (lui2012@hku.hk)		
Teachers Involved	(Dr C Zheng,Biological Sciences) (Dr D Yu,Faculty of Science) (Dr E K M Leung,Faculty of Science) (Dr R K W Lui,Faculty of Science)		
Course Objectives	To introduce the research being done by our Faculty's professors To broaden and enrich students' scientific knowledge in and outside of their of To foster intellectual discussions between our research professors and studer To observe how research is done and note the thinking processes and paths t To enhance students' awareness of the importance of science to solve some of To collaborate with and learn from peers from different academic backgrounds To develop essential written and spoken communication skills To serve as a potential mentor-mentee matching platform for faculty members To develop an awareness of research ethics	its hat lead to scientific of the problems facir in a scientific settin	ng the society
Course Contents & Topics	Professors from different departments will be featured in the honours semin- latest research with students. The topics will span the areas of Biological S Physics, as well as Mathematics/Statistics & Actuarial science. In addition, th for conducting and communicating research will also be introduced: Introduc Scientific Journals and/or Decoding a Scientific Paper and/or Effective Command Poster Presentations).	ciences, Chemistry e following topics to ction to Different Se	Earth Sciences, prepare students arch Engines for
Course Learning Outcomes	On successful completion of this course, students should be able to:  CLO 1   describe and discuss in an informed manner the fields of research of CLO 2   identify how professors with different scientific training solve their research		h professors

	II CLO 3	apply literature search ski	Ils to identify and develop a research to	pic				
			tific writing and presentation skills					
	CLO 5 demonstrate interpersonal skills in collaborating with their peers in a scientific setting							
	CLO 6 devise a research proposal and evaluate their peers' works							
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in a level 2 science course. The course is for Science students only . Students who participated or will participate in ORF/SRF must take this course.							
Offer in 2021 - 2022	Y 1	st sem Offer in 2022 - 20	023 : Y	Examination	No Exam			
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, and ability to apply knowledge to a wide range of familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.						
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the coulearning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiand some unfamiliar situations. Apply effective organizational and presentational skills.						
	С	outcomes. Show evidence	ncomplete command of knowledge and skills of some analytical and critical abilities and logi derately effective organizational and presentatio	cal thinking, and ability to app				
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.						
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.							
Communication- intensive Course	N		·					
Course Type	Lecture	-based course		Lecture-based course				
Course Teaching								
course reaching	Activit	ies	Details		No. of Hours			
	Activiti Lecture		Details		No. of Hours			
•		es .	Details					
•	Lecture	es .	Details		36			
& Learning Activities  Assessment Methods	Lecture	es ls g / Self study	Details	Weighting in final course grade (%)	36 12			
& Learning Activities  Assessment Methods	Lecture Tutoria Readin	es ls g / Self study ds	Details  A series of writing and reflection assignments will be given	• •	36 12 100 Assessment Methods to CLO			
& Learning Activities  Assessment Methods	Lecture Tutoria Readin Method	es ls g / Self study ds	Details  A series of writing and reflection	course grade (%)	36 12 100 Assessment Methods to CLO Mapping			
Course Teaching & Learning Activities  Assessment Methods and Weighting	Lecture Tutorial Readin Method	es ls g / Self study ds ments	Details  A series of writing and reflection assignments will be given Students will give a 30-minute group presentation during the last	course grade (%)	36 12 100 Assessment Methods to CLO Mapping CLO 1,2,4			

STAT1005	science	al skills for undergraduates: foundations of data (6 credits)	Academic Yea	r 2021		
Offering Department		& Actuarial Science	Quota	210		
Course Co-ordinator	Dr A S M I	Lau, Statistics & Actuarial Science (adelalau@hku.hk)				
Teachers Involved	(Dr R Luo,	(Dr A S M Lau, Statistics & Actuarial Science) (Dr R Luo, Computer Science) (Dr Y Huang, Statistics & Actuarial Science)				
Course Objectives		e introduces basic concepts and methodology of data scien	ce to junior undergradu	ate students. The		
Jourse Objectives		s designed at a level appropriate for all undergraduate stude				
		will engage in a full data work-flow including collaborative da of data science topics, from initial investigation and data acqui				
	the purpos prediction	y, the course provides exposure to different data types and so se of transforming them to a format suitable for analysis. It in and inference. Case studies involving less-manicured data an	troduces elementary not	ions in estimation		
Course Contents		itical abilities of the students.				
& Topics	* Overvie	introduction to data science www.with selected case studies. General discussion on original of tools for their analysis.	s and forms of data, ass	sociated question		
	* Data s cleaning/e Environme	nagement and exploration ources, data collection and its impact on visualization, mod xtraction; Quick introduction to high level programming ent (IDE) (Python, R); Exploratory Data Analysis (EDA) ns of data; Data visualization	language and Integrat	ed Development		
		ements on programming;	historyoma asymplaticy			
	* Statistics (1): model for randomness, random variables, distributions, histograms, correlations.  * Statistics (2): independent sample, estimation of mean and variance, confidence interval, hypothesis to with p-value.  * Statistics (3): regression models, forecasting, simple time series, method of classification.					
Course Learning		esful completion of this course, students should be able to:				
Outcomes	CLO 1 E	CLO 1 Explore and wrangle over data; summarize and visualize data CLO 2 Formulae problems and bring elementary concepts in estimation, prediction, and inference to bear CLO 3 Write basic functions and simple data analysis codes using state-of-art computing software				
Pre-requisites (and Co-requisites and Impermissible combinations)	Not for Ye Not for Ye and	idents who have passed or already enrolled in any of the follow ar 2 or above BSc(ActuarSc) and BEng(CompSc) students; are 2 or above students majoring in Computer Science/Deciser 4 or above students from any curriculum.	nd T			
Offer in 2021 - 2022		sem Offer in 2022 - 2023 : Y	Examination	No Exam		
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive knowle learning outcomes. Show strong analytical and critical abilities and logical to apply knowledge to a wide range of complex, familiar and unfamiliar	edge and skills required for a thinking, with evidence of origi	ttaining all the course		
	В	presentational skills.  Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the cours learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiand some unfamiliar situations. Apply effective organizational and presentational skills.				
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.				
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack				
		knowledge to solve problems. Apply limited or barely effective organizational	rtical and critical abilities. Show Il and presentational skills.	limited ability to apply		
Zommunicatio-	Fail	knowledge to solve problems. Apply limited or barely effective organizational	rtical and critical abilities. Show il and presentational skills. iired for attaining the course le ery little or no ability to appl	v limited ability to apply arning outcomes. Lack		
ntensive Course	Fail N	knowledge to solve problems. Apply limited or barely effective organizational Demonstrate little or no evidence of command of knowledge and skills requor analytical and critical abilities, logical and coherent thinking. Show we problems. Organization and presentational skills are minimally effective or in	rtical and critical abilities. Show il and presentational skills. iired for attaining the course le ery little or no ability to appl	v limited ability to apply arning outcomes. Lack		
ntensive Course Course Type	Fail N Lecture wi	knowledge to solve problems. Apply limited or barely effective organizational Demonstrate little or no evidence of command of knowledge and skills requor of analytical and critical abilities, logical and coherent thinking. Show we problems. Organization and presentational skills are minimally effective or in the laboratory component course	rtical and critical abilities. Show il and presentational skills. iired for attaining the course le ery little or no ability to appl	v limited abīlity to apply arning outcomes. Lack y knowledge to solve		
ntensive Course Course Type Course Teaching	Fail  N  Lecture wi  Activities	knowledge to solve problems. Apply limited or barely effective organizational Demonstrate little or no evidence of command of knowledge and skills requor of analytical and critical abilities, logical and coherent thinking. Show we problems. Organization and presentational skills are minimally effective or in the laboratory component course	rtical and critical abilities. Show il and presentational skills. iired for attaining the course le ery little or no ability to appl	v limited ability to apply arning outcomes. Lack y knowledge to solve No. of Hours		
ntensive Course Course Type Course Teaching	Fail  N  Lecture wi  Activities Lectures	knowledge to solve problems. Apply limited or barely effective organizational Demonstrate little or no evidence of command of knowledge and skills requ of analytical and critical abilities, logical and coherent thinking. Show we problems. Organization and presentational skills are minimally effective or in the laboratory component course  Details	rtical and critical abilities. Show il and presentational skills. iired for attaining the course le ery little or no ability to appl	w limited ability to apply arning outcomes. Lack y knowledge to solve No. of Hours 36		
ntensive Course Course Type Course Teaching	Fail  N  Lecture wi  Activities Lectures Project we	knowledge to solve problems. Apply limited or barely effective organizational Demonstrate little or no evidence of command of knowledge and skills requ of analytical and critical abilities, logical and coherent thinking. Show we problems. Organization and presentational skills are minimally effective or in the laboratory component course  Details	rtical and critical abilities. Show il and presentational skills. iired for attaining the course le ery little or no ability to appl	w limited ability to apply arning outcomes. Lack y knowledge to solve No. of Hours 36 20		
ntensive Course Course Type Course Teaching	Fail  N  Lecture wi  Activities  Lectures  Project wo Tutorials	knowledge to solve problems. Apply limited or barely effective organizational Demonstrate little or no evidence of command of knowledge and skills required for analytical and critical abilities, logical and coherent thinking. Show or problems. Organization and presentational skills are minimally effective or in the laboratory component course  Details  Details	rtical and critical abilities. Show il and presentational skills. iired for attaining the course le ery little or no ability to appl	w limited ability to apply arning outcomes. Lack y knowledge to solve No. of Hours  36  20  12		
ntensive Course Course Type Course Teaching	Fail  N  Lecture wi  Activities  Lectures  Project wo Tutorials  Reading /	knowledge to solve problems. Apply limited or barely effective organizational Demonstrate little or no evidence of command of knowledge and skills requoted analytical and critical abilities, logical and coherent thinking. Show we problems. Organization and presentational skills are minimally effective or in the laboratory component course  Details  Self study	rtical and critical abilities. Show il and presentational skills. iired for attaining the course le ery little or no ability to appl	No. of Hours  36  20  12  40		
Communication- intensive Course Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	Fail  N  Lecture wi  Activities  Lectures  Project wo Tutorials	knowledge to solve problems. Apply limited or barely effective organizational Demonstrate little or no evidence of command of knowledge and skills requoted analytical and critical abilities, logical and coherent thinking. Show we problems. Organization and presentational skills are minimally effective or in the laboratory component course  Details  Self study	rtical and critical abilities. Show il and presentational skills. iired for attaining the course le ery little or no ability to appl	No. of Hours 36 20 12 40 20 Assessment Methods		
ntensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail  N  Lecture wi Activities Lectures Project wo Tutorials Reading / Assessme	knowledge to solve problems. Apply limited or barely effective organizational Demonstrate little or no evidence of command of knowledge and skills required from the command of knowledge and skills required from the command of knowledge and skills remained from the command of knowledge and skills remained from the command of knowledge and skills are minimally effective or in the laboratory component course from the course from	tical and critical abilities. Show all and presentational skills. I wired for attaining the course leary little or no ability to applied to the course leary little or no ability to applied to the course leary little or no ability to applied to the course leary little or no ability to applied to the course leave	No. of Hours  36 20 12 40 Assessment		
ntensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail  N  Lecture wi Activities Lectures Project we Tutorials Reading / Assessme Methods  Assignme	knowledge to solve problems. Apply limited or barely effective organizational Demonstrate little or no evidence of command of knowledge and skills required for analytical and critical abilities, logical and coherent thinking. Show we problems. Organization and presentational skills are minimally effective or in the laboratory component course to be a better the laboratory component course.  Details  Details  Written / programming; class discussions; quizzes	tical and critical abilities. Show all and presentational skills. It interests the course leaves the c	No. of Hours 36 20 112 40 20 Assessment Methods to CLO Mapping CLO 1,2,3		
ntensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail  N  Lecture wi Activities Lectures Project wo Tutorials Reading / Assessme Methods	knowledge to solve problems. Apply limited or barely effective organizational Demonstrate little or no evidence of command of knowledge and skills required for analytical and critical abilities, logical and coherent thinking. Show we problems. Organization and presentational skills are minimally effective or in the laboratory component course to be a better the laboratory component course.  Details  Details  Written / programming; class discussions; quizzes	tical and critical abilities. Show all and presentational skills. I wired for attaining the course let ery little or no ability to applied to the course let ery little or no ability to applied to the course let ery little or no ability to applied to the course.  Weighting in final course grade (%)	No. of Hours  36  20  12  40  20  Assessment Methods to CLO Mapping		

STAT1015	Introduction to data science (6 credits)	Academic Year	2021
Offering Department	Statistics & Actuarial Science	Quota	40
Course Co-ordinator	Prof J J F Yao, Statistics & Actuarial Science (jeffyao@hku.hk)		
Teachers Involved	(Dr A S M Lau, Statistics & Actuarial Science)		

	(Prof J J I	n,Computer Science) F Yao,Statistics & Actu	,			
Course Objectives		is designed at a level	ncepts and methodology of data sci- appropriate for all undergraduate stu			
		0 0	ata work-flow including collaborative from initial investigation and data acq			
	the purpo prediction	ose of transforming the	exposure to different data types and m to a format suitable for analysis. It studies involving less-manicured data dents.	introduces elementary r	otions in estimation,	
Course Contents & Topics	* Overvi	l introduction to data sciew with selected cases of tools for their analys	studies. General discussion on orig	ins and forms of data, a	ssociated questions	
	* Data s cleaning/e Environm	extraction; Quick intro	n and its impact on visualization, m oduction to high level programmin R); Exploratory Data Analysis (ED	g language and Integ	ated Development	
	* Statisti * Statist with p-val	ements on programminics (1): model for randoics (2): independent salue.	g; omness, random variables, distribution amples, estimation of mean and varia els, forecasting, simple time series, m	ance, confidence interva		
	above. Po		workshops cover a few selected top advanced data visualization, advance		U	
Course Learning	On succe	essful completion of this	course, students should be able to:			
Outcomes	CLO 2 F	Formulate problems and Write basic functions an	er data; summarize and visualize data d bring elementary concepts in estima d simple data analysis codes using st alysis project using advanced methoc	tion, prediction, and infer ate-of-art computing soft		
Pre-requisites (and Co-requisites and Impermissible combinations)	Not for st	udents who have passe	ed in STAT1005, or already enrolled in c(AppliedAI) and BASc(FinTech) stud	this course; and		
Offer in 2021 - 2022	N Off	fer in 2022 - 2023 : N		Examination		
Grade Descriptors (A+ to F)	В	learning outcomes. Show to apply knowledge to a presentational skills.	astery at an advanced level of extensive kno strong analytical and critical abilities and logic wide range of complex, familiar and unfamilia	al thinking, with evidence of or ar situations. Apply highly effe	iginal thought, and ability ective organizational and	
	С	learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.  Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most				
	D	Demonstrate partial but lin Show evidence of some c knowledge to solve proble	noderately effective organizational and present mited command of knowledge and skills requir oherent and logical thinking, but with limited an ms. Apply limited or barely effective organization	ed for attaining some of the coallytical and critical abilities. Shonal and presentational skills.	ow limited ability to apply	
	Fail	of analytical and critical	ridence of command of knowledge and skills re abilities, logical and coherent thinking. Show and presentational skills are minimally effective o	very little or no ability to ap		
Communication- intensive Course	N	,	,			
Course Type	Lecture w	vith laboratory compone	ent course			
Course Teaching	Activitie		Details		No. of Hours	
& Learning Activities	Lectures				36	
	Project w				40	
	Tutorials				12	
	Reading / Self study				40	
	Assessment		20			
Aaaaamant Mathada	Assessm		Deteile		A = = = = : : : : : : : : : : : : : : :	
			Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
Assessment Methods and Weighting	Assessm	3	Details  Written / programming; class discussions; quizzes	0 0	Methods	
	Assessm Methods	ents ation	Written / programming; class	course grade (%)	Methods to CLO Mapping	

STAT1600	Statistics: ideas and concepts (6 credits)	Academic Year	2021
Offering Department	Statistics & Actuarial Science	Quota	
Course Co-ordinator	Dr C W Kwan, Statistics & Actuarial Science (cwkwan@hku.hk)		
Teachers Involved	(Dr C W Kwan, Statistics & Actuarial Science)		
	(Dr E A L Li, Statistics & Actuarial Science)		
	(Dr Y K Chung Statistics & Actuarial Science)		

Course Objectives	Managem disciplines panoramio	ent. It focuses on the s, and as a science of c foundation for a forma	proad overview of statistics for stude roles of statistics as a scientific to reasoning which has revolutionized I study of statistics at the university le	ol with applications to a d modern intellectual en	a wide spectrum of
Course Contents & Topics	- Data pre - Probabil - Inference	sentation: tables; graph ity: randomness; probat e: estimation; tests of si	udies versus designed experiments is; frequency distributions; correlation pility models; distributions; measures gnificance and hypotheses; confidency isuse of statistics; ethics.	of central tendency and o	
Course Learning Outcomes	CLO 1 ul CLO 2 pl CLO 3 ac CLO 4 di CLO 5 pl	nderstand the role of staresent data in a useful a cquire basic concepts a stinguish between good ursue a major study in S	nd perspectives of statistical modellin d and bad statistical practices Statistics or Risk Management with a	g and inference well-established concept	
Pre-requisites (and Co-requisites and Impermissible combinations)	Not for stu	idents who have passed	d in any of the following courses: STA	.T1602, STAT1603, STA	T3902.
Offer in 2021 - 2022	Y 1st	sem 2nd sem Offer	in 2022 - 2023 : Y	Examination	Dec May
Grade Descriptors (A+ to F)	A	learning outcomes. Show s	stery at an advanced level of extensive know strong analytical and critical abilities and logical vide range of complex, familiar and unfamilia	al thinking, with evidence of ori	ginal thought, and ability
	В	learning outcomes. Show e	ommand of a broad range of knowledge and vidence of analytical and critical abilities and lo ons. Apply effective organizational and present	ogical thinking, and ability to ap	
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.				
	D Fail	Show evidence of some co knowledge to solve problem	nited command of knowledge and skills require herent and logical thinking, but with limited an ns. Apply limited or barely effective organizatio dence of command of knowledge and skills re	alytical and critical abilities. Sho nal and presentational skills.	ow limited ability to apply
	ı alı	of analytical and critical a	abilities, logical and coherent thinking. Show the presentational skills are minimally effective or	very little or no ability to ap	
Communication- intensive Course	N				
Course Type	Lecture-ba	ased course			
Course Teaching	Activities	<b>i</b>	Details		No. of Hours
& Learning Activities	Lectures				36
	Tutorials				12
		Self study			100
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignme	ents	Coursework (assignments, class test(s) and project(s))	60	CLO 1,2,3,4,5
	Examinat	ion	One 2-hour written examination	40	CLO 1,2,3,4,5
Required/recommended reading and online materials	Heckard, Albright, S Cengage	R.F. and Utts, J.M. (201 S. C., Winston, W. L. ar Learning.	n Statistics (4th edition). Cengage Let 12). Statistics (International edition, 4 and Zappe, C. J. (2009). Data Analysi 16). Statistics: Concepts and Controve	th edition). Cengage Lea s and Decision Making v	vith Microsoft Excel.
Course Website		dle.hku.hk	,		

STAT1601	Elementary statistical methods (6 credits)	Academic Year	2021
Offering Department	Statistics & Actuarial Science	Quota	
Course Co-ordinator	TBC, Statistics & Actuarial Science ()		
Teachers Involved			
Course Objectives	Research findings are usually supported by data. Data collected in an experir situations involving variability and uncertainty. They are used to estimate the test the acceptability of a certain new hypothesis. Valid methods of analysir successful investigation. The course aims to present the fundamentals of researchers. Microsoft Excel might be used to carry out some statistical sophisticated technical mathematics.	true value of a cert ng the data are thus statistical methods	ain quantity or to essential to any widely used by
Course Contents & Topics	The course will introduce and study the following topics: Presentation of data, Measures of Central Tendency, Measures of Variabilit Laws, Common Probability Distributions such as Uniform, Binomial, Poisso Normal distributions, Random Sampling, Distribution of the Mean, Normal S Confidence Intervals, Sample Size Determination, Hypothesis Testing, Infer squared tests, Simple Regression and Correlation	on, Hyper-geometric campling Theorem,	, Geometric and Point Estimation,
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 select and use appropriate statistical methods to analyze data CLO 2 perform statistical analysis with calculator and Microsoft Excel CLO 3 understand and apply basic concepts of probability CLO 4 gain familiarity with the fundamental concepts of random variables CLO 5 make inferences on a population based on sample data CLO 6 determine the most appropriate statistical method to use for a given st CLO 7 write appropriate conclusions based on the statistical results CLO 8 understand the basic principles of simple linear regression and corrected problems	•	applications to

Pre-requisites (and Co-requisites and Impermissible combinations)	Not for st Not for s	udents with Level 2 or al	ematics or equivalent; and bove in HKDSE Mathematics Extend ed or already enrolled in any of the 80		AT2901, STAT1602,	
Offer in 2021 - 2022	N Of	fer in 2022 - 2023 : N		Examination		
Grade Descriptors (A+ to F)	A	learning outcomes. Show s	stery at an advanced level of extensive kno strong analytical and critical abilities and logic vide range of complex, familiar and unfamilia	al thinking, with evidence of or	iginal thought, and ability	
	В					
	С	outcomes. Show evidence	incomplete command of knowledge and ski of some analytical and critical abilities and le oderately effective organizational and presenta	ogical thinking, and ability to a		
	D	Show evidence of some co	ited command of knowledge and skills requir herent and logical thinking, but with limited an ns. Apply limited or barely effective organization	alytical and critical abilities. Sh		
	Fail	Demonstrate little or no evi	dence of command of knowledge and skills re bilities, logical and coherent thinking. Show I presentational skills are minimally effective o	equired for attaining the course very little or no ability to ap		
Communication- intensive Course	N					
Course Type	Lecture-b	ased course				
Course Teaching	Activitie	s	Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials				12	
	Reading	/ Self study			100	
Assessment Methods and Weighting	Methods	5	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignments		Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3,4,5,6	
	Examina	tion	One 2-hour written examination	75	CLO 1,2,3,4,5,6,7,8	
Required/recommended reading and online materials	Larson, F Berk, K.N	I. & Carey, P.: Data Anal	son (Asia), 2007) ary Statistics, Picturing the World (Pro lysis with Microsoft EXCEL (Duxbury tistics - A First Course (Prentice Hall,	press, Update Office 20		
Course Website	http://mo	odle.hku.hk				
Additional Course Information		or: CASIO fx-50FH (This uitable for this course.)	model has SD-MODE, REG-MODE	, nCr and Normal Proba	bility Function which	

STAT1602	Business	s statistics (6 c	redits)		Academic Year	2021
Offering Department	Statistics &	Actuarial Science	•		Quota	
Course Co-ordinator	Dr J T Y W	ong, Statistics & A	ctuarial Science (je	ftywong @hku.hk)	·	
Teachers Involved	(Dr J T Y W	Vong,Statistics & A	ctuarial Science)	,		
Course Objectives	affects the elementary analysis ar	e interpretation of course, which is t nd interpretation v	<sup>:</sup> data. Thus statis aught without much vith emphases on	tics forms an importa technical mathematics,	ertainty and variability. \ nt descriptive and anal presents many standard  e statistical tests of the  nalysis.	ytical tool. This situations of data
Course Contents & Topics	Measures of Binomial, N Point Estim Means and	of Variability and I Normal, Poisson, I nation, Confidence	Incertainty, Elemer Hyper-geometric and Intervals and Samp	tary Probability Rules and Geometric, Random State Size Determination, I	n of Data, Measures of C and Basic Probability Dist Sampling, the Normal Sa Hypothesis Testing involv ession and Correlation, I	ributions such as mpling Theorem ing Inferences fo
Course Learning	On success	sful completion of	this course, student	s should be able to:		
Outcomes	CLO 2 per nur CLO 3 unc CLO 4 gai CLO 5 ma CLO 6 det CLO 7 gai CLO 8 unc	rform statistical a merical summaries derstand and apply in familiarity with the like inferences on a termine the most a in familiarity with the	basic concepts of the fundamental concepts of population based of ppropriate statistical fundamental concepts of simples	ator and Microsoft Ex probability epts of random variable on sample data I method to use for a givepts of statistical infere		iety of problems
Pre-requisites (and Co-requisites and Impermissible combinations)	STAT1603	, STAT2901 or EC	ON1280	enrolled in any of the f najor/minor in Business	ollowing courses: STAT1 only).	601, STAT2601
Offer in 2021 - 2022	Y 1st s	sem 2nd sem C	Offer in 2022 - 2023	: N	Examination	Dec May
Grade Descriptors (A+ to F)	A	Demonstrate thorough learning outcomes. Sh to apply knowledge to presentational skills.	now strong analytical and o a wide range of comp	d critical abilities and logical to lex, familiar and unfamiliar s	edge and skills required for atta hinking, with evidence of origina situations. Apply highly effective	aining all the course al thought, and ability e organizational and
	_	learning outcomes. Shand some unfamiliar s	low evidence of analytica ituations. Apply effective	ıl and critical abilities and logi organizational and presentati		knowledge to familia
	С	outcomes. Show evid	ence of some analytical		required for attaining most of cal thinking, and ability to apply nal skills.	

	Fail	Show evidence of some knowledge to solve prob Demonstrate little or no of analytical and critical	limited command of knowledge and skills requing coherent and logical thinking, but with limited a slems. Apply limited or barely effective organization of command of knowledge and skills all abilities, logical and coherent thinking. Show and presentational skills are minimally effective	nalytical and critical abilities. Sh ional and presentational skills. required for attaining the course w very little or no ability to ap	now limited ability to apply learning outcomes. Lack
Communication- intensive Course	N				
Course Type	Lecture-bas	sed course			
Course Teaching	Activities		Details		No. of Hours
& Learning Activities	Lectures				36
	Tutorials				12
	Reading / S	Self study			100
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignmen	nts	Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3,4
	Examination	on	One 2-hour written examination	75	CLO 1,2,3,4,5,6,7,8
Required/recommended reading and online materials	Freund, J. I Berk, K.N.	E. & Perles, B. M.: N & Carey, P.: Data A	stics (Cengage Learning, 2009, 8th ed Modern Elementary Statistics (Prentice nalysis with Microsoft EXCEL (Duxbur E.S.: Business Statistics in Practice (M	Hall <sup>′</sup> , 2006, 12th ed.) y press, Update Office 20	
Course Website	http://mood		,		,

STAT1603	Introduc	ctory statistics (6	6 credits)	Academic Yea	ar 2021	
Offering Department	Statistics	& Actuarial Science	•	Quota		
Course Co-ordinator	Dr E K F	Lam, Statistics & Ac	tuarial Science (hrntlkf@hku.hk)			
Teachers Involved	(Dr E K F	Lam, Statistics & Ac	tuarial Science)			
	(Prof J J I	F Yao,Statistics & Ad	ctuarial Science)			
Course Objectives	data need descriptive this cours	The discipline of statistics is concerned with situations involving uncertainty and variability. The interpretation of data needs special techniques when variability plays a role, as it usually does. Thus statistics forms an important descriptive and analytical tool of many scientific disciplines. Candidates with a mathematical background will find this course suitable, because the language of mathematics allows the subject of statistics to be presented with economy and clarity.				
Course Contents & Topics	Probabilit Estimation	Presentation of data, Variability and Uncertainty, Measures of Central Tendency, Measures of Dispersion, Basic Probability Theory and Techniques, Random Variables and Probability Distributions, Random Samples, Point Estimation, Normal Sampling Theorem, Confidence Intervals, Hypotheses Testing, Simple Linear Regression and Correlation.				
Course Learning	On succe	ssful completion of t	his course, students should be able to:			
Outcomes			asures of central tendency and dispersion			
			probability theory and techniques to sol			
	po	opulation	ct confidence intervals and use hypoth			
	eı	nvironment	and correlation methods to solve probl		ocial and business	
Pre-requisites			Mathematics Extended Module 1 or 2 or e			
(and Co-requisites and Impermissible combinations)	and	udents who have pa	only of these courses: MATH1009, MATH ssed or already enrolled in any of these	,	,	
Offer in 2021 - 2022	Y 1st	sem 2nd sem C	offer in 2022 - 2023 : N	Examination	Dec May	
Grade Descriptors	Α		mastery at an advanced level of extensive known			
(A+ to F)		learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.				
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.				
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.				
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply				
	knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.					
	Fail	of analytical and critic	o evidence of command of knowledge and skills re cal abilities, logical and coherent thinking. Show	equired for attaining the course levery little or no ability to app		
Communication- intensive Course	Fail N	of analytical and critic	o evidence of command of knowledge and skills re cal abilities, logical and coherent thinking. Show	equired for attaining the course levery little or no ability to app		
intensive Course	N	of analytical and critic	o evidence of command of knowledge and skills re cal abilities, logical and coherent thinking. Show	equired for attaining the course levery little or no ability to app		
intensive Course Course Type	N	of analytical and critic problems. Organization ased course	o evidence of command of knowledge and skills re cal abilities, logical and coherent thinking. Show	equired for attaining the course levery little or no ability to app		
intensive Course Course Type Course Teaching	N Lecture-b	of analytical and critic problems. Organization ased course	o evidence of command of knowledge and skills re cal abilities, logical and coherent thinking. Show n and presentational skills are minimally effective o	equired for attaining the course levery little or no ability to app	oly knowledge to solve	
intensive Course Course Type Course Teaching	N Lecture-b	of analytical and critic problems. Organization ased course	o evidence of command of knowledge and skills re cal abilities, logical and coherent thinking. Show n and presentational skills are minimally effective o	equired for attaining the course levery little or no ability to app	No. of Hours	
intensive Course Course Type Course Teaching	N Lecture-b Activitie Lectures Tutorials	of analytical and critic problems. Organization ased course s	o evidence of command of knowledge and skills re cal abilities, logical and coherent thinking. Show n and presentational skills are minimally effective o	equired for attaining the course levery little or no ability to app	No. of Hours	
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture-b Activitie Lectures Tutorials	of analytical and critic problems. Organization ased course s	o evidence of command of knowledge and skills re cal abilities, logical and coherent thinking. Show n and presentational skills are minimally effective o	equired for attaining the course levery little or no ability to app	No. of Hours 36 12	
	N Lecture-b Activitie Lectures Tutorials Reading	of analytical and critic problems. Organization ased course s	o evidence of command of knowledge and skills re cal abilities, logical and coherent thinking. Show n and presentational skills are minimally effective o	equired for attaining the course I very little or no ability to apprint ineffective.  Weighting in final	No. of Hours 36 12 100 Assessment Methods	

reading and online materials	Hogg, R. V., Tanis, E. A., and Zimmerman, D. L. (2015). Probability and Statistical Inference (9th Edition). Pearson. Freund, J. E. and Perles B. M. (2003). Statistics: A First Course (8th Edition). Prentice Hall. Fernandes, M. (2009). Statistics for Business and Economics. Bookboon. Hooke, R. (1983). How to Tell the Liars from the Statisticians. Marcel Dekker. Levine, D. M., Stephan, D. F., and Szabat, K. A. (2016). Statistics for Managers Using Microsoft Excel (8th Edition). Pearson. Larson, R. and Farber, B. (2015). Elementary Statistics: Picturing the World (6th Edition). Pearson. Bluman, A. G. (2014). Elementary Statistics: A Step by Step Approach (9th Edition). McGraw-Hill. Triola, M. F. (2018). Elementary Statistics (13th Edition). Pearson. Newbold, P., Carlson, W. L., and Thorne, B. M. (2013). Statistics for Business and Economics (8th Edition). Pearson.
Course Website	http://moodle.hku.hk
Additional Course Information	Students who intend to major in "Decision Analytics" or "Risk Management" or "Statistics" should take STAT2601 instead of this course.  Other references:  Wonnacott, T. H. and Wonnacott, R. J.: Introductory Statistics (Wiley, New York, 1972, 2nd edition)  Dixon, W. J. and Massey, Jr, F. J.: Introduction to Statistical Analysis (McGraw Hill, 1983, 4th edition)

STAT2601						
		lity and statistics I (	6 credits)	Academic Yea	r 2021	
Offering Department		& Actuarial Science	0-1	Quota		
Course Co-ordinator			Science (watkp@hku.hk)			
Teachers Involved		/at,Statistics & Actuarial				
Course Objectives			erned with situations in which uncerta			
			d analytical tool in many practical prevent probability models for the description			
Course Contents			events; Probability and probability la			
& Topics			nulative distribution function (cdf);			
			distributions; Continuous random va			
	Probability	density function (pdf);	Exponential, gamma, and normal d	distributions; Functions of a	a random variabl	
			butions; Conditional distributions; In			
	-		s; Expected value; Variance and sta	ndard deviation; Covariand	e and correlation	
Course Learning		•	course, students should be able to:			
Outcomes	CLO 1		concepts in probability theory			
	CLO 2	0 0	statistics and inference			
	CLO 3	· · · · · · · · · · · · · · · · · · ·	ems by using probability calculations			
	CLO 4		udies in statistics and quantitative ar	· ·		
Pre-requisites			12014 or (MATH2101 and MATH221			
(and Co-requisites			l in STAT1603, STAT2901 or alread	y enrolled in these courses	s; and	
and Impermissible	NOT for BS	Sc(ActuarSc) students.				
combinations)	Y 1st	som 2nd som Offer	in 2022 - 2023 : Y	Evamination	Dog May	
Offer in 2021 - 2022 Grade Descriptors	A ISL		III 2022 - 2023 : Y stery at an advanced level of extensive kno	Examination	Dec May	
(A+ to F)	A		trong analytical and critical abilities and logic			
(A. 101)			ide range of complex, familiar and unfamilia	ar situations. Apply highly effect	ive organizational ar	
	D	presentational skills.	mmand of a broad range of knowledge and	skills required for attaining at le	act mact of the cours	
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar					
	and some unfamiliar situations. Apply effective organizational and presentational skills.					
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning					
	outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
		familiar situations. Apply mo			pry knowiedge to me	
	D	Demonstrate partial but limi	derately effective organizational and presentated command of knowledge and skills requir	ational skills. red for attaining some of the coul	rse learning outcome	
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		Demonstrate partial but limi Show evidence of some corknowledge to solve problem	derately effective organizational and presentated command of knowledge and skills requir	ational skills.  red for attaining some of the country in the coun	rse learning outcome v limited ability to app	
	D Fail	Demonstrate partial but limi Show evidence of some col- knowledge to solve problem Demonstrate little or no evic of analytical and critical at	iderately effective organizational and presentated command of knowledge and skills requirerent and logical thinking, but with limited an s. Apply limited or barely effective organization dence of command of knowledge and skills rebilities, logical and coherent thinking. Show	ational skills.  red for attaining some of the counalytical and critical abilities. Show onal and presentational skills.  equired for attaining the course lety very little or no ability to apple.	rse learning outcome v limited ability to app earning outcomes. La	
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intensive Course Course Type Course Teaching	Fail N Lecture-ba	Demonstrate partial but limi Show evidence of some cot knowledge to solve problem Demonstrate little or no evic of analytical and critical at problems. Organization and	iderately effective organizational and presentated command of knowledge and skills requirerent and logical thinking, but with limited an s. Apply limited or barely effective organization dence of command of knowledge and skills rebilities, logical and coherent thinking. Show	ational skills.  red for attaining some of the counalytical and critical abilities. Show onal and presentational skills.  equired for attaining the course lety very little or no ability to apple.	rse learning outcome v limited ability to app varning outcomes. La y knowledge to solv  No. of Hours	
intensive Course Course Type	Fail  N  Lecture-ba  Activities  Lectures	Demonstrate partial but limi Show evidence of some cot knowledge to solve problem Demonstrate little or no evic of analytical and critical at problems. Organization and	iderately effective organizational and present ted command of knowledge and skills requir nerent and logical thinking, but with limited an s. Apply limited or barely effective organizatio dence of command of knowledge and skills re pilities, logical and coherent thinking. Show presentational skills are minimally effective o	ational skills.  red for attaining some of the counalytical and critical abilities. Show onal and presentational skills.  equired for attaining the course lety very little or no ability to apple.	rse learning outcome v limited ability to app varning outcomes. La y knowledge to solv  No. of Hours 36	
intensive Course Course Type Course Teaching	Fail  N  Lecture-ba  Activities  Lectures  Tutorials	Demonstrate partial but limi Show evidence of some col- knowledge to solve problem Demonstrate little or no evic of analytical and critical at problems. Organization and ased course	iderately effective organizational and present ted command of knowledge and skills requir nerent and logical thinking, but with limited an s. Apply limited or barely effective organizatio dence of command of knowledge and skills re pilities, logical and coherent thinking. Show presentational skills are minimally effective o	ational skills.  red for attaining some of the counalytical and critical abilities. Show onal and presentational skills.  equired for attaining the course lety very little or no ability to apple.	rse learning outcome v limited ability to app varning outcomes. La y knowledge to solv  No. of Hours  36  12	
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Intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting	Fail  N  Lecture-ba Activities Lectures Tutorials Reading / Methods  Assignme Examinat	Demonstrate partial but limi Show evidence of some cot knowledge to solve problem Demonstrate little or no evic of analytical and critical at problems. Organization and assed course	iderately effective organizational and presented command of knowledge and skills requirement and logical thinking, but with limited and s. Apply limited or barely effective organization dence of command of knowledge and skills rebilities, logical and coherent thinking. Show presentational skills are minimally effective of the command of knowledge and skills are minimally effective of the command of knowledge and skills are minimally effective of the command of knowledge and skills are minimally effective of the command of knowledge and skills are minimally effective of the command of knowledge and skills are minimally effective of the command of knowledge and skills are minimally effective of the command of knowledge and skills are minimally effective of the command of knowledge and skills are minimally effective of the command of knowledge and skills required to the command of knowledge and skills republished to the command of knowledge and skills required to the command of knowledge and skills republished to	ational skills.  red for attaining some of the counalytical and critical abilities. Show an and presentational skills.  required for attaining the course let your little or no ability to applor ineffective.  Weighting in final course grade (%)  30  70	No. of Hours  100  Assessment Methods to CLO Mappin	
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting	Fail  N  Lecture-ba Activities Lectures Tutorials Reading / Methods  Assignme Examinat	Demonstrate partial but limi Show evidence of some cot knowledge to solve problem Demonstrate little or no evic of analytical and critical at problems. Organization and assed course	iderately effective organizational and presented command of knowledge and skills requirement and logical thinking, but with limited and s. Apply limited or barely effective organization of command of knowledge and skills repilities, logical and coherent thinking. Show presentational skills are minimally effective of the command of knowledge and skills are minimally effective of the command of knowledge and skills are minimally effective of the command of knowledge and skills are minimally effective of the command of knowledge and skills are minimally effective of the command of knowledge and skills are minimally effective of the command of knowledge and skills are minimally effective of the command of knowledge and skills are minimally effective of the command of knowledge and skills are minimally effective of the command of knowledge and skills required to the command of knowledge and skills required to the command of knowledge and skills repilition to the command of knowledge and	ational skills.  red for attaining some of the counalytical and critical abilities. Show an and presentational skills.  required for attaining the course let your little or no ability to applor ineffective.  Weighting in final course grade (%)  30  70	No. of Hours 36 12 100 Assessment Methods to CLO 1,2,3	
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intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Fail  N  Lecture-ba Activities Lectures Tutorials Reading Methods  Assignme Examinat Blitzstein, Ghahrama Pitman, J. DeGroot, Ross, S. M.	Demonstrate partial but limi Show evidence of some coh knowledge to solve problem Demonstrate little or no evic of analytical and critical at problems. Organization and assed course s  / Self study  Political Study  A Self study  Political Stud	iderately effective organizational and presente ted command of knowledge and skills requirerent and logical thinking, but with limited an s. Apply limited or barely effective organization of command of knowledge and skills redistricted and coherent thinking. Show presentational skills are minimally effective of the command of knowledge and skills redistricted and coherent thinking. Show presentational skills are minimally effective of the command of knowledge and skills are minimally effective of the command of	ational skills.  red for attaining some of the counalytical and critical abilities. Show and and presentational skills.  squired for attaining the course let overy little or no ability to applor ineffective.  Weighting in final course grade (%)  30  70  Edition). CRC Press.  Processes (4th Edition). CRC (4th Edition). Pearson.	No. of Hours 36 12 100 Assessment Methods to CLO 1,2,3 CLO 1,2,3	
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Fail  N  Lecture-ba Activities Lectures Tutorials Reading Methods  Assignme Examinat Blitzstein, Ghahrama, Pitman, J. DeGroot, Ross, S. M. Ross, S. M.	Demonstrate partial but limi Show evidence of some cot knowledge to solve problem Demonstrate little or no evic of analytical and critical at problems. Organization and ased course s  / Self study  Particular of the study  A sent scion  J. K. and Hwang, J. (20 ani, S. (2019). Fundame (1993). Probability. Spr M. H. and Schervish, M. M. (2019). A First Course M. (2019). Introduction to	iderately effective organizational and presente ted command of knowledge and skills requirerent and logical thinking, but with limited an s. Apply limited or barely effective organizationence of command of knowledge and skills rebilities, logical and coherent thinking. Show presentational skills are minimally effective of the presentational skills	ational skills.  red for attaining some of the counalytical and critical abilities. Show an and presentational skills.  squired for attaining the course let very little or no ability to applor ineffective.  Weighting in final course grade (%)  30  70  Edition). CRC Press.  Processes (4th Edition). CRC (4th Edition). Pearson. ce Hall.  Academic Press.	No. of Hours 36 12 100 Assessment Methods to CLO Mappin CLO 1,2,3 CC Press.	
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Fail  N  Lecture-ba Activities Lectures Tutorials Reading Methods  Assignme Examinat Blitzstein, Ghahrama Pitman, J. DeGroot, Ross, S. M. Ross, S. M. Miller, I. a	Demonstrate partial but limi Show evidence of some cot knowledge to solve problem Demonstrate little or no evic of analytical and critical at problems. Organization and ased course s  / Self study  Particular of the study  A sent scion  J. K. and Hwang, J. (20 ani, S. (2019). Fundame (1993). Probability. Spr M. H. and Schervish, M. M. (2019). A First Course M. (2019). Introduction to	iderately effective organizational and presente ted command of knowledge and skills requirerent and logical thinking, but with limited an s. Apply limited or barely effective organization of command of knowledge and skills redistricted and coherent thinking. Show presentational skills are minimally effective of the command of knowledge and skills redistricted and coherent thinking. Show presentational skills are minimally effective of the command of knowledge and skills are minimally effective of the command of	ational skills.  red for attaining some of the counalytical and critical abilities. Show an and presentational skills.  squired for attaining the course let very little or no ability to applor ineffective.  Weighting in final course grade (%)  30  70  Edition). CRC Press.  Processes (4th Edition). CRC (4th Edition). Pearson. ce Hall.  Academic Press.	No. of Hours 36 12 100 Assessment Methods to CLO Mappin CLO 1,2,3 CC Press.	
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Fail  N  Lecture-ba Activities Lectures Tutorials Reading Methods  Assignme Examinat Blitzstein, Ghahrama Pitman, J. DeGroot, Ross, S. M. Ross, S. M. Miller, I. a Hall. Hogg, R. Y.	Demonstrate partial but limi Show evidence of some cot knowledge to solve problem Demonstrate little or no evic of analytical and critical at problems. Organization and assed course sition  J. K. and Hwang, J. (20 ani, S. (2019). Fundame (1993). Probability. Spr M. H. and Schervish, M. (2019). A First Course M. (2019). Introduction to and Miller, M. (2014). Journal of the solution of the solutio	iderately effective organizational and presente ted command of knowledge and skills requirerent and logical thinking, but with limited an s. Apply limited or barely effective organizationence of command of knowledge and skills rebilities, logical and coherent thinking. Show presentational skills are minimally effective of the presentational skills	weighting in final course grade (%)  Weighting in final course grade (%)  Weighting in final course grade (%)  Weighting in final course grade (%)  30  70  Edition). CRC Press. Processes (4th Edition). CR  (4th Edition). Pearson. ce Hall. Academic Press.	No. of Hours 36 12 100 Assessment Methods to CLO Mappin CLO 1,2,3 CC Press.	
Intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Fail  N  Lecture-ba Activities Lectures Tutorials Reading Methods  Assignme Examinat Blitzstein, Ghahrama Pitman, J. DeGroot, Ross, S. M. Miller, I. a Hall. Hogg, R. Hall. Hogg, R.	Demonstrate partial but limi Show evidence of some cot knowledge to solve problem Demonstrate little or no evic of analytical and critical at problems. Organization and ased course s  // Self study  ents  ion  J. K. and Hwang, J. (20 ani, S. (2019). Fundame. (1993). Probability. Spr M. H. and Schervish, M. M. (2019). A First Course M. (2019). Introduction to and Miller, M. (2014). Journal of the course of	iderately effective organizational and presente ted command of knowledge and skills requirement and logical thinking, but with limited an s. Apply limited or barely effective organization and selective organization and selective of command of knowledge and skills redilities, logical and coherent thinking. Show presentational skills are minimally effective of the selective of th	weighting in final course grade (%)  Weighting in final course grade (%)  Weighting in final course grade (%)  Weighting in final course grade (%)  30  70  Edition). CRC Press. Processes (4th Edition). CRC (4th Edition). Pearson. ce Hall. Academic Press. Stics with Applications (8th Mathematical Statistics  No. of Hours 36 12 100 Assessment Methods to CLO Mappin CLO 1,2,3 CC Press.		
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Fail  N  Lecture-ba Activities Lectures Tutorials Reading Methods  Assignme Examinat Blitzstein, Ghahrama Pitman, J. DeGroot, Ross, S. M. Miller, I. a Hall. Hogg, R. Hall. Hogg, R. Pearson.	Demonstrate partial but limi Show evidence of some cot knowledge to solve problem Demonstrate little or no evic of analytical and critical at problems. Organization and ased course set of the study sents licin J. K. and Hwang, J. (20 ani, S. (2019). Fundame (1993). Probability. Spr M. H. and Schervish, M. M. (2019). A First Course M. (2019). Introduction to and Miller, M. (2014). Jc V., McKean, J. W., and V., Tanis, E. A., and J.	derately effective organizational and presente ted command of knowledge and skills requirerent and logical thinking, but with limited an s. Apply limited or barely effective organization of command of knowledge and skills reditites, logical and coherent thinking. Show presentational skills are minimally effective of presentational skills are minimally effective of the command of knowledge and skills reditites, logical and coherent thinking. Show presentational skills are minimally effective of the command of th	ational skills.  red for attaining some of the counalytical and critical abilities. Show and and presentational skills.  squired for attaining the course let very little or no ability to applor ineffective.  Weighting in final course grade (%)  30  70  Edition). CRC Press. Processes (4th Edition). CRC (4th Edition). Pearson.  Ce Hall. Academic Press. Stics with Applications (8th Mathematical Statistics (8th illity and Statistical Inference in the country of the course of the country of the countr	No. of Hours 36 12 100 Assessment Methods to CLO Mappin CLO 1,2,3 CC Press.	

	Miller, M. B. (2014). Mathematics and Statistics for Financial Risk Management (2nd Edition). Wiley. Chung, K. L. (2001). A Course in Probability Theory (3rd Edition). Academic Press.
Course Website	http://moodle.hku.hk

STAT2602	Probabi	ility and statistics	II (6 credits)		Academic Yea	r 2021
Offering Department		& Actuarial Science	,		Quota	
Course Co-ordinator	Dr J Xu, S	Statistics & Actuarial S	Science (xujf@hku	.hk)		
Teachers Involved	(Dr J Xu,S	hang,Statistics & Actu Statistics & Actuarial S Statistics & Actuarial	Science)			
Course Objectives	This cours two major modelling	This course builds on STAT2601, introducing further the concepts and methods of statistics. Emphasis is on the two major areas of statistical analysis: estimation and hypothesis testing. Through the disciplines of statistical modelling, inference and decision making, students will be equipped with both quantitative skills and qualitative perceptions essential for making rigorous statistical analysis of real-life data.  1. Overview: random sample; sampling distributions of statistics; moment generating function; large-sample theory:				
Course Contents & Topics	laws of lar 2. Estima Lower Bor 3. Hypoth Pearson L	rge numbers and Cer ution: estimator; bias; pund; efficiency; metho nesis testing: types o Lemma; generalized l	ntral Limit Theorem mean squared en od of moments; ma of hypotheses; tes likelihood ratio test	n; likelihood; sufficie ror; standard error aximum likelihood e st statistics; p-valu ; Pearson chi-squa	ency; factorisation criterion; ; consistency; Fisher informestimator; ie; size; power; likelihood r	ation; Cramer-Rao
Course Learning		ssful completion of th				
Outcomes		apprehend the objecti				
		elate a real-life proble				
		conduct standard para eckon the general ap			of estimation and hypothesis	s testing
Dro roquicitos		TAT2601; and	plicability of statisti	ics in a broad range	e or subject areas	
Pre-requisites (and Co-requisites and Impermissible combinations)		udents who have pas	sed in STAT3902,	or already enrolled	in this course.	
Offer in 2021 - 2022	Y 1st	sem 2nd sem Of	fer in 2022 - 2023	: Y	Examination	Dec May
Grade Descriptors	Α	Demonstrate thorough	mastery at an advance	ed level of extensive k	nowledge and skills required for a	ttaining all the course
(A+ to F)		learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.				
		Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.				
		Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.				
		Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.				
	Fail		al abilities, logical and	coherent thinking. She	required for attaining the course le ow very little or no ability to apple or ineffective.	
Communication- intensive Course	N					
Course Type		ased course	D 4 "			No. of Hours
Course Teaching & Learning Activities	Activities Lectures		Details	Details		
a Learning Activities	Tutorials					36 12
		/ Self study				100
Assessment Methods and Weighting	Methods	•	Details		Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignme	ents	Coursework tutorials and a	(assignments, a class test)	25	CLO 1,2,3,4
	Examinat			ritten examination	75	CLO 1,2,3,4
		A. & Lindgren, B.W. (			s. Duxbury: Belmont. deas and Selected Topics. P	rentice Hall: Unne
Required/recommended reading and		. ,	oo i j. maailoinaaloa	ii Otatiotios. Dasio ii	acas ana ocicoloa ropios. r	rentice Hall. Oppel
	Saddle Ri Hogg, R.\ Miller, I. &	iver, N.J. V. & Craig, A.T. (1989	9). Introduction to N	Mathematical Statis	tics. Macmillan: New York. stics with Applications. Pear	

STAT2603	Data management with SAS (6 credits)	Academic Year	2021
Offering Department	Statistics & Actuarial Science	Quota	
Course Co-ordinator	Dr G C S Lui, Statistics & Actuarial Science (csglui@hku.hk)		
Teachers Involved	(Dr G C S Lui, Statistics & Actuarial Science)		
Course Objectives	This course is designed for students who want to learn the statistical software elementary data analysis. This course focuses on using SAS to manage dat different data types, manipulate and transform data, perform random sampling create summary reports and graphics.	ta`set input and o	output, work with
Course Contents & Topics	Data management system for statistical projects. Data validation and cleanin topics, including the following: Data set input and output. Working v manipulation. Data transformation. File manipulation. File management. I presentation and graphics. Basic data analysis. Structured query language.	vith different da	ta types. Data

Course Learning	On succes	ssful completion of this c	ourse, students should be able to:				
Outcomes	CLO 1 ac	cess online help and do	cument				
	CLO 2 us	e Data Step to create da	ata files				
	CLO 3 summarize data by PROC MEANS, PROC FREQ, and PROC UNIVARIATE						
	CLO 4 work with numeric, character, and date variables and functions in Data Step						
	CLO 5 pe	rform conditional proces	sing in Data Step				
	S.A PF	AS data sets by Data S ROC APPEND; present	ig in Data Step including the followi tep and PROC TRANSPOSE; sub data in a readable way by PROC T output by ODS; procedure SQL fo	set and merge data sets ABULATE; produce high	by Data Step and resolution graphics		
Pre-requisites (and Co-requisites and Impermissible combinations)			or already enrolled in this course	1,	9-		
Offer in 2021 - 2022	N Offe	er in 2022 - 2023 : N		Examination			
Grade Descriptors (A+ to F)	Α	learning outcomes. Show st	tery at an advanced level of extensive knorong analytical and critical abilities and logic de range of complex, familiar and unfamil	cal thinking, with evidence of ori	iginal thought, and ability		
	В	learning outcomes. Show ev	mmand of a broad range of knowledge and idence of analytical and critical abilities and ns. Apply effective organizational and prese	logical thinking, and ability to ap			
	С						
	D						
		knowledge to solve problems			ow limited ability to apply		
	Fail	Demonstrate little or no evid of analytical and critical ab		onal and presentational skills. equired for attaining the course v very little or no ability to ap	learning outcomes. Lack		
	Fail N	Demonstrate little or no evid of analytical and critical ab	s. Apply limited or barely effective organizati ence of command of knowledge and skills r illities, logical and coherent thinking. Show	onal and presentational skills. equired for attaining the course v very little or no ability to ap	learning outcomes. Lack		
intensive Course	N	Demonstrate little or no evid of analytical and critical ab	s. Apply limited or barely effective organizati ence of command of knowledge and skills r illities, logical and coherent thinking. Show	onal and presentational skills. equired for attaining the course v very little or no ability to ap	learning outcomes. Lack		
intensive Course Course Type Course Teaching	N	Demonstrate little or no evid of analytical and critical ab problems. Organization and ased course	s. Apply limited or barely effective organizati ence of command of knowledge and skills r illities, logical and coherent thinking. Show	onal and presentational skills. equired for attaining the course v very little or no ability to ap	learning outcomes. Lack		
intensive Course Course Type Course Teaching	N Lecture-ba	Demonstrate little or no evid of analytical and critical ab problems. Organization and ased course	s. Apply limited or barely effective organizati ence of command of knowledge and skills r illities, logical and coherent thinking. Show presentational skills are minimally effective of	onal and presentational skills. equired for attaining the course v very little or no ability to ap	learning outcomes. Lack ply knowledge to solve		
intensive Course Course Type Course Teaching	N Lecture-ba	Demonstrate little or no evid of analytical and critical ab problems. Organization and ased course	s. Apply limited or barely effective organizati ence of command of knowledge and skills r illities, logical and coherent thinking. Show presentational skills are minimally effective of	onal and presentational skills. equired for attaining the course v very little or no ability to ap	learning outcomes. Lack ply knowledge to solve		
intensive Course Course Type Course Teaching	N Lecture-ba Activities Lectures Tutorials	Demonstrate little or no evid of analytical and critical ab problems. Organization and ased course	s. Apply limited or barely effective organizati ence of command of knowledge and skills r illities, logical and coherent thinking. Show presentational skills are minimally effective of	onal and presentational skills. equired for attaining the course v very little or no ability to ap	learning outcomes. Lack ply knowledge to solve  No. of Hours 36		
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture-ba Activities Lectures Tutorials	Demonstrate little or no evid of analytical and critical ab problems. Organization and ased course	s. Apply limited or barely effective organizati ence of command of knowledge and skills r illities, logical and coherent thinking. Show presentational skills are minimally effective of	onal and presentational skills. equired for attaining the course v very little or no ability to ap	learning outcomes. Lack ply knowledge to solve  No. of Hours  36  12		
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture-ba Activities Lectures Tutorials Reading /	Demonstrate little or no evid of analytical and critical ab problems. Organization and ased course  Self study	s. Apply limited or barely effective organizati ence of command of knowledge and skills rillities, logical and coherent thinking. Show presentational skills are minimally effective of the common of	onal and presentational skills. equired for attaining the course v very little or no ability to ap or ineffective.  Weighting in final	No. of Hours 36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5,6		
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture-ba Activities Lectures Tutorials Reading / Methods Assignme Examinat	Demonstrate little or no evid of analytical and critical ab problems. Organization and ased course  Self study	s. Apply limited or barely effective organization of command of knowledge and skills rilities, logical and coherent thinking. Show presentational skills are minimally effective of the command of the coherent thinking. Show presentational skills are minimally effective of the coherent cohere	onal and presentational skills. equired for attaining the course v very little or no ability to ap or ineffective.  Weighting in final course grade (%)  40 60	No. of Hours 36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5,6 CLO 1,2,3,4,5,6		
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	N Lecture-ba Activities Lectures Tutorials Reading / Methods Assignme Examinat Cody, R.P	Demonstrate little or no evid of analytical and critical ab problems. Organization and ased course  Self study  ents  ion  Learning SAS by Example of analytical ab problems. Organization and ased course  state of the self study	s. Apply limited or barely effective organization of command of knowledge and skills rilities, logical and coherent thinking. Show presentational skills are minimally effective of the command of the co	onal and presentational skills. equired for attaining the course very little or no ability to ap or ineffective.  Weighting in final course grade (%)  40  60 n Carolina: SAS Institute In	No. of Hours 36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5,6 CLO 1,2,3,4,5,6 nc., 2007)		
Communication- intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	N Lecture-ba Activities Lectures Tutorials Reading / Methods  Assignme Examinat I Cody, R.P. SAS: SAS Bailer, J.: Delwiche, Cody, R.	Demonstrate little or no evid of analytical and critical at problems. Organization and ased course  Self study  Ents  Certification Prep Guide Statistical Programming L. and Slaughter, S.: Th	s. Apply limited or barely effective organization of command of knowledge and skills rilities, logical and coherent thinking. Show presentational skills are minimally effective of the command of the coherent thinking. Show presentational skills are minimally effective of the coherent cohere	onal and presentational skills. equired for attaining the course very little or no ability to ap or ineffective.  Weighting in final course grade (%)  40  60  a Carolina: SAS Institute In inid Edition. (SAS Institute ute Inc., 2010) Edition. (SAS Institute Inc,	No. of Hours 36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5,6 CLO 1,2,3,4,5,6 nc., 2007) Inc., 2011)		
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	N Lecture-ba Activities Lectures Tutorials Reading / Methods  Assignme Examinat I Cody, R.P SAS: SAS Bailer, J.: Delwiche, Cody, R. edition)	Demonstrate little or no evid of analytical and critical ab problems. Organization and ased course  Self study  Ents  Certification Prep Guide Statistical Programming L. and Slaughter, S.: Th P.: Cody's Data Cleani	s. Apply limited or barely effective organization of command of knowledge and skills relitities, logical and coherent thinking. Show presentational skills are minimally effective of the command of the	onal and presentational skills. equired for attaining the course very little or no ability to ap or ineffective.  Weighting in final course grade (%)  40  60  Carolina: SAS Institute In oird Edition. (SAS Institute ute Inc., 2010) idition. (SAS Institute Inc, n (North Carolina: SAS	No. of Hours 36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5,6 nc., 2007) Inc., 2011) 2012) Institute, 2008, 2nd		

STAT2604	Introdu (6 credi	ction to R programming and elementary data analysis ts)	Academic Year	2021	
Offering Department	Statistics	& Actuarial Science	Quota		
Course Co-ordinator	Dr Z Liu,	Statistics & Actuarial Science (zhhliu@hku.hk)			
Teachers Involved		Statistics & Actuarial Science)			
Course Objectives	language elementa work witl	rse is designed to provide a first-level introduction to the popular and R. This course focuses on learning the basic programming skills in ry statistical analysis. The programming skills involved can be appendifferent data types, manipulation and transformation of data, and production of professional summary reports with high-quality gray	R with examples and lied to input and our random sampling,	nd applications in	
Course Contents & Topics	2. The R 3. Probable continuou 4. Descripsummary	cs: first steps; language essentials. environment: session management; the graphics subsystem; R prog bility and distributions: random sampling; probability calculations and us distributions; the built-in distributions in R. ptive statistics and graphics: summary statistics for a single grou statistics by groups; graphics for grouped data; graphical display of linear regression: residuals and fitted values; prediction and confide	I combinatorics; disc ip; graphical display tables.	rete distributions of distributions;	
Course Learning		essful completion of this course, students should be able to:	,		
Outcomes	CLO 1   access online help and documents for R				
	CLO 2 use R to input data, perform data transformation and merging, output data				
	CLO 3 summarize data in tables and graphs for descriptive data analysis				
	CLO 4 work with numeric, character, and other unstructured data types				
	CLO 5	be able to write functions, loops and control flows			
	CLO 6	perform data management using SQL language in R			
	CLO 7 perform Monte Carlo simulations to validate statistical concepts				
Pre-requisites (and Co-requisites and Impermissible	Pass or a	lready enrolled in STAT1600 or MATH1821.			

	Y 1st	t sem Offer in 2022 -	2023 : Y	Examination	No Exam	
Grade Descriptors (A+ to F)	A	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.				
	В	learning outcomes. Show	command of a broad range of knowledge and revidence of analytical and critical abilities and ations. Apply effective organizational and preser	logical thinking, and ability to ap		
	С	outcomes. Show evidence	it incomplete command of knowledge and sk be of some analytical and critical abilities and moderately effective organizational and present	logical thinking, and ability to a		
	D	Show evidence of some	imited command of knowledge and skills requi coherent and logical thinking, but with limited an ems. Apply limited or barely effective organizati	nalytical and critical abilities. Sh		
	Fail	of analytical and critical	evidence of command of knowledge and skills r abilities, logical and coherent thinking. Show and presentational skills are minimally effective of	v very little or no ability to ap		
Communication- intensive Course	N					
Course Type	Lecture-b	ased course				
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures				36	
A Learning Activities	Lectures				30	
a Learning Activities	Tutorials				12	
a Learning Activities	Tutorials	/ Self study				
Assessment Methods	Tutorials	/ Self study	Details	Weighting in final course grade (%)	12	
Assessment Methods	Tutorials Reading	/ Self study	Details  Coursework (assignments, tutorials, and class test(s))		12 100 Assessment Methods	
Assessment Methods	Tutorials Reading Methods	/ Self study s ents	Coursework (assignments,	course grade (%)	12 100 Assessment Methods to CLO Mapping	
Assessment Methods and Weighting  Required/recommended reading and online materials	Tutorials Reading Methods  Assignm Project re- Peter D	/ Self study s ents eports algaard. Introductory s are also many on-line	Coursework (assignments,	50 50 inger, 2008.	12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5,6,7 CLO 1,2,3,4,5,6,7	

STAT2605	Demogr	aphic and socio-econor	mic statistics (6 credits)	Aca	ademic Year	2021	
Offering Department		& Actuarial Science	, ,	Quo	ota		
Course Co-ordinator	Ms L M S	Kwan, Statistics & Actuarial	Science (lucykwan@hku.hk)				
Teachers Involved	(Ms L M S	Kwan, Statistics & Actuarial	Science)				
Course Objectives	evidence- aims to p adopted s	based approach to understa rovide students with 1) esse	s for studying demographic and and the socio-economic well-bential underlying principles and skills in the statistical descriptial endeavours of a territory.	eing of residen the pertinent r	nts in a territo methods behi	ory. The cours nd international	
Course Contents & Topics	Demographics Socio-eccioneccio	Demographic statistics on population structure, fertility, mortality, migration, life tables, population projections; Socio-economic statistics on housing, labour, and social equity; Economic statistics on external trade, innovation, prices and GDP measurements (with emphasis on method pertaining to some important economic sectors in the case of GDP). Sources, theory and methods of such statistics; Examples would be especially drawn from Hong Kong, neighbouring economies or comparable economies.					
Course Learning	On succe	ssful completion of this cours	se, students should be able to:				
Outcomes	CLO 1 de	escribe and interpret major of	fficial & other publicly dissemina	ated socio-econ	omic statistic	s of a territory	
	K	ong, neighbouring economies		•	•	eference to Hon	
	CLO 3 predict a future situation by extrapolating or referencing from appropriate statistics						
	CLO 4 critically assess statistics reporting						
	(Level 2 c	r above in HKDSE Mathema	atics or Level 2 or above in HK	DSE Mathemat	ics Extended	Module 1 or 2 of	
(and Co-requisites and Impermissible combinations)	(Level 2 of equivalent Pass or a	or above in HKDSE Mathema t); and Iready enrolled in BIOL2102,	- C	1602, STAT260	01, STAT1600		
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022	(Level 2 c equivalen Pass or a	or above in HKDSE Mathema t); and ready enrolled in BIOL2102, er in 2022 - 2023 : N	atics or Level 2 or above in HK ECON1280, STAT1601, STAT	1602, STAT260 <b>Exa</b>	01, STAT1600	3, STAT2901	
Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)	(Level 2 of equivalent Pass or a	or above in HKDSE Mathemati); and iready enrolled in BIOL2102, er in 2022 - 2023 : N  Demonstrate thorough mastery a learning outcomes. Show strong	atics or Level 2 or above in HK	Exact thinking, with every series of the ser	01, STAT1603 mination required for atta ridence of origina	3, STAT2901  aining all the coursel thought, and abilit	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	(Level 2 c equivalen Pass or a	or above in HKDSE Mathemati); and Iready enrolled in BIOL2102, er in 2022 - 2023 : N  Demonstrate thorough mastery a learning outcomes. Show strong to apply knowledge to a wide rapresentational skills.  Demonstrate substantial comman learning outcomes. Show evidence	atics or Level 2 or above in HK ECON1280, STAT1601, STAT at an advanced level of extensive kn analytical and critical abilities and logic	Exa expended and sking with eviar situations. Appl I skills required for logical thinking, and	on, STAT1603 amination required for atta vidence of origina by highly effective attaining at leas	3, STAT2901  aining all the course at thought, and abilite organizational and the course of the course the course of the cou	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	(Level 2 c equivalen Pass or a N Off	or above in HKDSE Mathemath; and liready enrolled in BIOL2102, er in 2022 - 2023 : N  Demonstrate thorough mastery a learning outcomes. Show strong to apply knowledge to a wide rapresentational skills.  Demonstrate substantial comman learning outcomes. Show evidence and some unfamiliar situations. Appemonstrate general but incompoutcomes. Show evidence of sor familiar situations. Apply moderate	atics or Level 2 or above in HK ECON1280, STAT1601, STAT  at an advanced level of extensive kn analytical and critical abilities and logi- ange of complex, familiar and unfamil and of a broad range of knowledge and be of analytical and critical abilities and pply effective organizational and prese plete command of knowledge and si me analytical and critical abilities and ely effective organizational and presen ely effective organizational and presen	Example 1602, STAT260  Example 260 A State	on, STAT1603  Immination required for atta ridence of origina by highly effective attaining at leas d ability to apply ttaining most of ad ability to apply	3, STAT2901  aining all the course al thought, and abilite organizational and the course through the course learning with the course learning	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	(Level 2 c equivalen Pass or a N Off A B C	or above in HKDSE Mathemati); and Iready enrolled in BIOL2102, er in 2022 - 2023 : N  Demonstrate thorough mastery a learning outcomes. Show strong to apply knowledge to a wide rapresentational skills.  Demonstrate substantial comman learning outcomes. Show evidence and some unfamiliar situations. Applemonstrate general but incompoutcomes. Show evidence of sor familiar situations. Apply moderate Demonstrate partial but limited or Show evidence of some coherent knowledge to solve problems. App.	atics or Level 2 or above in HK ECON1280, STAT1601, STAT at an advanced level of extensive kn analytical and critical abilities and logical and critical abilities and unfamily and of a broad range of knowledge and be of analytical and critical abilities and pply effective organizational and prese plete command of knowledge and sk me analytical and critical abilities and ely effective organizational and presen ommand of knowledge and skills requ t and logical thinking, but with limited a ply limited or barely effective organization	Exactions. STAT260  Exactions. STAT260  Exactions. Appl  I skills required for logical thinking, annuational skills. It is required for at logical thinking, an attional skills. The skills is red for attaining so malytical and critical onal and presentational a	on, STAT1603  Immination required for attaining at least dability to apply training most of id ability to apply to a bilities. Show I lonal skills.	3, STAT2901  aining all the course all thought, and abilitie organizational and the course knowledge to familiate the course learning variety knowledge to mose elearning outcomes imited ability to applications.	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)	(Level 2 c equivalen Pass or a N Off A B C D Fail	or above in HKDSE Mathemati); and iready enrolled in BIOL2102, er in 2022 - 2023 : N  Demonstrate thorough mastery a learning outcomes. Show strong to apply knowledge to a wide rapresentational skills.  Demonstrate substantial comman learning outcomes. Show evidence and some unfamiliar situations. Applemonstrate general but incompoutcomes. Show evidence of some interest periodical structure of some coherent knowledge to solve problems. Applemonstrate little or no evidence of analytical and critical abilities	atics or Level 2 or above in HK ECON1280, STAT1601, STAT at an advanced level of extensive kn analytical and critical abilities and logi- ange of complex, familiar and unfamil and of a broad range of knowledge and be of analytical and critical abilities and pply effective organizational and prese plete command of knowledge and sk me analytical and critical abilities and ely effective organizational and presen ommand of knowledge and skills requ t and logical thinking, but with limited a	Exa expended and skills call thinking, with eviar situations. Appl I skills required for logical thinking, and tational skills. Ills required for at logical thinking, and tational skills. red for attaining so nalytical and critical onal and presentati equired for attaining v very little or no	mination required for atta vidence of origina y highly effective attaining at leas d ability to apply ttaining most of a bility to apply one of the course i abilities. Show I ional skills. g the course lear	3, STAT2901  aining all the course al thought, and abilitie organizational and the course that most of the course that course learning with the course learning with the course learning outcomes imited ability to applications.	
and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)	(Level 2 cequivalen Pass or a N Off A B C	or above in HKDSE Mathemati); and iready enrolled in BIOL2102, er in 2022 - 2023 : N  Demonstrate thorough mastery a learning outcomes. Show strong to apply knowledge to a wide rapresentational skills.  Demonstrate substantial comman learning outcomes. Show evidence and some unfamiliar situations. Applemonstrate general but incompoutcomes. Show evidence of some interest periodical structure of some coherent knowledge to solve problems. Applemonstrate little or no evidence of analytical and critical abilities	atics or Level 2 or above in HK ECON1280, STAT1601, STAT at an advanced level of extensive kn analytical and critical abilities and logical and or ange of knowledge and are of analytical and critical abilities and pply effective organizational and prese plete command of knowledge and sk me analytical and critical abilities and ely effective organizational and presen ommand of knowledge and skills requ t and logical thinking, but with limited a ply limited or barely effective organizati of command of knowledge and skills requ t and logical thinking, but with limited a ply limited or barely effective organizati of command of knowledge and skills requ t and logical and coherent thinking. Sho	Exa expended and skills call thinking, with eviar situations. Appl I skills required for logical thinking, and tational skills. Ills required for at logical thinking, and tational skills. red for attaining so nalytical and critical onal and presentati equired for attaining v very little or no	mination required for atta vidence of origina y highly effective attaining at leas d ability to apply ttaining most of a bility to apply one of the course i abilities. Show I ional skills. g the course lear	3, STAT2901  aining all the course al thought, and abilitie organizational and the course that most of the course that course learning with the course learning with the course learning outcomes imited ability to applications.	
and Co-requisites and Impermissible combinations)  Offer in 2021 - 2022  Grade Descriptors (A+ to F)  Communication- ntensive Course Course Type	(Level 2 c equivalen Pass or a N Off A B C D Fail	or above in HKDSE Mathemati); and iready enrolled in BIOL2102, er in 2022 - 2023 : N  Demonstrate thorough mastery a learning outcomes. Show strong to apply knowledge to a wide rapresentational skills.  Demonstrate substantial comman learning outcomes. Show evidence and some unfamiliar situations. Applemonstrate general but incompoutcomes. Show evidence of some interest periodical structure of some coherent knowledge to solve problems. Applemonstrate little or no evidence of analytical and critical abilities	atics or Level 2 or above in HK ECON1280, STAT1601, STAT at an advanced level of extensive kn analytical and critical abilities and logical and or ange of knowledge and are of analytical and critical abilities and pply effective organizational and prese plete command of knowledge and sk me analytical and critical abilities and ely effective organizational and presen ommand of knowledge and skills requ t and logical thinking, but with limited a ply limited or barely effective organizati of command of knowledge and skills requ t and logical thinking, but with limited a ply limited or barely effective organizati of command of knowledge and skills requ t and logical and coherent thinking. Sho	Exa expended and skills call thinking, with eviar situations. Appl I skills required for logical thinking, and tational skills. Ills required for at logical thinking, and tational skills. red for attaining so nalytical and critical onal and presentati equired for attaining v very little or no	mination required for atta vidence of origina y highly effective attaining at leas d ability to apply ttaining most of a bility to apply one of the course i abilities. Show I ional skills. g the course lear	aining all the cours al thought, and abilite organizational and the course the course learning of the course learning outcomes imited ability to apporning outcomes. Lace	
and Co-requisites and Impermissible combinations)  Offer in 2021 - 2022  Grade Descriptors (A+ to F)  Communication- ntensive Course Course Type	(Level 2 c equivalen Pass or a N Off A B C D Fail	or above in HKDSE Mathemati); and Iready enrolled in BIOL2102, er in 2022 - 2023 : N  Demonstrate thorough mastery a learning outcomes. Show strong to apply knowledge to a wide rapresentational skills.  Demonstrate substantial comman learning outcomes. Show evidence and some unfamiliar situations. Ap Demonstrate general but incompoutcomes. Show evidence of sor familiar situations. Apply moderate Demonstrate partial but limited or Show evidence of some coherent knowledge to solve problems. App Demonstrate little or no evidence of analytical and critical abilities problems. Organization and presentated or several control of the several c	atics or Level 2 or above in HK ECON1280, STAT1601, STAT at an advanced level of extensive kn analytical and critical abilities and logical and or ange of knowledge and are of analytical and critical abilities and pply effective organizational and prese plete command of knowledge and sk me analytical and critical abilities and ely effective organizational and presen ommand of knowledge and skills requ t and logical thinking, but with limited a ply limited or barely effective organizati of command of knowledge and skills requ t and logical thinking, but with limited a ply limited or barely effective organizati of command of knowledge and skills requ t and logical and coherent thinking. Sho	Exa expended and skills call thinking, with eviar situations. Appl I skills required for logical thinking, and tational skills. Ills required for at logical thinking, and tational skills. red for attaining so nalytical and critical onal and presentati equired for attaining v very little or no	mination required for atta vidence of origina y highly effective attaining at leas d ability to apply ttaining most of a bility to apply one of the course i abilities. Show I ional skills. g the course lear	aining all the cours al thought, and abilite organizational and the course the course learning of the course learning outcomes imited ability to apporning outcomes. Lace	
and Co-requisites and Impermissible combinations)  Offer in 2021 - 2022  Grade Descriptors (A+ to F)  Communication- ntensive Course Course Type Course Teaching	(Level 2 cequivalen Pass or a N Off A B C D Fail N Lecture-b.	or above in HKDSE Mathemati); and Iready enrolled in BIOL2102, er in 2022 - 2023 : N  Demonstrate thorough mastery a learning outcomes. Show strong to apply knowledge to a wide rapresentational skills.  Demonstrate substantial comman learning outcomes. Show evidence and some unfamiliar situations. Ap Demonstrate general but incompoutcomes. Show evidence of sor familiar situations. Apply moderate Demonstrate partial but limited or Show evidence of some coherent knowledge to solve problems. App Demonstrate little or no evidence of analytical and critical abilities problems. Organization and presentated or several control of the several c	atics or Level 2 or above in HK ECON1280, STAT1601, STAT at an advanced level of extensive kn analytical and critical abilities and logical and critical abilities and unfamily and of a broad range of knowledge and be of analytical and critical abilities and pply effective organizational and prese plete command of knowledge and skills requ analytical and critical abilities and ely effective organizational and presen ommand of knowledge and skills requ and logical thinking, but with limited a ply limited or barely effective organizati of command of knowledge and skills re, s, logical and coherent thinking. Show entational skills are minimally effective	Exa expected and skills and thinking, with eviar situations. Appl I skills required for logical thinking, and tational skills. alls required for at logical thinking, and tational skills. and and presentational and and presentational equired for attaining very little or no	mination required for atta vidence of origina y highly effective attaining at leas d ability to apply ttaining most of a bility to apply one of the course i abilities. Show I ional skills. g the course lear	3, STAT2901  aining all the cours al thought, and abilit e organizational an- st most of the cours knowledge to familia the course learning y knowledge to mos e learning outcomes imited ability to app rning outcomes. Lac knowledge to solve	
Communication- intensive Course Course Type Course Teaching	(Level 2 cequivalen Pass or a N Off A B C D Fail N Lecture-b Activities	or above in HKDSE Mathemati); and Iready enrolled in BIOL2102, er in 2022 - 2023 : N  Demonstrate thorough mastery a learning outcomes. Show strong to apply knowledge to a wide rapresentational skills.  Demonstrate substantial comman learning outcomes. Show evidence and some unfamiliar situations. Ap Demonstrate general but incompoutcomes. Show evidence of sor familiar situations. Apply moderate Demonstrate partial but limited composition of some coherent knowledge to solve problems. App Demonstrate little or no evidence of analytical and critical abilities problems. Organization and presentated course	atics or Level 2 or above in HK ECON1280, STAT1601, STAT at an advanced level of extensive kn analytical and critical abilities and logical and critical abilities and unfamily and of a broad range of knowledge and be of analytical and critical abilities and pply effective organizational and prese plete command of knowledge and skills requ analytical and critical abilities and ely effective organizational and presen ommand of knowledge and skills requ and logical thinking, but with limited a ply limited or barely effective organizati of command of knowledge and skills re, s, logical and coherent thinking. Show entational skills are minimally effective	Exa expected and skills and thinking, with eviar situations. Appl I skills required for logical thinking, and tational skills. alls required for at logical thinking, and tational skills. and and presentational and and presentational equired for attaining very little or no	mination required for atta vidence of origina y highly effective attaining at leas d ability to apply ttaining most of a bility to apply one of the course i abilities. Show I ional skills. g the course lear	3, STAT2901  aining all the cours al thought, and abilit e organizational an at most of the cours knowledge to familia the course learning knowledge to most e learning outcomes imited ability to app rning outcomes. Lacknowledge to solv	
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	(Level 2 cequivalen Pass or a N Off A B C D Fail N Lecture-b Activities Lectures Tutorials	or above in HKDSE Mathemati); and Iready enrolled in BIOL2102, er in 2022 - 2023 : N  Demonstrate thorough mastery a learning outcomes. Show strong to apply knowledge to a wide rapresentational skills.  Demonstrate substantial comman learning outcomes. Show evidence and some unfamiliar situations. Ap Demonstrate general but incompoutcomes. Show evidence of sor familiar situations. Apply moderate Demonstrate partial but limited composition of some coherent knowledge to solve problems. App Demonstrate little or no evidence of analytical and critical abilities problems. Organization and presentated course	atics or Level 2 or above in HK ECON1280, STAT1601, STAT at an advanced level of extensive kn analytical and critical abilities and logical and critical abilities and unfamily and of a broad range of knowledge and be of analytical and critical abilities and pply effective organizational and prese plete command of knowledge and skills requ analytical and critical abilities and ely effective organizational and presen ommand of knowledge and skills requ and logical thinking, but with limited a ply limited or barely effective organizati of command of knowledge and skills re, s, logical and coherent thinking. Show entational skills are minimally effective	Exa expected and skills and thinking, with eviar situations. Appl I skills required for logical thinking, and tational skills. alls required for at logical thinking, and tational skills. and and presentational and and presentational equired for attaining very little or no	mination required for atta vidence of origina y highly effective attaining at leas d ability to apply ttaining most of a bility to apply one of the course i abilities. Show I ional skills. g the course lear	aning all the cours all thought, and abilite organizational and the course the course the course that the cour	

and Weighting			course grade (%)	Methods to CLO Mapping
	Assignments	Coursework (assignments, tutorials and a test)	35	CLO 1,2,3,4
	Examination	One 2-hour written examination	65	CLO 1,2,3,4
Required/recommended reading and online materials	Pollard A. H., Yusuf F., & Pollard C	s & Statistics Department, Hong Ko 5. N.: Demographic Techniques (Penomic Statistics - an OECD Perspe	ergamon Press, 1990, 3rd	d edition)
Course Website	http://moodle.hku.hk			

STAT2901	Probabilit credits)	ty and statisti	cs: foundations	of actuarial scie	ence (6	Academic Yea	ar 2021
Offering Department		Actuarial Science	e			Quota	
Course Co-ordinator			Actuarial Science (	smslee @hku.hk)		1 -41 - 11	
Teachers Involved	(Prof S M S	Lee,Statistics &	Actuarial Science)	•			
Course Objectives	quantitative	ly assessing ris	k. Applications of	owledge of the fun- these tools to act pability topics and th	uarial scier	nce problems w	
Course Contents & Topics  Course Learning	1. General p - Basic elen - Mutually e - Addition ar - Independe - Combinato - Conditiona - Bayes thee - Random v 2. Univariat uniform, ex distribution - Probability - Cumulative - Mode, mee - Variance a - Central lim 3. Sampling	probability nents of probabil xclusive events nd multiplication ence of events orial probability al probability and orem / Law of to cariables te probability dis ponential, chi-so y functions and p e distribution fun dian, percentiles and measures of nit theorem y distributions and	expectations tall probability density fuctions and moments dispersion dintroduction of esti	i binomial, negative b, lognormal, gamn nctions	binomial, ç na, Weibull	geometric, hyperg	•
Outcomes	CLO 1 u CLO 2 de CLO 3 a	nderstand the m evelop skills in p pply techniques	athematical theory robabilistic analysis in probability and st	underlying the mode for problems involv atistics to solve actu	rn practice ing random arial scienc	ness ce problems	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in MATH1821 [for BSc(ActuarSc) students] or already enrolled in this course, or Pass in MATH1013 or already enrolled in this course [for students outside the BSc(ActuarSc) programme]; and Not for students who have passed or enrolled in any of these courses: STAT1601, STAT1602, STAT1603 STAT2601						T1602, STAT1603
Offer in 2021 - 2022	Y 2nd s		122 - 2023 : Y			Examination	May
Grade Descriptors (A+ to F)  Communication-	B C D	learning outcomes. It to apply knowledge presentational skills. Demonstrate substa learning outcomes. It and some unfamiliar Demonstrate genera outcomes. Show evifamiliar situations. A Demonstrate partial Show evidence of so knowledge to solve poemonstrate little or of analytical and or	Show strong analytical at to a wide range of cornitial command of a broshow evidence of analytic situations. Apply effective all but incomplete commidence of some analytic pply moderately effective but limited command of ome coherent and logical problems. Apply limited companding to comman or evidence of comman to evidence of comman titical abilities, logical and to a wide range of comman to evidence of comman to evidence of comman the comman to evidence of comman the comman that the comma	nced level of extensive and critical abilities and longlex, familiar and unfar and range of knowledge a cal and critical abilities are organizational and presand of knowledge and and critical abilities are organizational and presaknowledge and skills rethinking, but with limiteer or barely effective organization of knowledge and skills do cherent thinking. Sl kills are minimally effective.	igical thinking, miliar situation and skills requid logical think sentational skil skills required id logical think entational skill quired for atta a nalytical and ational and priss required for so required for now very little	with evidence of original and a single properties. Apply highly effecting, and ability to applies. It is a single properties and a single properties and a single properties. Show that is a single properties are a single properties. Show the properties are a single properties and a single properties are a single properties. The properties are a single properties and a single properties are a single properties. The properties are a single properties and a single properties are a single properties. The properties are a single properties and a single properties are a single properties. The properties are a single properties and a single properties are a single properties. The properties are a single properties and a single properties are a single properties and a single properties are a single properties. The properties are a single properties are a single properties and a single properties are a single properties and a single properties are a single properties and a single properties are a single properties and a single properties are a single properties and a single properties are a single properties are a single properties are a single properties are a single properties and a single properties are a single prope	ginal thought, and ability citive organizational and east most of the course learning of the course learning opply knowledge to mosure learning outcomes we limited ability to apply earning outcomes. Lack
communication- intensive Course	IN						
Course Type	Lecture-bas	sed course					
Course Teaching	Activities	.5 004.00	Details				No. of Hours
& Learning Activities	Lectures		_ 5.66			36	
-	Tutorials		tutorials/exa	mple classes			12
	Reading / S	Self study					100
Assessment Methods and Weighting	Methods	•	Details			hting in final se grade (%)	Assessment Methods to CLO Mapping
	Assignmen			d a class test)		25	CLO 1,2,3
<b>D</b>							CLO 1,2,3
Required/recommended reading and online materials	Examination  One 3-hour written examination  75  CLO 1,2,3  Feller, W. (1968). An Introduction to Probability Theory and Its Applications. Wiley, New York.  Hassett, M. and Stewart, D. (2006). Probability for Risk Management (2nd Edition). ACTEX Publication: Winsted. Hogg, R.V. and Tanis, E.A. (2009). Probability and Statistical Inference (8th Edition). Prentice Hall: Upper Sadc River.  Ross, S.M. (2005). A First Course in Probability (7th Edition). Prentice Hall: Upper Saddle River.  Wackerly, D., Mendenhall, R. and Scheaffer, R. (2008). Mathematical Statistics with Applications. (7th Edition).						

STAT2902	Financia	al mathematics (6 cr	edits)	Academic Year	2021	
Offering Department	Statistics	& Actuarial Science	•	Quota		
Course Co-ordinator	Prof K C Yuen, Statistics & Actuarial Science (kcyuen@hku.hk)					
Teachers Involved	(Prof K C Yuen, Statistics & Actuarial Science)					
Course Objectives	This course introduces the fundamental concepts of financial mathematics which plays an important role in the					
-	development of basic actuarial techniques. Practical applications of these concepts are also covered.					
Course Contents & Topics	Key topics include: measurement of interest, annuities certain; discounted cash flow analysis; yield rates amortization schedules and sinking funds; bonds and related securities; practical applications such as real estat mortgage and short sales; stochastic approaches to interest; and key terms of financial analysis such as yield curves, spot rates, forward rates, duration, convexity, and immunization.					
Course Learning			ourse, students should be able to:			
Outcomes	CLO 1		epts of financial mathematics			
	CLO 2		ate elementary financial problems			
	CLO 3	apply compound interes	st theory to tackle some practical fina	incial problems		
	CLO 4	show an understanding	of the term structure of interest rates	S		
	CLO 5	show an understanding	of simple stochastic models for inve	stment returns		
Pre-requisites	Pass in S	TAT2901, or already enr				
(and Co-requisites and Impermissible combinations)	Not for stu	udents who have passed	in STAT3615, or already enrolled in	this course.		
Offer in 2021 - 2022	Y 2nd	d sem Offer in 2022 - 2	023 : Y	Examination	May	
Grade Descriptors (A+ to F)	A					
	В	II.				
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.				
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.				
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.					
Communication-	N					
intensive Course						
Course Type	Lecture-b	ased course				
Course Teaching	Activities	S	Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials		tutorials/example classes		12	
	Reading	/ Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignments		Coursework (assignments, tutorials, class test(s) and participation)	50	CLO 1,2,3,4,5	
	Examinat	tion	One 3-hour written examination	50	CLO 1,2,3,4,5	
Required/recommended reading and online materials		in, S. A.: Mathematics o	rest (Irwin: Illinois, 2008, 3rd edition) f Investment and Credit (ACTEX Pu	ublications - Mad River Bo	oks: Connecticut,	
Course Website		odle.hku.hk				

STAT3010	Image	processing and computer vision (6 credits)  Acade	emic Year	2021		
Offering Department	Statistics	s & Actuarial Science Quota	а	15		
Course Co-ordinator	Dr Y Cad	o, Statistics & Actuarial Science (yuancao@hku.hk)				
Teachers Involved	(Dr Y Ca	io,Statistics & Actuarial Science; Mathematics)				
Course Objectives	The course is a first-level course that introduces basic concepts of production and manipulation of digital image Materials are covered in both theoretical and computational aspects. On the theoretical foundations, the cour introduces mathematical tools for image processing including representation of two-dimensional data, time a frequency domain representations, filtering and enhancement, the Fourier transform, convolution, interpolatical color images, and techniques for animation. On the computational side, algorithms and their implementation emphasized during the lectures and exercised during computer labs or tutorials.					
Course Contents & Topics	- Imaging - Image I - Image I - Principl - Display effects; - Three-C - Image	content include the following topics g systems and representation of digital images; transformation and filtering; resolutions, sub-sampling and interpolation; les of colors in digital images, their manipulation for special image effects; y of 2-D or 3-D information from images such as perspective viewing the gendimensional vision and motion; processing methods, techniques, and tools, such as OpenCV, Tensorflow, Processing methods, techniques, and tools, such as OpenCV, Tensorflow, Processing methods, techniques, and tools, such as OpenCV, Tensorflow, Processing methods, techniques, and tools, such as OpenCV, Tensorflow, Processing methods, techniques, and tools, such as OpenCV, Tensorflow, Processing methods, techniques, and tools, such as OpenCV, Tensorflow, Processing methods, techniques, and tools, such as OpenCV, Tensorflow, Processing methods, techniques, and tools, such as OpenCV, Tensorflow, Processing methods, techniques, and tools, such as OpenCV, Tensorflow, Processing methods, techniques, and tools, such as OpenCV, Tensorflow, Processing methods, techniques, and tools, such as OpenCV, Tensorflow, Processing methods, techniques, and tools, such as OpenCV, Tensorflow, Processing methods, techniques, and tools, such as OpenCV, Tensorflow, Processing methods, techniques, and tools, such as OpenCV, Tensorflow, Processing methods, techniques, and tools, such as OpenCV, Tensorflow, Processing methods, techniques, and tools, such as OpenCV, Tensorflow, Processing methods, techniques, and tools, such as OpenCV, Tensorflow, Processing methods, techniques, and tools, such as OpenCV, Tensorflow, Processing methods, techniques, and tools, such as OpenCV, Tensorflow, Processing methods, techniques, and tools, such as OpenCV, Tensorflow, Processing methods, techniques, and tools, such as OpenCV, Tensorflow, Processing methods, techniques, and tools, such as OpenCV, tensorflow, and the OpenCV, tensorflow, techniques, and tools, techniques, and tensorflow, tensorflow, tensorflow, tensorflow, tensorflow, tensorflow,				
Course Learning Outcomes	CLO 1 CLO 2 CLO 3	essful completion of this course, students should be able to: Understand the mathematical theory of image formation Understand the mathematical theory of image transformation and filtering Implement algorithms and methods of image processing using a computing la Achieve simple image processing tasks on real-world images and videos	anguage			

	CLO 5 Acquire hands-on experience on the use of image processing and computer vision tools					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in STAT2602 and (COMP2113 or COMP2119 or COMP2396).					
Offer in 2021 - 2022	Y 2nd sem Offer in 2022 - 2023 : Y Examination May					
Grade Descriptors (A+ to F)	A	learning outcomes. S	th mastery at an advanced level of extensive k show strong analytical and critical abilities and log to a wide range of complex, familiar and unfam	gical thinking, with evidence of original	ginal thought, and ability	
	В	learning outcomes. S	ntial command of a broad range of knowledge ar show evidence of analytical and critical abilities an situations. Apply effective organizational and pres	d logical thinking, and ability to ap		
	С	outcomes. Show evi	Il but incomplete command of knowledge and sidence of some analytical and critical abilities and oply moderately effective organizational and prese	d logical thinking, and ability to a		
	D					
	Fail					
Communication- intensive Course	N					
Course Type	Lecture-b	ased course				
Course Teaching	Activitie	s	Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials				12	
	Reading / Self study				100	
Assessment Methods and Weighting	Methods	5	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignments		Coursework (assignments, tutorials, class test(s) and a ground a g	<b>л</b> р 50	CLO 1,2,3,4,5	
			project)			
	Examina	tion	One 2-hour written examination	50	CLO 1,2,3	

STAT3021	Modern	biostatistics (6 cred	its)	Academic Yea	r 2021		
Offering Department	Statistics	& Actuarial Science		Quota	15		
Course Co-ordinator	Dr J Xu, S	Dr J Xu, Statistics & Actuarial Science (xujf@hku.hk)					
Teachers Involved	(Dr J Xu,	(Dr J Xu, Statistics & Actuarial Science)					
Course Objectives	This course is designed to introduce students the-of-art study designs and statistical analysis methods in						
		biomedical studies including randomized and observational studies, high-throughput data from genetics/genomics.					
Course Contents		The following topics will be covered in the course.					
& Topics		<ul> <li>study design techniques including randomized and observational designs</li> <li>continuous, categorical and person-time data analysis</li> <li>longitudinal and correlated data analysis</li> </ul>					
	_	inai and correlated data a ialysis methods	inaiysis				
		ement error methods					
		data methods					
		ding and selection bias a	diustment				
		ale inference	-,				
Course Learning	On succe	ssful completion of this co	ourse, students should be able	to:			
Outcomes	CLO 1	Understanding the ba	sic concepts of study designs				
	CLO 2 Learn statistical analysis for various types of biomedical data						
	CLO 3						
	CLO 4 Learn statistical methods for handling various types of biases						
	CLO 5						
Pre-requisites		TAT2602	ods for large-scale inference				
(and Co-requisites and Impermissible			ods for large-scale inference				
(and Co-requisites and Impermissible combinations)	Pass in S		ods for large-scale inference	Examination			
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022	Pass in S	TAT2602  fer in 2022 - 2023 : Y  Demonstrate thorough mast learning outcomes. Show str	ery at an advanced level of extensive	<b>Examination</b> e knowledge and skills required for a logical thinking, with evidence of orig familiar situations. Apply highly effect	nal thought, and ability		
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Pass in S	fer in 2022 - 2023 : Y  Demonstrate thorough mast learning outcomes. Show str to apply knowledge to a wic presentational skills.  Demonstrate substantial con learning outcomes. Show evi	ery at an advanced level of extensivong analytical and critical abilities and de range of complex, familiar and un	e knowledge and skills required for a logical thinking, with evidence of orig familiar situations. Apply highly effect e and skills required for attaining at le and logical thinking, and ability to app	nal thought, and ability ive organizational and ast most of the course		
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Pass in S  N Off	fer in 2022 - 2023 : Y  Demonstrate thorough mast learning outcomes. Show str to apply knowledge to a wie presentational skills.  Demonstrate substantial con learning outcomes. Show evi and some unfamiliar situatior Demonstrate general but in outcomes. Show evidence or outcomes. Show evidence or service of the strength of the streng	ery at an advanced level of extensivong analytical and critical abilities and de range of complex, familiar and un an and of a broad range of knowledge dence of analytical and critical abilities is. Apply effective organizational and p complete command of knowledge an	e knowledge and skills required for a l logical thinking, with evidence of orig familiar situations. Apply highly effec- e and skills required for attaining at le- and logical thinking, and ability to app- presentational skills. and skills required for attaining most and and logical thinking, and ability to app-	nal thought, and ability ive organizational and ast most of the course ly knowledge to familia of the course learning		
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Pass in S  N Off  A  B	fer in 2022 - 2023 : Y  Demonstrate thorough mast learning outcomes. Show str to apply knowledge to a wide presentational skills.  Demonstrate substantial con learning outcomes. Show evi and some unfamiliar situation Demonstrate general but in outcomes. Show evidence of familiar situations. Apply mod Demonstrate partial but limit Show evidence of some coherents.	ery at an advanced level of extensivong analytical and critical abilities and de range of complex, familiar and un mand of a broad range of knowledge dence of analytical and critical abilities is. Apply effective organizational and promplete command of knowledge and fome analytical and critical abilities lerately effective organizational and preed command of knowledge and skills	e knowledge and skills required for a logical thinking, with evidence of orig familiar situations. Apply highly effect e and skills required for attaining at le and logical thinking, and ability to app oresentational skills. In d skills required for attaining most and logical thinking, and ability to app esentational skills.	nal thought, and ability ive organizational and ast most of the course y knowledge to familia of the course learning ply knowledge to most rise learning outcomes		
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Pass in S  N Off  A  B	fer in 2022 - 2023 : Y  Demonstrate thorough mast learning outcomes. Show str to apply knowledge to a wide presentational skills.  Demonstrate substantial con learning outcomes. Show eviand some unfamiliar situation Demonstrate general but in outcomes. Show evidence of familiar situations. Apply mod Demonstrate partial but limit Show evidence of some coheknowledge to solve problems Demonstrate little or no evide of analytical and critical ab	ery at an advanced level of extensivong analytical and critical abilities and the range of complex, familiar and unamend of a broad range of knowledge dence of analytical and critical abilities as. Apply effective organizational and promplete command of knowledge are for some analytical and critical abilities derately effective organizational and pred command of knowledge and skills erent and logical thinking, but with limit apply limited or barely effective organizational and predictive organizational and pred	e knowledge and skills required for a logical thinking, with evidence of orig familiar situations. Apply highly effect e and skills required for attaining at let and logical thinking, and ability to app oresentational skills. In description of the still still and the stills required for attaining most and logical thinking, and ability to app esentational skills. required for attaining some of the cou- ted analytical and critical abilities. Show inizational and presentational skills. Kills required for attaining the course let Show very little or no ability to app	nal thought, and ability ive organizational and ast most of the course y knowledge to familia of the course learning ply knowledge to most rise learning outcomes vi limited ability to apply tarning outcomes. Lack		
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)	Pass in S  N Off A  B  C	fer in 2022 - 2023 : Y  Demonstrate thorough mast learning outcomes. Show str to apply knowledge to a wide presentational skills.  Demonstrate substantial con learning outcomes. Show eviand some unfamiliar situation Demonstrate general but in outcomes. Show evidence of familiar situations. Apply mod Demonstrate partial but limit Show evidence of some coheknowledge to solve problems Demonstrate little or no evide of analytical and critical ab	ery at an advanced level of extensive ong analytical and critical abilities and de range of complex, familiar and un an advance of analytical and critical abilities is. Apply effective organizational and promplete command of knowledge and from analytical and critical abilities lerately effective organizational and promplete command of knowledge and skills erent and logical thinking, but with limit is. Apply limited or barely effective organizational command of knowledge and skills ence of command of knowledge and skills littles, logical and coherent thinking.	e knowledge and skills required for a logical thinking, with evidence of orig familiar situations. Apply highly effect e and skills required for attaining at let and logical thinking, and ability to app oresentational skills. In description of the still still and the stills required for attaining most and logical thinking, and ability to app esentational skills. required for attaining some of the cou- ted analytical and critical abilities. Show inizational and presentational skills. Kills required for attaining the course let Show very little or no ability to app	nal thought, and ability ive organizational and ast most of the course y knowledge to familia of the course learning ply knowledge to most rise learning outcomes vi limited ability to apply tarning outcomes. Lack		
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)	Pass in S  N Off A  B  C  D  Fail	fer in 2022 - 2023 : Y  Demonstrate thorough mast learning outcomes. Show str to apply knowledge to a wide presentational skills.  Demonstrate substantial con learning outcomes. Show eviand some unfamiliar situation Demonstrate general but in outcomes. Show evidence of familiar situations. Apply mod Demonstrate partial but limit Show evidence of some coheknowledge to solve problems Demonstrate little or no evide of analytical and critical ab	ery at an advanced level of extensive ong analytical and critical abilities and de range of complex, familiar and un an advance of analytical and critical abilities is. Apply effective organizational and promplete command of knowledge and from analytical and critical abilities lerately effective organizational and promplete command of knowledge and skills erent and logical thinking, but with limit is. Apply limited or barely effective organizational command of knowledge and skills ence of command of knowledge and skills littles, logical and coherent thinking.	e knowledge and skills required for a logical thinking, with evidence of orig familiar situations. Apply highly effect e and skills required for attaining at let and logical thinking, and ability to app oresentational skills. In description of the still still and the stills required for attaining most and logical thinking, and ability to app esentational skills. required for attaining some of the cou- ted analytical and critical abilities. Show inizational and presentational skills. Kills required for attaining the course let Show very little or no ability to app	nal thought, and ability ive organizational and ast most of the course y knowledge to familia of the course learning ply knowledge to most rise learning outcomes vi limited ability to apply tarning outcomes. Lack		
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Pass in S  N Off A  B  C  D  Fail	fer in 2022 - 2023 : Y  Demonstrate thorough mast learning outcomes. Show str to apply knowledge to a wice presentational skills.  Demonstrate substantial con learning outcomes. Show evidence of familiar situations. Apply more demonstrate partial but limite Show evidence of some conking the some conking the strength of the some conking the source of analytical and critical abproblems. Organization and passed course	ery at an advanced level of extensive ong analytical and critical abilities and de range of complex, familiar and un an advance of analytical and critical abilities is. Apply effective organizational and promplete command of knowledge and from analytical and critical abilities lerately effective organizational and promplete command of knowledge and skills erent and logical thinking, but with limit is. Apply limited or barely effective organizational command of knowledge and skills ence of command of knowledge and skills littles, logical and coherent thinking.	e knowledge and skills required for a logical thinking, with evidence of orig familiar situations. Apply highly effect e and skills required for attaining at let and logical thinking, and ability to app oresentational skills. In description of the still still and the stills required for attaining most and logical thinking, and ability to app esentational skills. required for attaining some of the cou- ted analytical and critical abilities. Show inizational and presentational skills. Kills required for attaining the course let Show very little or no ability to app	nal thought, and ability ive organizational and ast most of the course y knowledge to familia of the course learning ply knowledge to most rise learning outcomes vi limited ability to apply tarning outcomes. Lack		

	Tutorials			12
	Reading / Self study			100
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments	Coursework (assignments, tutorials, and class test(s))	25	CLO 1,2,3,4,5
	Examination	One 2-hour written examination	75	CLO 1,2,3,4,5
Course Website	http://moodle.hku.hk			

Statistics & Prof T W K (Prof T W The analytechniques practice of (1) Simple tests and (2) Multiple	K Fung, Statistics & Ac sis of variability is n s investigate these so these models. Inear regression: lea	tuarial Science <i>(wingfung@hku.hk)</i> tuarial Science)						
(Prof T W The analy techniques practice of (1) Simple tests and c (2) Multiple	K Fung, Statistics & Ac sis of variability is n s investigate these so these models. Inear regression: lea	tuarial Science) nainly concerned with locating th		·				
The analy techniques practice of (1) Simple tests and c (2) Multiple	rsis of variability is not investigate these so these models.	nainly concerned with locating th	ne sources of the variabil					
techniques practice of (1) Simple tests and o (2) Multiple	s investigate these so these models. linear regression: lea		(Prof T W K Fung, Statistics & Actuarial Science) The analysis of variability is mainly concerned with locating the sources of the variability. Many statistic					
tests and of (2) Multiple	•							
(3) One-wa (4) Two-w treatment (5) University and two-wa (6) Regress	e linear regression: leas, hypothesis tests and ay classification model way classification mode effects, contrasts, rance al approach to linear ay (unbalanced) mode ssion diagnostics: leve	dels: interactions, two-way ANOV lomised complete block design. modelling: dummy variables, 'multi ls, ANCOVA models, concomitant rage, residual plot, normal probab	riance, coefficient of determ parameters, prediction, postument effects, contrasts.  'A for balanced data struple linear regression' representations.  It is a support of the contract of the	mination, reduced vs olynomial regression. uctures, analysis of sentation of one-way				
On succes	sful completion of this	course, students should be able to	:					
CLO 1 u	ınderstand linear regre	ssion model with one or multiple in	dependent variables					
CLO 2 u	inderstand ANOVA mo	odels for one and two factors						
	<u> </u>	ear model with categorical and cont	inuous independent variabl	es				
Not for stu	dents who have passe	· •						
Y 1st	sem 2nd sem Offe	r in 2022 - 2023 : Y	Examination	Dec May				
B C D	learning outcomes. Show to apply knowledge to a presentational skills.  Demonstrate substantial clearning outcomes. Show and some unfamiliar situat Demonstrate general but outcomes. Show evidence familiar situations. Apply m Demonstrate partial but lir Show evidence of some or knowledge to solve proble Demonstrate little or no ev of analytical and critical	strong analytical and critical abilities and lowide range of complex, familiar and unfar command of a broad range of knowledge a evidence of analytical and critical abilities are ions. Apply effective organizational and preincomplete command of knowledge and of some analytical and critical abilities are noderately effective organizational and presented command of knowledge and skills recoherent and logical thinking, but with limited ms. Apply limited or barely effective organizationec of command of knowledge and skills reidence of command of knowledge and skill abilities, logical and coherent thinking. St	gical thinking, with evidence of or miliar situations. Apply highly effect and skills required for attaining at delogical thinking, and ability to ap- sentational skills. skills required for attaining most delogical thinking, and ability to ap- entational skills. quired for attaining some of the cultural quired for attaining some of the cultural analytical and critical abilities. Shational and presentational skills. s required for attaining the course low very little or no ability to ap-	riginal thought, and ability active organizational and least most of the course pply knowledge to familiar t of the course learning apply knowledge to most ourse learning outcomes. low limited ability to apply the learning outcomes. Lack				
N								
	i	Details		No. of Hours				
			36					
	Calf atudy			12 100				
Methods	Sell study	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping				
Assignme	nts	Coursework (assignments, tutorials and a test)	25	CLO 1,2,3				
Examinati	on	One 2-hour written examination	75	CLO 1,2,3				
Hill/Irwin; 5 Berry, D. A Draper, N. Krzanowsk Montgome	5th edition) A. & Lindgren, B. W.: S R. & Smith, H.: Applie ki, W. J.: An Introductio rry, D. C. & Peck, E. A.	tatistics: Theory and Methods (Duxed Regression Analysis (Wiley, Neven to Statistical Modelling (Arnold, I	kbury Belmont, 1996) v York, 1998) London, 1998)	,				
	(4) Two-w treatment (5) Universand two-w (6) Regres observation On success CLO 1   CLO 2   CLO 3   CLO	(4) Two-way classification mod treatment effects, contrasts, rand (5) Universal approach to linear and two-way (unbalanced) mode (6) Regression diagnostics: leve observation, Cook's distance, mu On successful completion of this CLO 1 understand linear regre CLO 2 understand ANOVA mc CLO 3 understand general line Pass in STAT2602; and Not for students who have passe Y 1st sem 2nd sem Offe A Demonstrate thorough malearning outcomes. Show to apply knowledge to a presentational skills.  B Demonstrate substantial clearning outcomes. Show and some unfamiliar situations. Apply moderate general but outcomes. Show evidence familiar situations. Apply moderate partial but lire Show evidence of some knowledge to solve problems. Organization and N  Lecture-based course Activities Lectures Tutorials Reading / Self study  Methods  Examination  Michael H Kutner, Christopher J Hill/Irwin; 5th edition)  Berry, D. A. & Lindgren, B. W.: S Draper, N. R. & Smith, H.: Applie Krzanowski, W. J.: An Introduction and the standard production of the control of the cont	<ul> <li>(4) Two-way classification models: interactions, two-way ANOV treatment effects, contrasts, randomised complete block design.</li> <li>(5) Universal approach to linear modelling: dummy variables, 'multi and two-way (unbalanced) models, ANCOVA models, concomitant (6) Regression diagnostics: leverage, residual plot, normal probab observation, Cook's distance, multicollinearity, model transformation On successful completion of this course, students should be able to CLO 1 understand linear regression model with one or multiple in CLO 2 understand ANOVA models for one and two factors CLO 3 understand general linear model with categorical and cont Pass in STAT2602; and Not for students who have passed in STAT3907, or have already er</li> <li>Y 1st sem 2nd sem Offer in 2022 - 2023 : Y</li> <li>A Demonstrate thorough mastery at an advanced level of extensive learning outcomes. Show strong analytical and critical abilities and to apply knowledge to a wide range of complex, familiar and unfar presentational skills.</li> <li>B Demonstrate substantial command of a broad range of knowledge and succomes. Show evidence of analytical and critical abilities and some unfamiliar situations. Apply effective organizational and presentational skills.</li> <li>D Demonstrate partial but limited command of knowledge and skill resolve organizational and presentational spatial but limited command of knowledge and skills resolve organization and presentational and presentational skills are minimally effective organization and presentational skills are minimally effective organization and presentational skills are minimally effective organization.</li> <li>Fail Demonstrate little or no evidence of command of knowledge and skills resolved to a solve problems. Apply limited or barely effective organization and presentational skills are minimally effective organization.</li> <li>Reading / Self study</li> <li>Methods</li> <li>Details</li> <li>Lecture-based course</li> <li>Activities<td>(5) Universal approach to linear modelling: dummy variables, 'multiple linear regression' represent divo-way (unbalanced) models, ANCOVA models, concomitant variables.  (6) Regression diagnostics: leverage, residual plot, normal probability plot, outlier, studentizer observation, Cook's distance, multicollinearity, model transformation.  On successful completion of this course, students should be able to:  CLO 1 understand linear regression model with one or multiple independent variables.  CLO 2 understand ANOVA models for one and two factors.  CLO 3 understand general linear model with categorical and continuous independent variable Pass in STAT2602; and  Not for students who have passed in STAT3907, or have already enrolled in this course.  Y 1st sem 2nd sem Offer in 2022 - 2023 : Y Examination  A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of or to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply inghip leff presentational skills.  B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to a rand some unfamiliar situations. Apply effective organizational and presentational skills.  C Demonstrate peneral but incomplete command of knowledge and skills required for attaining mos outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to a familiar situations. Apply methods and critical abilities and logical thinking, and ability to a show evidence of some analytical and critical abilities and logical thinking, and ability to a familiar situations. Apply methods of knowledge and skills required for attaining mos outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to a show evidence of so</td></li></ul>	(5) Universal approach to linear modelling: dummy variables, 'multiple linear regression' represent divo-way (unbalanced) models, ANCOVA models, concomitant variables.  (6) Regression diagnostics: leverage, residual plot, normal probability plot, outlier, studentizer observation, Cook's distance, multicollinearity, model transformation.  On successful completion of this course, students should be able to:  CLO 1 understand linear regression model with one or multiple independent variables.  CLO 2 understand ANOVA models for one and two factors.  CLO 3 understand general linear model with categorical and continuous independent variable Pass in STAT2602; and  Not for students who have passed in STAT3907, or have already enrolled in this course.  Y 1st sem 2nd sem Offer in 2022 - 2023 : Y Examination  A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of or to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply inghip leff presentational skills.  B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to a rand some unfamiliar situations. Apply effective organizational and presentational skills.  C Demonstrate peneral but incomplete command of knowledge and skills required for attaining mos outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to a familiar situations. Apply methods and critical abilities and logical thinking, and ability to a show evidence of some analytical and critical abilities and logical thinking, and ability to a familiar situations. Apply methods of knowledge and skills required for attaining mos outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to a show evidence of so				

STAT3602	Statistical inference (6 credits)	Academic Year	2021
Offering Department	Statistics & Actuarial Science	Quota	
Course Co-ordinator	Prof S M S Lee, Statistics & Actuarial Science (smslee@hku.hk)		
Teachers Involved	(Prof S M S Lee, Statistics & Actuarial Science)		
Course Objectives	This course covers the advanced theory of point estimation, interval estimatio mathematically-oriented approach, the course provides a solid and rigorous statistical methodologies and the underlying concepts and theory. It is suitable	treatment of infer	ential problems,

	to further their studies or to develop a career in statistical research.						
Course Contents & Topics	<ol> <li>Decision problem - frequentist approach: loss function; risk; decision rule; admissibility; minimaxity; unbiasedness; Bayes' rule.</li> <li>Decision problem - Bayesian approach: prior and posterior distributions, Bayesian inference.</li> <li>Estimation theory: exponential families; likelihood; sufficiency; minimal sufficiency; completeness; UMVU estimators; information inequality; large-sample theory of maximum likelihood estimation.</li> <li>Hypothesis testing: uniformly most powerful test; monotone likelihood ratio; UMP unbiased test; large-sample theory of likelihood ratio; confidence set.</li> </ol>						
Course Learning	On succes	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 form a panoramic view of classical developments in mathematical statistics CLO 2 gain thorough insight into the essentials of statistical inference CLO 3 build a solid foundation for future research studies in statistics and related areas						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in STAT2602 or STAT3902						
Offer in 2021 - 2022	Y 1st	sem Offer in 2022	- 2023 : Y	Examination	Dec		
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.  B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course						
	learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.						
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.						
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.						
	Fail	Demonstrate little or no of analytical and critical	evidence of command of knowledge and skills al abilities, logical and coherent thinking. Sho and presentational skills are minimally effective	required for attaining the course ow very little or no ability to ap			
Communication-	N						
intensive Course							
Course Type	Lecture-ba	ased course					
Course Type Course Teaching	Activities		Details		No. of Hours		
Course Type Course Teaching	Activities Lectures		Details		36		
Course Type Course Teaching	Activities Lectures Tutorials		Details		36 12		
Course Type Course Teaching & Learning Activities	Activities Lectures Tutorials Reading /			Weighting in final	36 12 100		
Course Type Course Teaching & Learning Activities Assessment Methods	Activities Lectures Tutorials		Details  Details	Weighting in final course grade (%)	36 12		
Course Type Course Teaching & Learning Activities Assessment Methods	Activities Lectures Tutorials Reading / Methods	Self study	Details  Coursework (assignments, tutorials, and a class test)	course grade (%)	36 12 100 Assessment Methods to CLO Mapping		
Course Type Course Teaching & Learning Activities Assessment Methods	Activities Lectures Tutorials Reading / Methods  Assignme Examinati	Self study ents	Details  Coursework (assignments, tutorials, and a class test) One 2-hour written examination	course grade (%) 40 60	36 12 100 Assessment Methods to CLO Mapping		
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	Activities Lectures Tutorials Reading / Methods  Assignme Examinati Berry, D. A Bickel, P. Upper Sac Freund, J. Hogg, R. V Pace, L. Singapore	ents ion A. & Lindgren, B. W.: J. & Doksum, K. A ddle River, N.J., 200 E.: Mathematical St V. & Craig, A. T.: Intr & Salvan, A.: Prince, 1997).	Details  Coursework (assignments, tutorials, and a class test) One 2-hour written examination Statistics: Theory and Methods (Duxl.: Mathematical Statistics: Basic Idea I) attistics (Prentice Hall, Englewood Clift oduction to Mathematical Statistics (Nathematical Statistics) ples of Statistical Inference: from a	course grade (%)  40  60  bury, Belmont, 1996) as and Selected Topics, V fs, N.J., 1992) lacmillan, New York, 1989 a neo-Fisherian perspective	36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2,3 fol. 1 (Prentice Hall,		
Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Activities Lectures Tutorials Reading / Methods  Assignme Examinati Berry, D. / Bickel, P. Upper Sac Freund, J. Hogg, R. V. Singapore Young, G.	ents ion A. & Lindgren, B. W.: J. & Doksum, K. A ddle River, N.J., 200 E.: Mathematical St V. & Craig, A. T.: Intr & Salvan, A.: Prince, 1997).	Details  Coursework (assignments, tutorials, and a class test) One 2-hour written examination Statistics: Theory and Methods (Duxl.: Mathematical Statistics: Basic Ideal) atistics (Prentice Hall, Englewood Clifteduction to Mathematical Statistics (Methodocuments)	course grade (%)  40  60  bury, Belmont, 1996) as and Selected Topics, V fs, N.J., 1992) lacmillan, New York, 1989 a neo-Fisherian perspective	36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2,3 fol. 1 (Prentice Hall,		

STAT3603	Stochast	Stochastic processes (6 credits)			2021		
Offering Department		Actuarial Science					
Course Co-ordinator	Prof J J F Yao, Statistics & Actuarial Science (jeffyao@hku.hk)						
Teachers Involved	(Prof J J F Yao, Statistics & Actuarial Science)						
Course Objectives	This is an introductory course in stochastic processes. It will cover the basic concepts of the theory of stochastic processes and explore different types of stochastic processes including Markov chains, Poisson processes and Brownian motions.						
Course Contents & Topics	Introduction to probability theory, conditional probability and expectation, Markov chains, random walk models, classification of states in a Markov chain, calculation of limiting probabilities and mean time spent in transient states, Poisson process, distribution of inter-arrival time and waiting time, conditional distribution of the arrival time, Brownian Motion, hitting time and maximum variable, geometric Brownian motion, the Black-Scholes option pricing formula, Gaussian bridge, and stationary processes. Birth-and-death process, branching process and renewal process may also be covered (if time permits).						
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 apply the conditioning method to calculate the mean and probability						
	CLO 2 understand the essentials of Markov chains, the Poisson process, and Brownian motion						
	CLO 3 understand how stochastic models can be applied to the study of real-life phenomena						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in STAT2601; and Not for students who have passed in MATH3603, or have already enrolled in this course; and Not for students who have passed in STAT3903, or have already enrolled in this course.						
Offer in 2021 - 2022	Y 1st s	sem Offer in 2022 - 2023 : Y		Examination	Dec		
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.						
	В	Demonstrate substantial command of a	broad range of knowledge and skills requ	uired for attaining at leas	at most of the course		

		learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.				
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.				
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.				
	Fail	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to problems. Organization and presentational skills are minimally effective or ineffective.				
Communication- intensive Course	N	· ·				
Course Type	Lecture-based course					
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials				12	
	Reading / Self study				100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignments		Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3	
	Examination		One 2-hour written examination	75	CLO 1,2,3	
Required/recommended reading and online materials	S. M. Ross: Introduction to Probability Models (9th edition)					
Course Website	http://moodle.hku.hk					

STAT3604	Design and analysis of experiments (6 credits)  Academic Year   20				ear 2021		
Offering Department	Statistics & Actuarial Science Quota				23		
Course Co-ordinator	Dr D Y Zhang, Statistics & Actuarial Science (doraz@hku.hk)						
Teachers Involved	(Dr D Y Zhang, Statistics & Actuarial Science)						
Course Objectives	Scientific research often requires proper design and analysis of experiments. This course aims to introduce the basic principles of experimental design; to explain the concepts and to develop the statistical skills in model-base analysis of experiment.						
Course Contents & Topics	Basic principles and guidelines for designing experiments. Analysis for experiments with a single factor randomised block, crossed and nested factorial structure. Balanced incomplete factorial experiments. Latin squares and related designs. Fixed/random effects models.						
Course Learning	On succes	sful completion of	f this course, students should be able	to:			
Outcomes	CLO 1 de	velop a conceptua	al understanding of experimental desig	jn			
	CLO 2 acquire the fundamental statistical tools of experimental design and the understanding to use then appropriately						
			xperimental designs for different problems				
			tatistical model and to know how to va	lidate the model			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in STAT2602 or STAT3611 or STAT3902						
Offer in 2021 - 2022	N Offe	er in 2022 - 2023 :	: N	Examination	)		
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.						
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.						
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.						
	D	Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lac of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.					
Communication- intensive Course	N						
Course Type		sed course					
Course Teaching & Learning Activities	Activities		Details		No. of Hours		
& Learning Activities	Lectures						
	Tutorials						
Assessment Methods	Reading / Self study		Dataile	Waighting in final			
and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin		
	Assignments		Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3,4		
	Examination One 2-hour written examination 75 CLO 1,2,3,4						
Required/recommended reading and online materials	<ul> <li>D. C. Montgomery: Design and Analysis of Experiments (Wiley, 1997, 4th edition)</li> <li>D. R. Cox: Planning of Experiments (Wiley, 1958)</li> <li>A. L. Edwards: Experimental Design in Psychological Research (Harper &amp; Row, 1985, 5th edition)</li> <li>G. A. Ferguson &amp; Y. Takane: Statistical Analysis in Psychology and Education (McGraw Hill, 1989, 6th edition)</li> </ul>						

	P. W. M. John: Statistical Design and Analysis of Experiments (Macmillan, 1971) R. L. Moson, R. F. Gungst, & J. L. Hess: Statistical Design and Analysis of Experiments (Wiley, 1989)	
Course Website	http://moodle.hku.hk	

STAT3605	Quality of	control and manage	ment (6 credits)	Academic Yea	r 2021		
Offering Department	Statistics 8	& Actuarial Science	· · ·	Quota			
Course Co-ordinator	TBC, Stati	stics & Actuarial Science	e ()	·	'		
Teachers Involved							
Course Objectives	course propresents a reliability, six-sigma,	The successful control of quality in production is a matter of primary importance to a company's prosperity. This course provides an overview of quality compromise which involves both the producer and the consumer. It presents a variety of statistical solutions including control charts, acceptance and sequential sampling plans, reliability, and life-testing. Contemporary quality management systems such as total quality control, zero defects, six-sigma, and ISO-9000 will be introduced. The student is brought to the frontier of today's quality control and management ideas.					
Course Contents	Probability	distributions and their	applications, process variability,	sampling and statistical i	nference. Process		
& Topics	sampling testing. El	control, variables and attributes control charts. Operating characteristic curves. Single, double and sequential sampling plans. MIL-STD-105D and Dodge-Romig schemes. Variables sampling. Reliability and lifetesting. Elementary experimental designs. Management of quality control, total quality control, zero defects, six-sigma, and ISO 9000.					
Course Learning	On succes	sful completion of this c	ourse, students should be able to:				
Outcomes	CLO 1 a	ppreciate the practicality	of statistical concepts and methods	s in general			
			pecific statistical methods can bene	•	tions		
			nodern systems of quality managen				
Pre-requisites (and Co-requisites and Impermissible combinations)	course) or		0 and any University level 2 course niversity level 2 course) or STAT26				
Offer in 2021 - 2022	N Offe	er in 2022 - 2023 : N		Examination			
Grade Descriptors (A+ to F)	A						
	В	·					
	С	outcomes. Show evidence of	ncomplete command of knowledge and ski of some analytical and critical abilities and l derately effective organizational and present	logical thinking, and ability to ap			
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail						
Communication- intensive Course	N						
Course Type	Lecture-ba	ased course					
Course Teaching	Activities	<b>1</b>	Details		No. of Hours		
& Learning Activities	Lectures				36		
	Tutorials				12		
		Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	nts	Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3		
	Examinati		One 2-hour written examination	75	CLO 1,2,3		
Required/recommended reading and online materials	D. C. Mon J. Banks: I	tgomery: Śtatistical Qua Principles of Quality Cor	Industrial Statistics (Irwin, Homewood lity Control (New York: Wiley, 1996, strol (New York: Wiley, 1989)	3rd edition)	dition)		
	I. D. Hill: A G. B. Weth	in Introduction to Sampli nerill: Sampling Inspection	Statistical Quality Control (New York ing Inspection (The Institute of Engir on and Quality Control (London: Me Hontrol (New York: McGraw-Hill, 198	neering Inspection Monogi thuen, 1977, 2nd edition)	,		
		dle.hku.hk	,	,			

STAT3606	Business logistics (6 credits)  Academic Year 2021				
Offering Department	Statistic				
Course Co-ordinator	Dr O T I	K Choi, Statistics & Actuarial Science (ochoi@hku.hk)			
Teachers Involved	(Dr O T	K Choi, Statistics & Actuarial Science)			
Course Objectives	budgetii	business corporations are increasingly using logistics as a managemeng problems, production planning, scheduling, transportations and deciding addresses the business applications of logistics.			
Course Contents & Topics	logistic	course, students will apply the analytical skills with aid of computer tech problems. Topics include optimization techniques applied in allocation of rtation, assignment, inventory control and queuing problems.			
Course Learning	On succ	cessful completion of this course, students should be able to:			
Outcomes	CLO 1 solve linear programming with Graphical approach, Simplex method and hands-on Excel Solving function				
	CLO 2 set up and solve network flow problems using least-cost approach, MODI method and Vogel's approximation.				
	CLO 3	understand decision theory and its applications			

	020 1 0	/aluate the cost and effe	conveniess of service systems			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BIOL2102 or (ECON1280 and any University level 2 course) or (STAT1601 and any University level 2 course) or (STAT1602 and any University level 2 course) or STAT2601 or (STAT1603 and any University level 2 course) or STAT2901; and  Not for students who have passed MATH3901, or have already enrolled in this course.					
Offer in 2021 - 2022		sem Offer in 2022 - 2		Examination	Dec	
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.					
	В	learning outcomes. Show e and some unfamiliar situati	ommand of a broad range of knowledge and vidence of analytical and critical abilities and ons. Apply effective organizational and prese	logical thinking, and ability to apntational skills.	pply knowledge to familia	
	С	outcomes. Show evidence	incomplete command of knowledge and sk of some analytical and critical abilities and oderately effective organizational and present	logical thinking, and ability to		
	D	Show evidence of some co	nited command of knowledge and skills requi herent and logical thinking, but with limited and hs. Apply limited or barely effective organizati	nalytical and critical abilities. Sh		
	Fail	of analytical and critical a	dence of command of knowledge and skills r ibilities, logical and coherent thinking. Show d presentational skills are minimally effective of	v very little or no ability to ap		
Communication-	N					
intensive Course						
		ased course				
Course Type			Details		No. of Hours	
Course Type Course Teaching	Lecture-ba		Details		No. of Hours	
Course Type Course Teaching	Lecture-ba		Details			
Course Type Course Teaching	Lecture-base Activities Lectures Tutorials		Details		36	
Course Type Course Teaching & Learning Activities Assessment Methods	Lecture-base Activities Lectures Tutorials	Self study	Details  Details	Weighting in final course grade (%)	36 12	
Course Type Course Teaching & Learning Activities Assessment Methods	Lecture-ba Activities Lectures Tutorials Reading	S / Self study			36 12 100 Assessment Methods	
Course Type Course Teaching & Learning Activities Assessment Methods	Lecture-b. Activities Lectures Tutorials Reading	Self study	Details  Coursework (assignments,	course grade (%)	36 12 100 Assessment Methods to CLO Mapping	
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	Lecture-ba Activities Lectures Tutorials Reading Methods Assignme Examinat B. Rendel Wayne L. H. Taha: A	Self study  Pents  Ition  Tr., R. Stair, M. Hanna: Q  Winston: Operations R  An Introduction to Opera  Tr and G, J. Lieberman: A	Details  Coursework (assignments, tutorials and a test)	course grade (%)  25  75 t, 10th edition, Pearson hing n International Edition rch	36 12 100 Assessment Methods to CLO Mapping	

STAT3607	Statistic credits)	cs in clinical medicine and bio-medical research (6	Academic Year	2021			
Offering Department	Statistics	& Actuarial Science	Quota				
Course Co-ordinator	Prof G Yi	n, Statistics & Actuarial Science (gyin@hku.hk)					
Teachers Involved	(Prof G Y	(in,Statistics & Actuarial Science)					
Course Objectives	the clinic designs. size and	In clinical research, medical data are often observed which motivates the application of statistical methodology to the clinical observational and decision-making process. Also, statistical problems often arise from clinical trial designs. It involves phase I, II, III and IV clinical trial designs, both Bayesian and frequentist approaches, sample size and power calculation. No knowledge in biology or medicine is assumed; the course provides the necessary biomedical background when the statistical problems are introduced.					
Course Contents & Topics	analysis,	tents of the course include contingency tables, regression model Bayesian designs, dose-finding methods, sample size and powe hypothesis testing, adaptive designs.					
Course Learning	On succe	essful completion of this course, students should be able to:					
Outcomes	CLO 1	understand the basic concepts in medical statistics					
	CLO 2	design clinical trials and compute sample sizes					
	CLO 3	conduct statistical inference and apply regression models					
	CLO 4	solve medical problems by using various statistical tests					
Pre-requisites (and Co-requisites and Impermissible combinations)							
Offer in 2021 - 2022	N Of	fer in 2022 - 2023 : N	Examination				
Grade Descriptors (A+ to F)			=xummation				
•	A	Demonstrate thorough mastery at an advanced level of extensive knowledge learning outcomes. Show strong analytical and critical abilities and logical thinkin to apply knowledge to a wide range of complex, familiar and unfamiliar situation presentational skills.	and skills required for atta g, with evidence of origina	al thought, and ability			
•		Demonstrate thorough mastery at an advanced level of extensive knowledge learning outcomes. Show strong analytical and critical abilities and logical thinkin to apply knowledge to a wide range of complex, familiar and unfamiliar situati	and skills required for attage, with evidence of originations. Apply highly effective quired for attaining at leas inking, and ability to apply	al thought, and ability e organizational and at most of the course			
•	A	Demonstrate thorough mastery at an advanced level of extensive knowledge learning outcomes. Show strong analytical and critical abilities and logical thinkin to apply knowledge to a wide range of complex, familiar and unfamiliar situation presentational skills.  Demonstrate substantial command of a broad range of knowledge and skills relearning outcomes. Show evidence of analytical and critical abilities and logical thin and some unfamiliar situations. Apply effective organizational and presentational some unfamiliar situations. Apply effective organizational and presentational soutcomes. Show evidence of some analytical and critical abilities and logical the familiar situations. Apply moderately effective organizational and presentational should be companious organizational and presentational should be companious.	and skills required for attage, with evidence of originations. Apply highly effective quired for attaining at leasinking, and ability to apply skills.  The for attaining most of inking, and ability to apply skills.	al thought, and ability e organizational and at most of the course knowledge to familiar the course learning y knowledge to most			
•	В	Demonstrate thorough mastery at an advanced level of extensive knowledge learning outcomes. Show strong analytical and critical abilities and logical thinkin to apply knowledge to a wide range of complex, familiar and unfamiliar situation presentational skills.  Demonstrate substantial command of a broad range of knowledge and skills relearning outcomes. Show evidence of analytical and critical abilities and logical thi and some unfamiliar situations. Apply effective organizational and presentational some command of knowledge and skills required outcomes. Show evidence of some analytical and critical abilities and logical the familiar situations. Apply moderately effective organizational and presentational show evidence of some coherent and logical thinking, but with limited analytical a knowledge to solve problems. Apply limited or barely effective organizational and	and skills required for attagg, with evidence of origina ons. Apply highly effective quired for attaining at leas inking, and ability to apply skills.  The distribution of the course inking, and ability to apply cills.  Taining some of the course and critical abilities. Show I presentational skills.	al thought, and ability e organizational and at most of the course knowledge to familial the course learning y knowledge to most e learning outcomes. imited ability to apply			
•	A B C	Demonstrate thorough mastery at an advanced level of extensive knowledge learning outcomes. Show strong analytical and critical abilities and logical thinkin to apply knowledge to a wide range of complex, familiar and unfamiliar situati presentational skills.  Demonstrate substantial command of a broad range of knowledge and skills relearning outcomes. Show evidence of analytical and critical abilities and logical thi and some unfamiliar situations. Apply effective organizational and presentational situations. Demonstrate general but incomplete command of knowledge and skills require outcomes. Show evidence of some analytical and critical abilities and logical the familiar situations. Apply moderately effective organizational and presentational shomonstrate partial but limited command of knowledge and skills required for at Show evidence of some coherent and logical thinking, but with limited analytical as the command of knowledge and skills required for at Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities and logical thinking, but with limited analytical as the command of knowledge and skills required for at Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities and logical the command of knowledge and skills required for at Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities and logical the command of knowledge and skills required to the command of knowledge and skills required to the command of knowledge and skills required to the command of knowledge and skills required to the command of knowledge and skills required to the command of knowledge and skills required to the command of knowledge and skills required to the command of knowledge and skills required to the command of knowledge and skills required to the command of knowledge and skills required to the command of knowledge and skills required to the command of knowledge and skills required to the c	and skills required for attag, with evidence of origina ons. Apply highly effective quired for attaining at leas nking, and ability to apply skills. The for attaining most of inking, and ability to apply skills, and ability to apply skills. The for attaining some of the course and critical abilities. Show I presentational skills. The for attaining the course lear the or no ability to apply the course lear the form of ability to apply apply and the course lear the form of ability to apply the course lear the form of ability to apply the course lear the form of ability to apply the course lear the form of ability to apply the course lear the form of a shifty to apply the course lear the form of	al thought, and ability e organizational and at most of the course knowledge to familian the course learning y knowledge to most e learning outcomes. imited ability to apply rning outcomes. Lack			
•	B C	Demonstrate thorough mastery at an advanced level of extensive knowledge learning outcomes. Show strong analytical and critical abilities and logical thinkin to apply knowledge to a wide range of complex, familiar and unfamiliar situati presentational skills.  Demonstrate substantial command of a broad range of knowledge and skills relearning outcomes. Show evidence of analytical and critical abilities and logical thi and some unfamiliar situations. Apply effective organizational and presentational spenorstrate general but incomplete command of knowledge and skills requively outcomes. Show evidence of some analytical and critical abilities and logical the familiar situations. Apply moderately effective organizational and presentational show evidence of some coherent and logical thinking, but with limited analytical aknowledge to solve problems. Apply limited or barely effective organizational and Demonstrate little or no evidence of command of knowledge and skills required for analytical and critical abilities, logical and coherent thinking. Show very litted or barely effective organizational and persentent and critical abilities, logical and coherent thinking. Show very litted or barely effective organizational and persentent and critical abilities, logical and coherent thinking. Show very litted and critical abilities, logical and coherent thinking. Show very litted or barely effective organizational and coherent thinking.	and skills required for attag, with evidence of origina ons. Apply highly effective quired for attaining at leas nking, and ability to apply skills. The for attaining most of inking, and ability to apply skills, and ability to apply skills. The for attaining some of the course and critical abilities. Show I presentational skills. The for attaining the course lear the or no ability to apply the course lear the form of ability to apply apply and the course lear the form of ability to apply the course lear the form of ability to apply the course lear the form of ability to apply the course lear the form of ability to apply the course lear the form of a shifty to apply the course lear the form of	al thought, and ability e organizational and at most of the course knowledge to familian the course learning y knowledge to most e learning outcomes. imited ability to apply rning outcomes. Lack			
(A+ to F)	A B C D Fail	Demonstrate thorough mastery at an advanced level of extensive knowledge learning outcomes. Show strong analytical and critical abilities and logical thinkin to apply knowledge to a wide range of complex, familiar and unfamiliar situati presentational skills.  Demonstrate substantial command of a broad range of knowledge and skills relearning outcomes. Show evidence of analytical and critical abilities and logical thi and some unfamiliar situations. Apply effective organizational and presentational spenorstrate general but incomplete command of knowledge and skills requively outcomes. Show evidence of some analytical and critical abilities and logical the familiar situations. Apply moderately effective organizational and presentational show evidence of some coherent and logical thinking, but with limited analytical aknowledge to solve problems. Apply limited or barely effective organizational and Demonstrate little or no evidence of command of knowledge and skills required for analytical and critical abilities, logical and coherent thinking. Show very litted or barely effective organizational and persentent and critical abilities, logical and coherent thinking. Show very litted or barely effective organizational and persentent and critical abilities, logical and coherent thinking. Show very litted and critical abilities, logical and coherent thinking. Show very litted or barely effective organizational and coherent thinking.	and skills required for attag, with evidence of origina ons. Apply highly effective quired for attaining at leas nking, and ability to apply skills. The for attaining most of inking, and ability to apply skills, and ability to apply skills. The for attaining some of the course and critical abilities. Show I presentational skills. The for attaining the course lear the or no ability to apply the course lear the form of ability to apply apply and the course lear the form of ability to apply the course lear the form of ability to apply the course lear the form of ability to apply the course lear the form of ability to apply the course lear the form of a shifty to apply the course lear the form of	al thought, and ability e organizational and at most of the course knowledge to familial the course learning y knowledge to most e learning outcomes, imited ability to apply rning outcomes. Lack			

& Learning Activities	Lectures			36
	Tutorials			12
	Reading / Self study			100
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments	Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3,4
	Examination	One 2-hour written examination	75	CLO 1,2,3,4
Required/recommended reading and online materials	Hall/CRC, 2004) J. Aitchison & J. Dunsmore: Statis P. Armitage: Statistical Methods ir P. Armitage: Sequential Medical T D. Altman: Practical Statistics for I N. E. Breslow & N. E. Day: Statist (Lyon: IARC, 1980) D. R. Cox & E. J. Snell: The Analy D. R. Cox & D. V. Hinkley: Theore	auder: Statistical Concepts and Ap stical Prediction Analysis (Cambridge in Medical Research (Oxford: Blackwei Trials (Oxford: Blackwell, 1975, 2nd e Medical Research (London: Chapma ical Methods in Cancer Research Vo visis of Binary Data (London: Chapma stical Statistics (London: Chapman an	University Press, 1976) ell, 1971) dition) n & Hall, 1991) dume 1 - The analysis of an and Hall, 1989, 2nd ed	case-control studies
Course Website	http://moodle.hku.hk			
Additional Course Information	B. Jones & M. G. Kenward: Desig B. J. T. Morgan: Analysis of Quan S. J. Pocock: Clinical Trials. A Pr	hip Analysis for Clinical Studies (Nev n and Analysis of Cross-Over Trials tal Response Data (London: Chapma actical Approach (Chickestes: John V eralised Linear Models (London: Cha	(London: Chapman and F an and Hall, 1992) Viley & Sons, 1991)	Hall, 1990)

STAT3608	Statistic	cal genetics (6	credits)		Academic Year	2021
Offering Department	Statistics	& Actuarial Science	ce ,		Quota	23
Course Co-ordinator	Prof T W	K Fung, Statistics	& Actuarial Science (wingfung@	hku.hk)		
Teachers Involved	(Prof T W	K Fung, Statistics	& Actuarial Science)			
Course Objectives	genetic e		e students with a fundamental k ne mapping and to understand h problems.			
Course Contents & Topics	equilibrium and kinsh analysis;	This course will cover the following topics: background of genetics; Mendelian inheritance; Hardy-Weinberg equilibrium; linkage equilibrium; chi-square test; likelihood ratio test; exact test; match probability; paternity testing and kinship analysis; DNA mixed stain; relatedness; population structure; gene mapping; parametric linkage analysis; non-parametric linkage analysis; linkage disequilibrium; association designs; case-control analysis; family based association study; quantitative traits.				
Course Learning	On succe	ssful completion c	of this course, students should be	able to:		
Outcomes	CLO 1 ui	nderstand the fund	damental principles in statistical [	NA forensics and	I genetic epidemiolo	ogy
	m	napping	s and possible limitations of sta		gy in human identi	fication and gene
Pre-requisites (and Co-requisites and Impermissible combinations)		TAT2602 or STAT		·		
Offer in 2021 - 2022	N Off	fer in 2022 - 2023	: N		Examination	
Grade Descriptors (A+ to F)	A					
	В					
	С					
		Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.				
	Fail Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.					
Communication- intensive Course	N					
Course Type		ased course				
Course Teaching	Activitie		Details			No. of Hours
& Learning Activities	Lectures					36
	Tutorials					12
		/ Self study				100
Assessment Methods and Weighting	Methods	<b>3</b>	Details		ghting in final rse grade (%)	Assessment Methods to CLO Mapping
	Assignme	ents	Coursework (assignment tutorials, and a class test	)	25	CLO 1,2,3
	Examina	tion	One 2-hour written exam	ination	75	CLO 1,2,3
Required/recommended reading and online materials	Ott, J.: Ar	nalysis of Human (	, M. R.: Essentials of Genetics (F Genetic Linkage (The Johns Hop A Statistical Approach to Genetic	kins University Pre	ess, 1999, 3rd ed.)	

	Fung, W. K. and Hu, Y. Q.: Statistical DNA Forensics: Theory, Methods and Computation (Wiley, Sussex, 2008)
Course Website	http://moodle.hku.hk

STAT3609	The stat	The challenge of mirecannels from (e creame)		Academic Year	2021		
Offering Department	Statistics	& Actuarial Science		Quota			
Course Co-ordinator	Dr K P Wa	at, Statistics & Actuarial Science	(watkp@hku.hk)				
Teachers Involved	(Dr K P W	/at,Statistics & Actuarial Science)					
Course Objectives	uncertaint rational fra rates, con	Most investments involve some risk. The decision to invest or not is usually made against a background of incertainty. Whilst prediction of the future is difficult, there are statistical modelling techniques which provide a ational framework for investment decisions, particularly those relating to stock markets and the markets for interest ates, commodities and currencies. Building upon research, both in Hong Kong and abroad, this course presents he prevailing statistical theories for prices and price-change in these vital markets.					
Course Contents & Topics	Concept of	of market efficiency, mean-varian performance and management, be	ce portfolio theory, capital a		age pricing theory,		
Course Learning	On succe	ssful completion of this course, st	udents should be able to:				
Outcomes		easure risk and return of portfolio					
		oply different approaches in const					
		oplain and apply asset pricing mo					
		oplain the concepts of market ef rms of market efficiency	ficiency and apply appropri	ate testing procedures to	assess different		
Pre-requisites		TAT2602, or already enrolled in t					
(and Co-requisites		STAT1603 and any University leve					
and Impermissible		udents who have passed in FINA2	2320, or have already enrolle	ed in this course; and			
combinations)		Sc(Actuarial Science) students			Б		
Offer in 2021 - 2022		sem Offer in 2022 - 2023 : Y	advanced level of outcombine leaves	Examination	Dec		
Grade Descriptors (A+ to F)	Α	Demonstrate thorough mastery at an learning outcomes. Show strong analyl to apply knowledge to a wide range opresentational skills.	tical and critical abilities and logical of complex, familiar and unfamiliar	thinking, with evidence of origing situations. Apply highly effective	nal thought, and ability ve organizational and		
	В						
	С						
	D						
	Fail	Demonstrate little or no evidence of co		uired for attaining the course lea			
Communication-	N	of analytical and critical abilities, logi-		very little or no ability to apply			
intensive Course		of analytical and critical abilities, logi problems. Organization and presentation		very little or no ability to apply			
intensive Course Course Type	Lecture-ba			very little or no ability to apply			
intensive Course Course Type Course Teaching	Lecture-ba	problems. Organization and presentation		very little or no ability to apply			
intensive Course Course Type Course Teaching	Activities Lectures	problems. Organization and presentation		very little or no ability to apply	No. of Hours		
intensive Course Course Type Course Teaching	Activities Lectures Tutorials	problems. Organization and presentation asset course  Details		very little or no ability to apply	No. of Hours 36 12		
intensive Course Course Type Course Teaching & Learning Activities	Activities Lectures Tutorials	problems. Organization and presentation		very little or no ability to apply	No. of Hours		
intensive Course Course Type Course Teaching	Activities Lectures Tutorials	ased course  S  Details  / Self study	onal skills are minimally effective or	very little or no ability to apply	No. of Hours 36 12		
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Activities Lectures Tutorials Reading	problems. Organization and presentation  assed course  S	work (assignments, class test(s) and a group	very little or no ability to apply ineffective.  Weighting in final	No. of Hours 36 12 100 Assessment Methods		
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Activities Lectures Tutorials Reading Methods Assignment	problems. Organization and presentation asset course s Details  / Self study Details  Course tutorials project)	work (assignments, c, class test(s) and a group	wery little or no ability to apply ineffective.  Weighting in final course grade (%)	No. of Hours 36 12 100 Assessment Methods to CLO Mapping		
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	Activities Lectures Tutorials Reading Methods  Assignme Examinat Bodie, Z., Elton, E., Analysis ( Luenberg Capiński, Defusco, Institute Ir	problems. Organization and presentation  ased course  ased course  Details  / Self study  Details  Courses tutorials project) tion One 2-f Kane, A., Marcus, A. J., and Jain J., Gruber, M. J., Brown, S. J., a 9th Edition). Wiley. er, D. G. (2009). Investment Scie M. J. and Kopp, E. (2014). Portfo M. J. and Kopp, E. (2014). Portfo R. A., McLeavey, D. W., Pinto, onvestment Series (2nd Edition). Wileystment Series (2nd Edition).	work (assignments, s, class test(s) and a group nour written examination n, R. (2014). Investments (As nd Goetzmann, W. N. (2014). Ince (International Edition). O lio Theory and Risk Manage J. E., and Runkle D. E. (2007/	Weighting in final course grade (%)  40  60 sia Global Edition). McGraval). Modern Portfolio Theorem Course University Press. Imment. Cambridge University Or). Quantitative Investment.	No. of Hours  36 12 100  Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 w-Hill. ry and Investment		
intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and	Activities Lectures Tutorials Reading Methods  Assignme Examinat Bodie, Z., Elton, E., Analysis ( Luenberg Capiński, Defusco, Institute Ir Ruppert, I	problems. Organization and presentation  assed course  assed course  by Self study  Course  tutorials  project)  Cone 2-f  Kane, A., Marcus, A. J., and Jain  J., Gruber, M. J., Brown, S. J., a  9th Edition). Wiley.  er, D. G. (2009). Investment Scie  M. J. and Kopp, E. (2014). Portfo  R. A., McLeavey, D. W., Pinto, A.	work (assignments, s, class test(s) and a group nour written examination n, R. (2014). Investments (As nd Goetzmann, W. N. (2014). Ince (International Edition). O lio Theory and Risk Manage J. E., and Runkle D. E. (2007/	Weighting in final course grade (%)  40  60 sia Global Edition). McGraval). Modern Portfolio Theorem Course University Press. Imment. Cambridge University Or). Quantitative Investment.	No. of Hours  36 12 100  Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 w-Hill. ry and Investment  ity Press.		

STAT3610	Risk management and insurance (6 credits)	Academic Year	2021
Offering Department	Statistics & Actuarial Science	Quota	
Course Co-ordinator	Dr R W L Wong, Statistics & Actuarial Science (rwong@hku.hk)	·	
Teachers Involved	(Dr R W L Wong, Statistics & Actuarial Science)		
Course Objectives	This course provides knowledge on basic risk and its management, as well insurance products, to students. It allows students to understand the stati underlying the techniques for managing the insurable risks faced by organis aims at students who have minimal background in quantitative methods, it calculations.	stical, financial and ations and individu	l legal principles lals. This course
Course Contents & Topics	The course introduces and explains: - risk in our society, - insurance and risk, - introduction to risk management, - fundamental legal principles, and analysis of insurance contracts, - life insurance, their contractual provisions, - individual health insurance coverages.		

Course Learning	OII Succe	ssful completion of this	course, staderite critatia pe apie te.			
Outcomes		nderstand the general rinciple	risks faced by organisations and ir	ndividuals and the generi	c risk management	
	CLO 2 demonstrate knowledge and understanding of the underlying financial and legal principles of the insurance industry					
	CLO 3 understand how risk can be managed through insurance					
	CLO 4 co	ompare and contrast dif	ferent types of commercial and pers	onal insurance products		
	CLO 5 pl	lan for and arrange thei	r own personal insurance needs			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BIOL2102 or (ECON1280 and any University level 2 course) or (STAT1601 and any University level 2 course) or STAT2601 or (STAT1603 and any University level 2 course) or STAT2601 or (STAT1603 and any University level 2 course) or STAT2901.  (Not available to Actuarial Science students)					
Offer in 2021 - 2022	N Off	fer in 2022 - 2023 : N	,	Examination		
Grade Descriptors (A+ to F)	Α	learning outcomes. Show	astery at an advanced level of extensive kn strong analytical and critical abilities and logi wide range of complex, familiar and unfami	ical thinking, with evidence of or	iginal thought, and ability	
	В	learning outcomes. Show e	ommand of a broad range of knowledge and evidence of analytical and critical abilities and ions. Apply effective organizational and prese	l logical thinking, and ability to ap		
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
					apply knowledge to most	
	D	familiar situations. Apply m Demonstrate partial but lin Show evidence of some co	noderately effective organizational and presen nited command of knowledge and skills requ pherent and logical thinking, but with limited a	ntational skills. iired for attaining some of the co analytical and critical abilities. Sh	ourse learning outcomes.	
	D Fail	familiar situations. Apply m Demonstrate partial but lin Show evidence of some or knowledge to solve problet Demonstrate little or no ew of analytical and critical a	noderately effective organizational and presen nited command of knowledge and skills requ	ntational skills.  iired for attaining some of the connection and itical abilities. Shional and presentational skills.  required for attaining the course were very little or no ability to ap	ourse learning outcomes. ow limited ability to apply	
		familiar situations. Apply m Demonstrate partial but lin Show evidence of some or knowledge to solve problet Demonstrate little or no ew of analytical and critical a	noderately effective organizational and presen nited command of knowledge and skills requ oherent and logical thinking, but with limited a ms. Apply limited or barely effective organizat idence of command of knowledge and skills abilities, logical and coherent thinking. Sho	ntational skills.  iired for attaining some of the connection and itical abilities. Shional and presentational skills.  required for attaining the course were very little or no ability to ap	ourse learning outcomes. ow limited ability to apply	
intensive Course	<b>Fail</b>	familiar situations. Apply m Demonstrate partial but lin Show evidence of some or knowledge to solve problet Demonstrate little or no ew of analytical and critical a	noderately effective organizational and presen nited command of knowledge and skills requ oherent and logical thinking, but with limited a ms. Apply limited or barely effective organizat idence of command of knowledge and skills abilities, logical and coherent thinking. Sho	ntational skills.  iired for attaining some of the connection and itical abilities. Shional and presentational skills.  required for attaining the course were very little or no ability to ap	ourse learning outcomes. ow limited ability to apply	
intensive Course Course Type Course Teaching	<b>Fail</b>	familiar situations. Apply m Demonstrate partial but lin Show evidence of some ox knowledge to solve problet Demonstrate little or no ev of analytical and critical a problems. Organization an	noderately effective organizational and presen nited command of knowledge and skills requ oherent and logical thinking, but with limited a ms. Apply limited or barely effective organizat idence of command of knowledge and skills abilities, logical and coherent thinking. Sho	ntational skills.  iired for attaining some of the connection and itical abilities. Shional and presentational skills.  required for attaining the course were very little or no ability to ap	ourse learning outcomes. ow limited ability to apply	
intensive Course Course Type Course Teaching	Fail N Lecture-b	familiar situations. Apply m Demonstrate partial but lin Show evidence of some or knowledge to solve problet Demonstrate little or no ev of analytical and critical a problems. Organization an	noderately effective organizational and presen nited command of knowledge and skills requ oberent and logical thinking, but with limited a ms. Apply limited or barely effective organizat idence of command of knowledge and skills abilities, logical and coherent thinking. Sho d presentational skills are minimally effective	ntational skills.  iired for attaining some of the connection and itical abilities. Shional and presentational skills.  required for attaining the course were very little or no ability to ap	ow limited ability to apply learning outcomes. Lack oply knowledge to solve	
intensive Course Course Type Course Teaching	Fail N Lecture-b Activities	familiar situations. Apply m Demonstrate partial but lin Show evidence of some or knowledge to solve problet Demonstrate little or no ev of analytical and critical a problems. Organization an	noderately effective organizational and presen nited command of knowledge and skills requ oberent and logical thinking, but with limited a ms. Apply limited or barely effective organizat idence of command of knowledge and skills abilities, logical and coherent thinking. Sho d presentational skills are minimally effective	ntational skills.  iired for attaining some of the connection and itical abilities. Shional and presentational skills.  required for attaining the course were very little or no ability to ap	ow limited ability to apply learning outcomes. Lack ply knowledge to solve	
intensive Course Course Type Course Teaching	Fail  N  Lecture-b  Activities Lectures Tutorials	familiar situations. Apply m Demonstrate partial but lin Show evidence of some or knowledge to solve problet Demonstrate little or no ev of analytical and critical a problems. Organization an	noderately effective organizational and presen nited command of knowledge and skills requ oberent and logical thinking, but with limited a ms. Apply limited or barely effective organizat idence of command of knowledge and skills abilities, logical and coherent thinking. Sho d presentational skills are minimally effective	ntational skills.  iired for attaining some of the connection and itical abilities. Shional and presentational skills.  required for attaining the course were very little or no ability to ap	No. of Hours  36	
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail  N  Lecture-b  Activities Lectures Tutorials	familiar situations. Apply m Demonstrate partial but lin Show evidence of some or knowledge to solve problet Demonstrate little or no ev of analytical and critical a problems. Organization an  assed course  S  / Self study	noderately effective organizational and presen nited command of knowledge and skills requ oberent and logical thinking, but with limited a ms. Apply limited or barely effective organizat idence of command of knowledge and skills abilities, logical and coherent thinking. Sho d presentational skills are minimally effective	ntational skills.  iired for attaining some of the connection and itical abilities. Shional and presentational skills.  required for attaining the course were very little or no ability to ap	No. of Hours  36  12	
Communication- intensive Course Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	Fail  N  Lecture-b  Activitie Lectures Tutorials Reading	familiar situations. Apply m Demonstrate partial but lin Show evidence of some or knowledge to solve problet Demonstrate little or no ev of analytical and critical a problems. Organization an  assed course  S  / Self study	noderately effective organizational and presentited command of knowledge and skills requipherent and logical thinking, but with limited at ms. Apply limited or barely effective organizatidence of command of knowledge and skills abilities, logical and coherent thinking. Sho dipresentational skills are minimally effective	ntational skills.  irred for attaining some of the containing some of the containing some of the containing the containing the course was very little or no ability to apport in the course was very little or no	No. of Hours  36  12  100  Assessment Methods	
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail  N  Lecture-b  Activitie  Lectures  Tutorials  Reading  Methods	familiar situations. Apply m Demonstrate partial but lin Show evidence of some ox knowledge to solve problet Demonstrate little or no ev of analytical and critical a problems. Organization an  assed course  \$ / Self study  ents	noderately effective organizational and presentited command of knowledge and skills requisherent and logical thinking, but with limited a ms. Apply limited or barely effective organizatidence of command of knowledge and skills abilities, logical and coherent thinking. Sho dipresentational skills are minimally effective    Details   Details   Coursework (assignments,	ntational skills.  irred for attaining some of the control irred for attaining some of the control irred for attaining some of the control irred for attaining the course were little or no ability to approximate the course were little or no ability to approximate the course or ineffective.  Weighting in final course grade (%)	No. of Hours  36  12  100  Assessment Methods to CLO Mapping	
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail  N  Lecture-b  Activities Lectures Tutorials Reading  Methods  Assignment	familiar situations. Apply m Demonstrate partial but lin Show evidence of some ox knowledge to solve problet Demonstrate little or no ev of analytical and critical a problems. Organization an  mased course s / Self study	noderately effective organizational and presentited command of knowledge and skills requisherent and logical thinking, but with limited a ms. Apply limited or barely effective organizatidence of command of knowledge and skills abilities, logical and coherent thinking. Sho did presentational skills are minimally effective    Details   Details   Coursework (assignments, tutorials, and a class test)	intational skills.  irred for attaining some of the control of the	No. of Hours  36  12  100  Assessment Methods to CLO Mapping CLO 1,3  CLO 1,2,3,4,5	
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	Fail  N  Lecture-b  Activitie Lectures Tutorials Reading  Methods  Assignme Examina Rejda, G.	familiar situations. Apply m Demonstrate partial but lin Show evidence of some ox knowledge to solve problet Demonstrate little or no ev of analytical and critical a problems. Organization an  assed course   / Self study  ents  tion  E.: Principles of Risk M	inderately effective organizational and presentited command of knowledge and skills requisherent and logical thinking, but with limited a ms. Apply limited or barely effective organizatidence of command of knowledge and skills abilities, logical and coherent thinking. Sho dipresentational skills are minimally effective    Details   Details	intational skills.  irred for attaining some of the control of attaining some of the control of a training some of the control of a training the course was very little or no ability to aport interfective.  Weighting in final course grade (%)  25  75  Addison Wesley, 10th econtrol of attaining the course grade (%)	No. of Hours  36 12 100 Assessment Methods to CLO Mapping CLO 1,3 CLO 1,2,3,4,5 dition)	

STAT3611	Compu	ter-aided data analysis	(6 credits)	Academic Ye	ar  2021	
Offering Department	Statistics	& Actuarial Science		Quota		
Course Co-ordinator	Dr E K F	Lam, Statistics & Actuarial	Science (hrntlkf@hku.hk)			
Teachers Involved						
Course Objectives	A wide range of statistical analyses and methods are presented using data sets from social sciences research an scientific studies. Measuring uncertainty, describing patterns of variability and the inter-relationship between several variables are essential aspects of scientific investigations that require good understanding of statistics. This computer-oriented but non-mathematical course develops the important concepts and methods of statistics. The course makes extensive use of computers through the user friendly statistical software JMP. No knowledge of a programming language is required.					
Course Contents & Topics	Data exp	*	able hypotheses, the evalu	ation of evidence and forecas	ting on the basis o	
Course Learning			rse, students should be able			
Outcomes	CLO 1 s	ummarize and describe the	quantitative and qualitative	data using some simple statist	cal measures	
	v	ariables	,	onship between several cont		
	CLO 3 carry out simple statistical analyses based on some real life data, formulate testable hypotheses, make appropriate statistical inferences and make interpretations on the findings					
Pre-requisites		`	, ,	course) or (STAT1601 and an	,	
(and Co-requisites and Impermissible combinations)		tudents who have passed		T1603 and any University leven in any of these courses: STA		
Offer in 2021 - 2022	N Of	fer in 2022 - 2023 : N		Examination		
Grade Descriptors (A+ to F)	A	learning outcomes. Show strong	g analytical and critical abilities an	ve knowledge and skills required for d logical thinking, with evidence of ori of amiliar situations. Apply highly effe	ginal thought, and ability	
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familia and some unfamiliar situations. Apply effective organizational and presentational skills.				
	С	outcomes. Show evidence of s		nd skills required for attaining most and logical thinking, and ability to a resentational skills.		
	D	Show evidence of some cohere	ent and logical thinking, but with lim	required for attaining some of the co ted analytical and critical abilities. Sh- nizational and presentational skills.		
	Fail			skills required for attaining the course Show very little or no ability to ap		

Communication-	N problems. Organi	zation and presentational skills are minimally effective or	menective.		
intensive Course					
Course Type	Lecture-based course				
Course Teaching	Activities	Details		No. of Hours	
& Learning Activities	Lectures			36	
	Tutorials			12	
	Reading / Self study			100	
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignments	Coursework (assignments, practical work, and a term test)	40	CLO 1,2,3	
	Examination	One 2-hour written examination	60	CLO 1,2,3	
	<ul> <li>J. E. Freund &amp; G. A. Simon: Statistics - A First Course (Prentice Hall, 7th edition)</li> <li>R. Hooke: How to tell the liars from the Statisticians (Marcel Dekker)</li> <li>D. G. Kleinbaum, L. L. Kupper, &amp; K. E. Muller: Applied Regression Analysis and Other Multivariable M (Duxbury Press, 1988, 2nd edition)</li> <li>D. M. Levine, M. L. Berenson, &amp; D. Stephan: Statistics for Managers - Using Microsoft Excel (Prentice Hall)</li> </ul>				
Course Website	edition) http://moodle.hku.hk				
Additional Course Information	ional Course CogSc or CompSc students having taken STAT1301 should obtain approval from the dept.				
	J. T. McClave & F. H. Dietrich II: Statistics (Maxwell Macmillian, 5th ed.) M. R. Middleton: Data Analysis Using Microsoft EXCEL 5.0 (Duxbury) J. Neter, W. Wasserman, & G. A. Whitmore: Applied Statistics (Allyn and Bacon) P. Newbold: Statistics for Business and Economics (Prentice-Hall, International Editions, 3rd ed.) I. Olkin, L. J. Gleser, & C. Derman: Probability Models and Applications (Prentice-Hall, 2nd ed.) J. G. Peatman: Introduction to Applied Statistics (Harper)				

STAT3612	Statisti	cal machine lear	ning (6 credits)	Academic Yea	r 2021		
Offering Department		& Actuarial Science		Quota			
Course Co-ordinator	Dr C Wa	Dr C Wang, Statistics & Actuarial Science (stacw@hku.hk)					
Teachers Involved	(Dr C Wang, Statistics & Actuarial Science)						
Course Objectives	Machine learning is the study of computer algorithms that build models of observed data in order to make predictions or decisions. Statistical machine learning emphasizes the importance of statistical theory and methodology in the algorithmic development. This course provides a comprehensive and practical coverage of essential machine learning concepts and a variety of learning algorithms under supervised and unsupervised settings.						
Course Contents & Topics		Basics of machine learning, generalized linear models, variable selection, regularization, cross-validation, tree based methods, dimension reduction, principal component analysis, cluster analysis.					
Course Learning	On succe	essful completion of	this course, students should be	able to:			
Outcomes	CLO 1 g	et familiar with the v	vorkflow of a data science or ma	chine learning project			
		•	ply a wide range of statistica gths and weaknesses	I machine learning methods, and	d recognize their		
			opriate techniques for a particula				
				prediction accuracy and model exp	lainability		
	CLO 5 a	pply R programmin	g for solving data-scientific probl	ems			
Pre-requisites		`	1603 and any University level 2	,			
and Co-requisites			3907, or already enrolled in these				
and Impermissible		•	assed in STAT4904, or already e	enrolled in this course; and			
combinations)		Sc(Actuarial Scienc	,				
~~ . ~~~	_ `			04 Statistical learning for risk mode			
Offer in 2021 - 2022		t sem Offer in 202		Examination	No Exam		
Grade Descriptors (A+ to F)	В	learning outcomes. S to apply knowledge presentational skills.	how strong analytical and critical abilitie to a wide range of complex, familiar a	tensive knowledge and skills required for a s and logical thinking, with evidence of origind and unfamiliar situations. Apply highly effect wledge and skills required for attaining at le	nal thought, and abilitive organizational ar		
		learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.					
	С	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.						
	Fail	Demonstrate little or of analytical and crit	no evidence of command of knowledge	and skills required for attaining the course le king. Show very little or no ability to appl			
Communication- Intensive Course	N		·				
Course Type	Lecture-k	pased course					
Course Teaching	Activitie	S	Details		No. of Hours		
& Learning Activities	Lectures	<b>;</b>			36		
	Tutorials	<b>i</b>			12		
	Reading	/ Self study			100		
Assessment Methods and Weighting	Methods	S	Details	Weighting in final course grade (%)	Assessment Methods		

				to CLO Mapping		
	Assignments		30	CLO 1,2,3,5		
	Project reports		30	CLO 1,2,3,4,5		
	Test		40	CLO 2,3		
Required/recommended	1. James, G., Witten, D., Hastie	, T. and Tibshirani, R. (20	13). An Introduction to Statist	tical Learning with		
reading and	Applications in R, Springer, New York.					
online materials	2. Hastie, T., Tibshirani, R. and Friedman, J. (2009). The Elements of Statistical Learning: Data Mining, Inference,					
	and Prediction. Second Edition, Springer, New York.					
	3. P. Dunn and G. Smyth (2018). G	eneralized Linear Models wit	th Examples in R, Springer, New	/ York.		
Course Website	http://moodle.hku.hk					

STAT3613	Marketin	g analytics (6 credi	its)	Academic Yea	ar 2021	
Offering Department	Statistics &	& Actuarial Science	•	Quota	50	
Course Co-ordinator	Dr C W Kw	van, Statistics & Actuari	ial Science (cwkwan@hku.hk)			
Teachers Involved	(Dr C W K	(Dr C W Kwan, Statistics & Actuarial Science)				
Course Objectives	This course is designed to provide an overview and practical application of trends, technology and methodology used in the marketing survey process including problem formulation, survey design, data collection and analysis, and report writing. Special emphasis will be put on statistical techniques particularly for analysing marketing data including market segmentation, market response models, consumer preference analysis and conjoint analysis. Students will analyse a variety of marketing case studies.					
Course Contents & Topics	Marketing decision models, Market response models, Survey research, Statistical methods for segmentation, Statistical methods for positioning, Statistical methods for new product design					
Course Learning	On successful completion of this course, students should be able to:  CLO 1 develop hands-on skills of curve fitting and analyzing data with SAS procedures or R packages					
Outcomes						
	CLO 2 un	derstand marketing dec	cision models			
	an		sis, factor analysis, multidimensional confirmatory factor analysis, and dis act design			
Pre-requisites	Pass in Bl	IOL2102 or (ECON128	0 and any University level 2 course	e) or (STAT1601 and an	y University level 2	
(and Co-requisites and Impermissible combinations)		(STAT1602 and any U STAT2901	Iniversity level 2 course) or STAT26	01 or (STAT1603 and ar	y University level 2	
Offer in 2021 - 2022	Y 1st s	sem Offer in 2022 - 20	023 : Y	Examination	Dec	
Grade Descriptors	Α		stery at an advanced level of extensive know			
(A+ to F)		learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.				
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.				
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.				
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.				
	Fail	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.				
Communication- intensive Course	N					
Course Type	Lecture-ba	ased course				
Course Teaching	Activities	i	Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials				12	
	Reading /	Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	nts	Coursework (assignments, a class test and a group project)	50	CLO 1,2,3	
	Examinati	on	One 2-hour written examination	50	CLO 1,2,3	
Danisius d'us sausses adad		Examination One 2-hour written examination 50 CLO 1,2,3  Lattin J., Carroll J.D. and Green P.E.: Analysing multivariate data (Thomson)  Malhotra, Naresh: Marketing Research: An Applied Orientation (Pearson, 2010, 6th ed.)  Johnson R., Wichern D.: Applied Multivariate Statistical Analysis (Prentice Hall, 5th ed.)				
Required/recommended reading and online materials	Johnson R	R., Wichern D.: Applied I		tice Hall, 5th ed.)		

STAT3614	Business forecasting (6 credits)	Academic Year	2021		
Offering Department	Statistics & Actuarial Science	Quota			
Course Co-ordinator	Dr R W L Wong, Statistics & Actuarial Science (rwong @hku.hk)				
Teachers Involved					
Course Objectives	In daily business operations, forecasts are routinely required on different aspect individual companies. Numerous statistical techniques have been developed forecasts for the business decision-maker. This course considers a wide ran proven useful to practitioners. The course will involve the use of computer s process.	in the past dec ge of such techr	ades to provide		
Course Contents & Topics	Review of basic statistical concepts; autocorrelation analysis; evaluation and combination of forecasts; moving averages and smoothing methods; simple linear regression; multiple regression; growth curves; time series regression; the handling of seasonal cycles; decomposition methods.				
Course Learning	On successful completion of this course, students should be able to:				

Outcomes		CLO 1 understand data patterns and choose a suitable forecasting techniques				
	CLO 2 un	nderstand forecasting methods, simple and mult	ethods: moving averages and smoo iple linear regression	othing methods, decomp	osition and winter's	
	CLO 3 de		of analyzing business data with co	omputer software, EXCE	EL, and its add-ins	
Pre-requisites (and Co-requisites	course) or	Pass in BIOL2102 or (ECON1280 and any University level 2 course) or (STAT1601 and any University level 2 course) or (STAT1602 and any University level 2 course) or (STAT1603 and any University level 2 course); and Not for students who have passed or already enrolled in any of these courses: STAT2601, STAT2901, STAT3907,				
and Impermissible combinations)		idenis who have passed 1, ECON2280.	d or already enrolled in any or these	courses: STATZ001, ST	A12901, STA13907,	
Offer in 2021 - 2022	N Offe	er in 2022 - 2023 : N		Examination		
Grade Descriptors (A+ to F)	A	learning outcomes. Show s	stery at an advanced level of extensive kno trong analytical and critical abilities and logica ide range of complex, familiar and unfamilia	al thinking, with evidence of or	iginal thought, and ability	
	В	learning outcomes. Show ev	mmand of a broad range of knowledge and vidence of analytical and critical abilities and loons. Apply effective organizational and presen	ogical thinking, and ability to ap		
	С					
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.				
	Fail	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.				
Communication- intensive Course	N					
Course Type	Lecture-ba	ased course				
Course Teaching	Activities	3	Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials				12	
	Reading /	Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents	Coursework (assignments,	40	CLO 1	
	J		tutorials, and a class test)			
	Examinat		One 2-hour written examination	60	CLO 1,2,3	
Required/recommended reading and online materials	Examinati J. E. Hank P. E. Gar Economics	ion ke, D. W. Wichern, & A. ynor & R. C. Kirkpatri s (McGraw-Hill, 1994)	One 2-hour written examination G. Reitsch: Business Forecasting (Pick: Introduction to Time-series Mo	rentice Hall, 2009, 9th ecodelling and Forecastin	1.)	
reading and online materials	Examinati J. E. Hank P. E. Ga Economic P. Newbol	ion ke, D. W. Wichern, & A. ynor & R. C. Kirkpatr s (McGraw-Hill, 1994) ld & T. Bos: Introductory	One 2-hour written examination G. Reitsch: Business Forecasting (P	rentice Hall, 2009, 9th ecodelling and Forecastin	1.)	
reading and	Examinati J. E. Hank P. E. Ga Economics P. Newbol http://moo	ion ke, D. W. Wichern, & A. ynor & R. C. Kirkpatr s (McGraw-Hill, 1994) ld & T. Bos: Introductory dle.hku.hk	One 2-hour written examination G. Reitsch: Business Forecasting (Pick: Introduction to Time-series Mo	rentice Hall, 2009, 9th ecodelling and Forecastin	d.) g in Business and	

STAT3615	Practic	cal mathematics for i	nvestment (6 credits)	Academic Year	2021			
Offering Department	Statistics	s & Actuarial Science		Quota				
Course Co-ordinator	Prof K C	Prof K C Yuen, Statistics & Actuarial Science (kcyuen@hku.hk)						
Teachers Involved	(Prof K 0	(Prof K C Yuen,Statistics & Actuarial Science)						
Course Objectives		The main focus of this course is built on the concepts on financial mathematics. Practical applications of these concepts are also considered.						
Course Contents & Topics	schedule	This course covers: simple and compound interest; annuities certain; discounted cash flow analysis; amortization schedules and sinking funds; yield rates; bonds and related securities; practical applications such as real estate mortgage, short sales and term structure of interest rates.						
Course Learning	On succ	essful completion of this	course, students should be able to:					
Outcomes	CLO 1	solve practical problems	relating to annuities certain, simple a	and compound interest				
	CLO 2	carry out discounted casl	h flow analysis					
	CLO 3	apply amortization sched	lules and sinking funds to the practic	al problems such as real esta	ate mortgage			
Pre-requisites (and Co-requisites and Impermissible combinations)	STAT26	Pass in (STAT1601 and any University level 2 course) or (STAT1602 and any University level 2 course) or STAT2601 or (STAT1603 and any University level 2 course) or STAT2901; and Not for students who have passed in STAT2902, or have already enrolled in this course.						
Offer in 2021 - 2022	Y 2r	nd sem Offer in 2022 - 2	2023 : Y	Examination	May			
Grade Descriptors	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills							
(A+ to F)		learning outcomes. Show s to apply knowledge to a v	strong analytical and critical abilities and logic					
•	В	learning outcomes. Show s to apply knowledge to a v presentational skills. Demonstrate substantial or learning outcomes. Show e	strong analytical and critical abilities and logic wide range of complex, familiar and unfamil ommand of a broad range of knowledge and evidence of analytical and critical abilities and	iar situations. Apply highly effectiv  I skills required for attaining at leas logical thinking, and ability to apply	e organizational and st most of the course			
•		learning outcomes. Šhow s to apply knowledge to a v presentational skills.  Demonstrate substantial crearning outcomes. Show e and some unfamiliar situation becomes. Show evidence show evidence show evidence show evidence.	strong analytical and critical abilities and logic wide range of complex, familiar and unfamili ommand of a broad range of knowledge and	iar situations. Apply highly effective skills required for attaining at least logical thinking, and ability to apply ntational skills. Ills required for attaining most of logical thinking, and ability to apply	e organizational and st most of the course knowledge to familiar the course learning			
•	В	learning outcomes. Šhow s to apply knowledge to a v presentational skills.  Demonstrate substantial crearning outcomes. Show e and some unfamiliar situati Demonstrate general but outcomes. Show evidence familiar situations. Apply m Demonstrate partial but lim Show evidence of some co	strong analytical and critical abilities and logic wide range of complex, familiar and unfamilion ommand of a broad range of knowledge and evidence of analytical and critical abilities and ions. Apply effective organizational and preser incomplete command of knowledge and sk of some analytical and critical abilities and	iar situations. Apply highly effective skills required for attaining at least logical thinking, and ability to apply ntational skills. Illis required for attaining most of logical thinking, and ability to apply attoinal skills. The course apply that on attaining some of the course halytical and critical abilities. Show learn and the course applytical and critical abilities.	te organizational and st most of the course knowledge to familiar the course learning y knowledge to most te learning outcomes.			
•	В	learning outcomes. Šhow s to apply knowledge to a v presentational skills.  Demonstrate substantial or learning outcomes. Show e and some unfamiliar situati Demonstrate general but outcomes. Show evidence familiar situations. Apply m Demonstrate partial but tim Show evidence of some oc knowledge to solve probler Demonstrate little or no ev of analytical and critical a	strong analytical and critical abilities and logic wide range of complex, familiar and unfamilion ommand of a broad range of knowledge and evidence of analytical and critical abilities and ions. Apply effective organizational and present incomplete command of knowledge and sket of some analytical and critical abilities and ioderately effective organizational and present inted command of knowledge and skills requisited command of knowledge and skills requisherent and logical thinking, but with limited at	iar situations. Apply highly effective skills required for attaining at least logical thinking, and ability to apply tational skills. Illis required for attaining most of logical thinking, and ability to apply tational skills. The street for attaining some of the course halytical and critical abilities. Show lonal and presentational skills. The equired for attaining the course least very little or no ability to apply	e organizational and st most of the course knowledge to familiar the course learning y knowledge to most se learning outcomes. limited ability to apply rning outcomes. Lack			
•	B C	learning outcomes. Šhow s to apply knowledge to a v presentational skills.  Demonstrate substantial or learning outcomes. Show e and some unfamiliar situati Demonstrate general but outcomes. Show evidence familiar situations. Apply m Demonstrate partial but tim Show evidence of some oc knowledge to solve probler Demonstrate little or no ev of analytical and critical a	strong analytical and critical abilities and logic wide range of complex, familiar and unfamilionmmand of a broad range of knowledge and evidence of analytical and critical abilities and ions. Apply effective organizational and present incomplete command of knowledge and skip of some analytical and critical abilities and ioderately effective organizational and present inted command of knowledge and skills requiberent and logical thinking, but with limited at ms. Apply limited or barely effective organizati idence of command of knowledge and skills reductions of the command of knowledge and skills reductions.	iar situations. Apply highly effective skills required for attaining at least logical thinking, and ability to apply tational skills. Illis required for attaining most of logical thinking, and ability to apply tational skills. The street for attaining some of the course halytical and critical abilities. Show lonal and presentational skills. The equired for attaining the course least very little or no ability to apply	e organizational and st most of the course knowledge to familiar the course learning y knowledge to most se learning outcomes. limited ability to apply rning outcomes. Lack			
(A+ to F)	B C D Fail	learning outcomes. Šhow s to apply knowledge to a v presentational skills.  Demonstrate substantial or learning outcomes. Show e and some unfamiliar situati Demonstrate general but outcomes. Show evidence familiar situations. Apply m Demonstrate partial but tim Show evidence of some oc knowledge to solve probler Demonstrate little or no ev of analytical and critical a	strong analytical and critical abilities and logic wide range of complex, familiar and unfamilionmmand of a broad range of knowledge and evidence of analytical and critical abilities and ions. Apply effective organizational and present incomplete command of knowledge and skip of some analytical and critical abilities and ioderately effective organizational and present inted command of knowledge and skills requiberent and logical thinking, but with limited at ms. Apply limited or barely effective organizati idence of command of knowledge and skills reductions of the command of knowledge and skills reductions.	iar situations. Apply highly effective skills required for attaining at least logical thinking, and ability to apply tational skills. Illis required for attaining most of logical thinking, and ability to apply tational skills. The street for attaining some of the course halytical and critical abilities. Show lonal and presentational skills. The equired for attaining the course least very little or no ability to apply	e organizational and st most of the course knowledge to familiar the course learning y knowledge to most se learning outcomes. limited ability to apply rning outcomes. Lack			

& Learning Activities	Lectures			36			
	Tutorials			12			
	Reading / Self study			100			
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignments	Coursework (assignments, tutorials, and a class test)	50	CLO 1,2,3			
	Examination	One 3-hour written examination	50	CLO 1,2,3			
Required/recommended reading and online materials		Kellison, S. G.: The Theory of Interest (Irwin: Illinois, 2008, 3rd edition)  Broverman, S. A.: Mathematics of Investment and Credit (ACTEX Publications - Mad River Books: Connecticut, 1004, 3rd edition)					
Course Website	http://moodle.hku.hk						

STAT3616	Advanc	ed SAS progra	mming (6 credits)	Academic Ye	ar 2021		
Offering Department	Statistics	& Actuarial Science	e ,	Quota	50		
Course Co-ordinator	TBC, Stat	tistics & Actuarial S	Science ()	'			
Teachers Involved							
Course Objectives		This course aims to equip students, who have taken STAT2603, with a high level of proficiency in SAS programming for automation of procedures and data processing in solving complex problems more efficiently.					
Course Contents & Topics	Overview of SAS underlying parts. Macro programming. Advanced programming techniques including data simulation, advanced data look-up techniques, modifying transaction datasets and controlling I/O processing and memory.						
Course Learning	On succe	ssful completion o	f this course, students should be able to:				
Outcomes	CLO 1	Understand the sy	stem of SAS and basic programming				
	CLO 2	Use the BY statem	nent for parallel processing to aid automa	tion			
	CLO 3	Use the output dat	aset without printing to OUTPUT window	s for piping idea in automa	tion		
	CLO 4	Use SAS MACRO	to develop customized and automated a	pplications			
	CLO 5	Use advanced SAS	S programming statements and technique	es to solve complex proble	ms		
Pre-requisites	Pass in S	TAT2601 or STAT	2901				
(and Co-requisites and Impermissible combinations)	(Students	are strongly recor	mmended to take STAT2603 or STAT260	)4 prior to taking this cours	e.)		
Offer in 2021 - 2022	N Off	fer in 2022 - 2023 :	: N	Examination			
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.						
	В	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.					
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.						
Communication- intensive Course	N		,				
Course Type	Lecture-b	ased course					
Course Teaching	Activitie	s	Details	Details			
& Learning Activities	Lectures				36		
	Tutorials						
	Reading	/ Self study			100		
Assessment Methods and Weighting	Methods	· · · · · · · · · · · · · · · · · · ·	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents	Coursework (assignments, tutorials, and a class test)	50	CLO 1,2,3,4,5		
	Examina	tion	One 2-hour written examination	50	CLO 1,2,3,4,5		
Required/recommended reading and online materials	Carpente		le: Advanced Programming for SAS 9, Th Complete Guide to the SAS Macro Lan		lorth Carolina: SAS		
Course Website		odle.hku.hk					

STAT3617	Sample survey methods (6 credits)  Academic Year	2021
Offering Department	Statistics & Actuarial Science Quota	
Course Co-ordinator	Ms O T K Choi, Statistics & Actuarial Science (ochoi@hku.hk)	
Teachers Involved	(Ms O T K Choi, Statistics & Actuarial Science) (Prof F W H Ho, Statistics & Actuarial Science)	
Course Objectives	This course will cover design and implementation of sample surveys and analysis of statistical of Survey design includes overall survey design, design of sampling schemes and questionnair methods include sample size determination, sampling and non-sampling errors and biases, met of parameters from survey data, imputation for missing data etc.	es, etc. Samplin
Course Contents & Topics	Topics may include: survey design and planning; survey quality and ethics; implementa management of survey staff, respondent relationship and logistical issues; and sampling management of survey staff, respondent relationship and logistical issues; and sampling management of survey staff, respondent relationship and logistical issues; and sampling, multi-stage sampled determination, post-stratification, ratio and regression estimation methods, non-sampling error	thods like simpl bling, sample siz

	private se	ectors, with some examp	se studies of major applications o les on the analysis and application			
Course Learning		discussed.  On successful completion of this course, students should be able to:				
Outcomes			and understanding of the various	e stone to be taken in	the planning and	
Outcomes	in	nplementation of sample	surveys	•		
	S	urvey - make statistical in	hemes and select the most efficient ference on parameters based on a	sample	ption for a particular	
	CLO 3 ju	idge whether the statistic	s presented by other survey takers	are trustworthy		
Pre-requisites (and Co-requisites and Impermissible combinations)	University		2102, or (ECON1280 and any Unive T1602 and any University level 2 c T2901.			
Offer in 2021 - 2022	Y 2n	d sem Offer in 2022 - 2	023 : Y	Examination	May	
Grade Descriptors (A+ to F)	A	learning outcomes. Show st	tery at an advanced level of extensive kno rong analytical and critical abilities and logic de range of complex, familiar and unfamili	al thinking, with evidence of or	iginal thought, and ability	
	В					
	С					
	D					
	Fail	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.				
Communication- intensive Course	N					
Course Type	Lecture-b	ased course				
Course Teaching	Activitie	S	Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials				12	
	Reading	/ Self study			100	
Assessment Methods and Weighting	Methods	<b>S</b>	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignm	ents	Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3	
	Examina	tion	One 2-hour written examination	75	CLO 1,2,3	
Required/recommended reading and online materials	R. L. Sch W. G. Co R. M. Gro Wiley & S L. Kish: S	Examination   One 2-nour written examination   75   CLO 1,2,3   S. L. Lohr: Sampling: Design and Analysis, 2nd edition (Duxbury Press, 2010) R. L. Scheaffer, W. Mendenhall, & R. L. Ott: Elementary Survey Sampling (Duxbury Press, 2011, 7th edition) W. G. Cochran: Sampling Techniques (John Wiley & Sons Ltd., 1997) R. M. Groves, F. J. Fowler, M. P. Couper, J. M. Lepkowski, E. Singer, R. Tourangeau: Survey Methodology (J Wiley & Sons Ltd., 2009, 2nd edition) L. Kish: Survey Sampling (John Wiley & Sons, Inc., 1995) P. Salant & D. A. Dillman: How to Conduct Your Own Survey (John Wiley & Sons, Inc., 1994)			,	
Course Website		odle.hku.hk	Conduct Four Own Curvey (John W	ncy & Oolis, IIIc., 1994)		

STAT3618	Derivati	ives and risk management (6 credits)	Academic Year	2021		
Offering Department	Statistics	& Actuarial Science	Quota			
Course Co-ordinator	Dr K P W	at, Statistics & Actuarial Science (watkp@hku.hk)				
Teachers Involved	(Dr K P V	Vat,Statistics & Actuarial Science)				
Course Objectives	derivative be decon aims at d hedging s	es all risk managers must be well versed in the use and es are forwards (having a linear payoff) and options (have inposed to these underlying payoffs or alternatively they lemonstrating the practical use of financial derivatives in strategies, and the no-arbitrage principle.	ving a non-linear payoff). All oth- are variations on these basic ion risk management. Emphases a	er derivatives can deas. This course are on pricing and		
Course Contents & Topics	Review of futures, forwards and options and the no-arbitrage principle; hedging strategies using futures; pricing of forwards and futures; interest rate futures and swaps; trading strategies using options; put-call parity; valuation of European and American options using the binomial-tree model; valuation of European and American options using the Black-Scholes option pricing model; the Greeks: their calculation and interpretation; implied volatility; delta hedging and the role of market-makers; exotic options: Asian options, barrier options, compound options, gap options and exchange options.					
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 use futures, forwards, options and swaps to formulate financial strategies					
	CLO 2 determine the payoff and the value of various derivative products using binomial tree and Black-Scholes formula					
	CLO 3 explain how derivative products can be used as tools to manage financial risk					
	CLO 4 recognize how to decompose complicated derivatives into a portfolio of standard derivatives					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in STAT3615; and Not for students who have passed or already enrolled in any of the following courses: FINA2322, STAT3905, STAT3910; and Not for BSc(Actuarial Science) students.					
Offer in 2021 - 2022	Y 1st	t sem Offer in 2022 - 2023 : Y	Examination	Dec		
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive learning outcomes. Show strong analytical and critical abilities and to apply knowledge to a wide range of complex, familiar and un presentational skills.	logical thinking, with evidence of origin	al thought, and ability		
	В	Demonstrate substantial command of a broad range of knowledge	e and skills required for attaining at leas	st most of the course		

		learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge and some unfamiliar situations. Apply effective organizational and presentational skills.  Demonstrate general but incomplete command of knowledge and skills required for attaining most of the coulutcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowlefamiliar situations. Apply moderately effective organizational and presentational skills.					
	С						
	D	Demonstrate partial but lim Show evidence of some co	nited command of knowledge and skills requi pherent and logical thinking, but with limited at ms. Apply limited or barely effective organizati	red for attaining some of the conalytical and critical abilities. Sh			
	Fail	Demonstrate little or no evi of analytical and critical a	idence of command of knowledge and skills r abilities, logical and coherent thinking. Show d presentational skills are minimally effective of	equired for attaining the course v very little or no ability to ap			
Communication- intensive Course	N						
Course Type	Lecture-b	ased course					
Course Teaching	Activities		Details	No. of Hours			
& Learning Activities	Lectures			36			
	Tutorials				12		
	Reading / Self study				100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments		Coursework (assignments, tutorials, and class test(s))	40	CLO 1,3		
	Examination		One 2-hour written examination	60	CLO 1,2,3,4		
Required/recommended reading and online materials	Hull, J. C.	McDonald, R. L. (2013). Derivatives Markets (3rd Edition). Pearson. Hull, J. C. (2018). Options, Futures, and Other Derivatives (10th Edition). Pearson. Hull, J. C. (2018). Risk Management and Financial Institutions (5th Edition). Wiley.					
Course Website		i, J. C. (2018). Risk Management and Financial Institutions (5th Edition). Wiley.					

	Modern	nonparametric stat	istics (6 credits)	Academic Year	r 2021	
Offering Department	Statistics & Actuarial Science Quota					
Course Co-ordinator	TBC, Sta	BC, Statistics & Actuarial Science (ug_enquiry@saas.hku.hk)				
Teachers Involved		tistics & Actuarial Science				
Course Objectives		se aims to acquaint stu netric statistical methods	dents with the fundamentals, basic for data analysis.	properties and use of class	ssical and moderr	
Course Contents & Topics	samples;		stics; goodness-of-fit tests; rank te periments; permutation tests; tests netric regression.			
Course Learning			course, students should be able to:			
Outcomes	CLO 1 id	dentify appropriate nonpa	arametric methods for analyzing data	l		
	CLO 2 p	erform a variety of nonpa	arametric statistical analyses			
	n	onparametric statistical a	•	for data management and	performing basic	
		ffectively communicate f	indings and conclusions			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in S	STAT2602 or STAT3902				
Offer in 2021 - 2022	N Of	fer in 2022 - 2023 : Y		Examination		
Grade Descriptors (A+ to F)	Α					
	В					
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.					
	Fail	Demonstrate little or no evidence of analytical and critical a	dence of command of knowledge and skills re bilities, logical and coherent thinking. Show	equired for attaining the course lead very little or no ability to apply	r limited ability to apply arning outcomes. Lack	
	Fail N	Demonstrate little or no evidence of analytical and critical a	dence of command of knowledge and skills re bilities, logical and coherent thinking. Show	equired for attaining the course lead very little or no ability to apply	r limited ability to apply arning outcomes. Lack	
ntensive Course Course Type	N Lecture-b	Demonstrate little or no evi- of analytical and critical a problems. Organization and	dence of command of knowledge and skills re bilities, logical and coherent thinking. Show d presentational skills are minimally effective of	equired for attaining the course lead very little or no ability to apply	v limited ability to apply arning outcomes. Lack y knowledge to solve	
ntensive Course Course Type Course Teaching	N	Demonstrate little or no evi- of analytical and critical a problems. Organization and	dence of command of knowledge and skills re bilities, logical and coherent thinking. Show	equired for attaining the course lead very little or no ability to apply	r limited ability to apply arning outcomes. Lack	
ntensive Course Course Type Course Teaching	N Lecture-b	Demonstrate little or no evior of analytical and critical a problems. Organization and based course	dence of command of knowledge and skills re bilities, logical and coherent thinking. Show d presentational skills are minimally effective of	equired for attaining the course lead very little or no ability to apply	v limited ability to apply arning outcomes. Lack y knowledge to solve No. of Hours 36	
ntensive Course Course Type Course Teaching	N Lecture-b Activitie Lectures Tutorials	Demonstrate little or no evior of analytical and critical a problems. Organization and passed course	dence of command of knowledge and skills re bilities, logical and coherent thinking. Show d presentational skills are minimally effective of	equired for attaining the course lead very little or no ability to apply	v limited ability to apply arming outcomes. Lack y knowledge to solve No. of Hours 36 12	
intensive Course Course Type Course Teaching & Learning Activities	N Lecture-b Activitie Lectures Tutorials	Demonstrate little or no evior of analytical and critical a problems. Organization and passed course	dence of command of knowledge and skills re bilities, logical and coherent thinking. Show d presentational skills are minimally effective of	equired for attaining the course lead very little or no ability to apply	v limited ability to apply arning outcomes. Lack y knowledge to solve No. of Hours 36	
Intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture-b Activitie Lectures Tutorials	Demonstrate little or no evior of analytical and critical a problems. Organization and coased course	dence of command of knowledge and skills re bilities, logical and coherent thinking. Show d presentational skills are minimally effective of	equired for attaining the course lead very little or no ability to apply	v limited ability to apply arming outcomes. Lack y knowledge to solve No. of Hours 36 12	
Intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture-b Activitie Lectures Tutorials Reading	Demonstrate little or no evior analytical and critical a problems. Organization and coased course is	dence of command of knowledge and skills re bilities, logical and coherent thinking. Show d presentational skills are minimally effective of Details	equired for attaining the course let very little or no ability to apply or ineffective.  Weighting in final	No. of Hours  36  12  100  Assessment  Methods	
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture-b Activitie Lectures Tutorials Reading Methods	Demonstrate little or no evior analytical and critical a problems. Organization and based course is	dence of command of knowledge and skills re bilities, logical and coherent thinking. Show d presentational skills are minimally effective of  Details  Details  Coursework (assignments,	equired for attaining the course let very little or no ability to apply rineffective.  Weighting in final course grade (%)	No. of Hours 36 12 100 Assessment Methods to CLO Mapping	
Communication- intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	N Lecture-b Activitie Lectures Tutorials Reading Methods Assignme Examina Alvo, M. a Gibbons, Higgins, Sprent, P	Demonstrate little or no evior analytical and critical a problems. Organization and coased course as / Self study  ents  tion and Yu, P.L.H.: Statistica J.D. and Chakraborti, S.  James: Introduction to M. D. and Smeeton, N.C.: Ap	dence of command of knowledge and skills re bilities, logical and coherent thinking. Show d presentational skills are minimally effective of  Details  Details  Coursework (assignments, tutorials and a class test)	Weighting in final course grade (%)  Weighting in final course grade (%)  50  50 er, 2014) e, 5th edition (CRC press, 2 dury Press, 2004)	No. of Hours 36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3	

STAT3621	Statistic	al data analysis (6	credits)	Academic Y	ear 2021		
Offering Department		& Actuarial Science		Quota	50		
Course Co-ordinator	Dr J F Xu, Statistics & Actuarial Science (xujf@hku.hk)						
Teachers Involved	(Dr J F Xu, Statistics & Actuarial Science)						
Course Objectives	entire prod so that qu review and	cess of data analysis. lestions of interest can d improvement, when le data, to build relia	statistical methods and modeling, s The course aims to develop skills on the properly formulated and answ one's first attempt does not adequible models, and to communicate	of model selection and hy rered. An important elem- uately fit the data. Stude	potheses formulation ent deals with mode nts will learn how to		
Course Contents			on and visualization of data; Simple	statistical analyses for the	one-sample and two		
& Topics	sample ca and mode Covariance	se using parametric a el diagnostic checking e analysis; Categorica sets will be present	nd nonparametric methods; Regres g; Analysis of Variance (ANOVA) I and count data: binary logistic regreed feed for modelling and analysis us	sion analyses: model fitti : 1-way, two-way and l ession, Poisson regressio	ng; variable selectior higher-way ANOVA; n.		
Course Learning			course, students should be able to:				
Outcomes	CLO 2 su		problem and identify what to measu the quantitative and qualitative d				
	CLO 4 ca	rry out appropriate a lection, perform mod	mong several continuous or discrete nd comprehensive statistical analy del diagnostics, formulate testable etations on the findings and report w	ses based on real life d e hypotheses, make ap			
Pre-requisites (and Co-requisites and Impermissible combinations)		FAT3600 or STAT3907 are strongly recomme	nded to take STAT2603 or STAT260	04 prior to taking this cour	se.)		
Offer in 2021 - 2022	Y 2nd	sem Offer in 2022 -	2023 : Y	Examination	n May		
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the cours learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and abilit to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational an presentational skills.					
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.					
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	D Fail	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack					
	of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.						
Communication- intensive Course	N		·				
Course Type	Lecture-ha	ased course					
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures				36		
_	Tutorials			12			
	Reading /	Self study			100		
Assessment Methods and Weighting	Methods	,	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	nts	Coursework (assignments and a class test)	50	CLO 1,2,3,4		
	Examinati	on	One 3-hour written examination	50	CLO 1,2,3,4		
Required/recommended reading and online materials	2013) 2. The Sta 3. Applied	tistical Sleuth: A Cours Regression Analysis	earning, with Applications in R, by see in Methods of Data Analysis, by F and Other Multivariable Methods, I (Author), Eli S. Rosenberg (Author)	Fred Ramsey (Author), Da by David G. Kleinbaum(	niel Schafer (Author)		
Course Website	4. Learning	,,,	unction Guide to Data Analysis, by F				

STAT3622	Data vis	ualization (6 credits) Academic Yea	r 2021		
Offering Department	Statistics 8	& Actuarial Science Quota	50		
Course Co-ordinator	Prof G Yin	n, Statistics & Actuarial Science (gyin@hku.hk)			
Teachers Involved	(Dr Y Fan,	Statistics & Actuarial Science) ,Statistics & Actuarial Science) n,Statistics & Actuarial Science)			
Course Objectives		se will focus on how to work with statistical graphics, graphics that display statistical da ze data. Students will learn a set of tools such as R to create these graphics and critica			
Course Contents & Topics	Grammar of graphics, visualizing patterns over time, visualizing relationship, visualizing spatial relationships, visualizing texts.				
Course Learning	On successful completion of this course, students should be able to:				
Outcomes	CLO 1 choose the best chart that fits the data				
	CLO 2 create a compelling visualization using computer software				

	CLO 3	communicate effect	tively using statistical graphics			
	CLO 4	critically evaluate g	raphics and suggest improvements			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in S	TAT2602 or STAT3902				
Offer in 2021 - 2022	N Off	er in 2022 - 2023 : N		Examination	)	
Grade Descriptors (A+ to F)	A	learning outcomes. Show to apply knowledge to a presentational skills.	astery at an advanced level of extensive kr strong analytical and critical abilities and logi wide range of complex, familiar and unfami	ical thinking, with evidence of o iliar situations. Apply highly eff	original thought, and ability fective organizational and	
	В	learning outcomes. Show e	ommand of a broad range of knowledge an evidence of analytical and critical abilities and ions. Apply effective organizational and prese	d logical thinking, and ability to a		
	С	outcomes. Show evidence	incomplete command of knowledge and set of some analytical and critical abilities and noderately effective organizational and preser	l logical thinking, and ability to		
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.				
		Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.				
	Fail	of analytical and critical	abilities, logical and coherent thinking. Sho	ow very little or no ability to a		
	Fail N	of analytical and critical	abilities, logical and coherent thinking. Sho	ow very little or no ability to a		
intensive Course Course Type	N	of analytical and critical	abilities, logical and coherent thinking. Sho	ow very little or no ability to a	apply knowledge to solve	
intensive Course Course Type Course Teaching	N	of analytical and critical a problems. Organization an ased course	abilities, logical and coherent thinking. Sho	ow very little or no ability to a		
intensive Course Course Type Course Teaching	N Lecture-b	of analytical and critical a problems. Organization an ased course	abilities, logical and coherent thinking. Sho d presentational skills are minimally effective	ow very little or no ability to a	No. of Hours	
intensive Course Course Type Course Teaching	N Lecture-b Activities Lectures Tutorials	of analytical and critical a problems. Organization an ased course s	abilities, logical and coherent thinking. Sho d presentational skills are minimally effective	ow very little or no ability to a	No. of Hours 36 12	
Course Type Course Teaching & Learning Activities	N Lecture-b Activities Lectures Tutorials	of analytical and critical a problems. Organization an ased course	abilities, logical and coherent thinking. Sho d presentational skills are minimally effective	ow very little or no ability to a	No. of Hours	
intensive Course Course Type Course Teaching	N Lecture-b Activities Lectures Tutorials	of analytical and critical a problems. Organization an ased course s	abilities, logical and coherent thinking. Sho d presentational skills are minimally effective	ow very little or no ability to a	No. of Hours 36 12	
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture-b Activities Lectures Tutorials Reading	of analytical and critical a problems. Organization an ased course s	abilities, logical and coherent thinking. Sho d presentational skills are minimally effective  Details	w very little or no ability to a or ineffective.  Weighting in final	No. of Hours 36 12 100 Assessment Methods	
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture-b Activities Lectures Tutorials Reading Methods	of analytical and critical aproblems. Organization and ased course s	bilities, logical and coherent thinking. Sho d presentational skills are minimally effective    Details   Details	w very little or no ability to a or ineffective.  Weighting in final course grade (%)	No. of Hours  36  12  100  Assessment Methods to CLO Mapping	
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	N Lecture-b Activitie: Lectures Tutorials Reading Methods  Presenta Project re Yau, Nath Tufle, Edv Chang, W Murray, D	of analytical and critical aproblems. Organization and assed course s  / Self study  tion eports nan (2011). Visualize Thewards R. (2001). The Visualize Thewards R. (2013). Tableau You and (2013). Tableau You	bilities, logical and coherent thinking. Sho d presentational skills are minimally effective  Details  Details  oral presentation and in-class discussion	Weighting in final course grade (%)  40 60 gn, Visualization, and Statition. 2nd edition, Graphic ysis with Tableau Softwar	No. of Hours  36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 istics. Wiley. s Press.	

STAT3655	Surviva	al analysis (6 credits)		Academic Year	2021		
Offering Department	Statistics	s & Actuarial Science		Quota			
Course Co-ordinator	Dr J F X	u, Statistics & Actuarial Science (xujf@hku.hk)					
Teachers Involved	(Dr J F )	Ku,Statistics & Actuarial Science)					
Course Objectives		urse is concerned with how models which predict ned. This exercise is sometimes referred to as surviv			other entities are		
Course Contents & Topics	include: common survival from pos kernel de means co	e nature and properties of parametric and nonparametric survival models will be studied. Topics to be covered lude: the introduction of some important basic quantities like the hazard function and survival function; some nmonly used parametric survival models; concepts of censoring and/or truncation; parametric estimation of the vival distribution by maximum likelihood estimation method; nonparametric estimation of the survival functions in possibly censored samples by means of the Kaplan-Meier estimator, the Nelson-Aalen estimator; and the nel density estimator or the Ramlau-Hansen estimator and comparisons of k independent survival functions by ans of the generalized log-rank test; parametric regression models; Cox's semiparametric proportional hazards ression model; and multivariate survival analysis.					
Course Learning Outcomes	CLO 1	essful completion of this course, students should be acquire a clear understanding of the nature of failu concept of death and life		vival data, a gene	eralization of the		
	CLO 2 perform estimation for some commonly used survival models under different types of censoring mechanisms						
	CLO 3 analyze survival data using the Cox's semiparametric proportional hazards model CLO 4 extend the Cox's model to a multivariate setup to accommodate multivariate survival data						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Pass in	STAT3902, or already enrolled in this course; or STAT3600 or STAT3901; and students who have passed in STAT3955, or already e					
Offer in 2021 - 2022	N O	ffer in 2022 - 2023 : N		Examination			
Grade Descriptors (A+ to F)	Α	Demonstrate thorough mastery at an advanced level of ex learning outcomes. Show strong analytical and critical abilitie to apply knowledge to a wide range of complex, familiar a presentational skills.	es and logical thinking, w	ith evidence of origina	al thought, and ability		
	В	Demonstrate substantial command of a broad range of know learning outcomes. Show evidence of analytical and critical al and some unfamiliar situations. Apply effective organizational	bilities and logical thinking	g, and ability to apply			
	С						
	D	Demonstrate partial but limited command of knowledge and Show evidence of some coherent and logical thinking, but wit knowledge to solve problems. Apply limited or barely effective	h limited analytical and c	ritical abilities. Show I			
	Fail	Demonstrate little or no evidence of command of knowledge of analytical and critical abilities, logical and coherent thin	and skills required for att	aining the course lear			

	problems. Organization a	and presentational skills are minimally effective o	or ineffective.			
Communication- intensive Course	N					
Course Type	Lecture-based course					
Course Teaching	Activities	Details		No. of Hours		
& Learning Activities	Lectures			36		
	Tutorials			12		
	Reading / Self study			100		
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments	Coursework (assignments, tutorials, and a class test)	40	CLO 1,2,3,4		
	Examination	One 2-hour written examination	60	CLO 1,2,3,4		
Required/recommended reading and online materials	Cox, D. R. and Oakes, D.: Analysis of Survival Data (Chapman and Hall, 1984) Hosmer, D. W. and Lemeshow, S.: Applied Survival Analysis: Regression Modeling of Time to Event Data (Wiley, 1999) Klein, J. P. and Moeschberger, M. L.: Survival Analysis: Techniques for Censored and Truncated Data (Springer Verlag, New York, 2005, 2nd ed.)					
Course Website	http://moodle.hku.hk	,				

STAT3799	Directe	d studies in stati	stics (6 credits)	Academic Ye	ar 2021		
Offering Department		Statistics & Actuarial Science Quota 50					
Course Co-ordinator	Prof S M	Prof S M S Lee, Statistics & Actuarial Science (smslee@hku.hk)					
Teachers Involved	(Various	teachers as the asse	essors of oral presentations and written	reports, Statistics & Actuari	al Science)		
Course Objectives	To enhar	nce students' knowle	dge of a particular topic and students's	self-directed learning and cr	itical thinking skills		
Course Contents & Topics	topic is p or a syn	referably one not su thesis of published	If-managed study on a topic in statistics fficiently covered in the regular curricul work on the subject, or a laboratory The project may not require an eleme	um. The directed study car or field study that would	n be a critical review		
Course Learning	On succe	essful completion of	this course, students should be able to:				
Outcomes	CLO 1 g	ain first-hand experi	ence in solving a research or applied p	roblem in statistics or relate	d areas		
		levelop skills in impo tatistical research ar	ortant technical tools, including the use nd data analyses	of computer software or p	rograms, for typica		
	CLO 3 w	vrite succinct reports	on the findings of a research study				
	CLO 4 m	nake concise oral pro	esentation of the findings of a research	study			
Pre-requisites	Pass in	at least 24 credits	of advanced level disciplinary core/el-	ective courses in the Deci	sion Analytics/Risl		
(and Co-requisites and Impermissible combinations)	This caps to the co	stone course is only nsent of course coor	s; and Not for students who have alrea for students majoring in Decision Ana dinator. This course is mutually exclusi allowed to take this capstone course is	llytics/Risk Management/St ve with STAT4710.	,		
Offer in 2021 - 2022			Offer in 2022 - 2023 : Y	Examination	No Exam		
Grade Descriptors (A+ to F)	A Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking, with evidence of original thought. Insightful use and critical analysis / evaluation of information drawn from a full range of high quality sources and to quote/reference aptly. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills. [Work of A+ should show considerable additional work beyond that is required in wider areas relevant to the topic.]						
	В	Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Critical use of relevant information from sources, showing ability to make meaningful comparisons between different secondary interpretations and to quote/reference aptly. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.					
	С	Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Use of relevant information from sources, showing ability to make comparisons between different interpretations and to quote/reference aptly. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.					
	D	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Demonstrate use and reference of several sources, but mainly through summary rather than analysis and comparison. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.					
	Fail	analytical and critical	e of little or no grasp of the knowledge and u abilities, logical and coherent thinking. Limited and results and/or unable to draw appropriate ineffective.	use of secondary sources and n	o critical comparison o		
Communication- intensive Course	N						
Course Type	Project-b	ased course					
Course Teaching	Activitie	s	Details	Details			
& Learning Activities	Reading	/ Self study	discussion & meetings to be an the supervisor	ranged by the student &	120		
Assessment Methods and Weighting	Methods	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Oral presentation		oral presentation & in-class	40			
	Oral pres	Senialion	discussion		CLO 1,2,4		
	Researc		discussion written report	60	CLO 1,2,4 CLO 1,2,3		

STAT3901	Life contingencies I (6 credits)	Academic Year	2021
Offering Department	Statistics & Actuarial Science	Quota	
Course Co-ordinator	Prof K C Yuen, Statistics & Actuarial Science (kcyuen@hku.hk)		
Teachers Involved	(Prof K C Yuen, Statistics & Actuarial Science)		
Course Objectives	The major objectives of this course are to integrate life contingencies into a full	probabilistic fram	ework. The time-

			basic building block by which models ent of untimely death, are developed.			
	contingencies and the basic mathematical skills for modelling life insurance products.					
Course Contents			outions; life table functions; select an		surance models; life	
& Topics	, ,		lom variable; benefit premiums.	,	,	
Course Learning			course, students should be able to:			
Outcomes		•	ues, variances, probabilities, and per	centiles for survival-time	random variables	
		•	rvival-time random variable that arise			
			nptions for fractional ages			
			enefit random variables defined on sur	vival-time random varial	oles	
		•	expected values, variances and proba			
			f-loss-at-issue random variables, and			
		· · ·	s for life insurances and annuities			
Pre-requisites		STAT2602 and STAT361				
(and Co-requisites			STAT3902 or already enrolled in this o	course)) or		
and Impermissible	`	STAT2602 and STAT290	,	304.00// 0.		
combinations)	(. 4.00	.,	/			
Offer in 2021 - 2022	Y 1st	sem Offer in 2022 - 20	023 : Y	Examination	Dec	
Grade Descriptors	Α		stery at an advanced level of extensive know	ledge and skills required for	attaining all the course	
(A+ to F)	``	learning outcomes. Show st	trong analytical and critical abilities and logical	thinking, with evidence of original	ginal thought, and ability	
(** 30 **)			ide range of complex, familiar and unfamiliar	situations. Apply highly effect	ctive organizational and	
	presentational skills.					
	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar					
	and some unfamiliar situations. Apply effective organizational and presentational skills.					
	С		ncomplete command of knowledge and skills			
			of some analytical and critical abilities and lo		pply knowledge to most	
	familiar situations. Apply moderately effective organizational and presentational skills.  Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes.					
	-		nerent and logical thinking, but with limited ana		w limited ability to apply	
		knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.				
	Fall	Fail Demonstrate little or no evidence of command of knowledge and skills required for attaining the course le of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to app				
			presentational skills are minimally effective or		,g	
Communication-	N					
intensive Course						
Course Type	Lecture-b	ased course				
Course Teaching	Activitie	S	Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials				12	
	Reading / Self study				100	
Assessment Methods	Methods	•	Details	Weighting in final	Assessment	
and Weighting	Motificati	•	Details	course grade (%)	Methods	
gg				354.55 g.445 (70)	to CLO Mapping	
			Coursework (assignments,		to ozo mapping	
	Assignm	ents	tutorials, class test(s) and	50	CLO 1,2,3,4,5	
	Assignments		participation)	00	020 1,2,0,1,0	
	Examina	tion	One 3-hour written examination	50	CLO 1,2,3,4,5	
Required/recommended			nan, J.C., Jones, D.A. & Nesbitt, C.J.			
reading and		nois: The Society of Actu		. Addana Mathematics	(1001, Ziid CaillOff),	
online materials		,	nd Waters, H.R.: Actuarial Mathema	tics for Life Contingent	Risks (Cambridge:	
Ommo materiala		ge University Press, 2009		aco for Life Contingent	rains (Cambridge.	
Course Website		odle.hku.hk	· /			
	p.//////OC	Jaioii(u.iii)				

STAT3902	Statistic	cal models (6 credits)		Academic Year	2021
Offering Department	Statistics	& Actuarial Science		Quota	
Course Co-ordinator	Dr J F Xu	, Statistics & Actuarial Science (	(xujf@hku.hk)		
Teachers Involved	(Dr J F X	u,Statistics & Actuarial Science)			
Course Objectives	study the testing, the both quar	concepts and methods of state the two major areas of statistical in titative skills and qualitative pe	Probability and Statistics: Foundation tistics. The course will lay emphasis inference. Through the study of this coerceptions essential for making rigorouthematical Statistics from the Society	on the estimation ourse, students will ous statistical analy	and hypothesis be equipped with
Course Contents & Topics	estimator confidence two norm	(MLE), moment estimator, Ba e interval estimations for norma	dom variables; order statistics, centra yesian estimator, properties of estin I mean, the difference of two normal r confidence intervals; power function, I	nators, limiting promeans, normal var	operties of MLE; iance, the ratio of
Course Learning Outcomes	CLO 1 ur es CLO 2 do CLO 3 lo CLO 4 fir	stimation, confidence interval es erive maximum likelihood estima cate pivotal quantity to construc nd testing statistic to test hypoth	students should be able to: ficient statistic(s) in data reduction and timation, and testing hypothesis stors of parameters to calculate maxim t confidence intervals of parameters eses associated with one-sample and normal distributions with large sample	num likelihood estir	nates
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in S Not for st	TAT2901; and	T2602, or already enrolled in this coul		
Offer in 2021 - 2022	Y 1st	sem Offer in 2022 - 2023 : Y		Examination	Dec
Grade Descriptors (A+ to F)	A	learning outcomes. Show strong ana	n advanced level of extensive knowledge and lytical and critical abilities and logical thinking, of complex, familiar and unfamiliar situations	with evidence of origina	al thought, and ability

		presentational skills.					
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least relearning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply kn and some unfamiliar situations. Apply effective organizational and presentational skills.					
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	D	Demonstrate partial but lim Show evidence of some co	ited command of knowledge and skills requinerent and logical thinking, but with limited ans. Apply limited or barely effective organizations.	ired for attaining some of the conalytical and critical abilities. Sh			
	Fail	of analytical and critical a	dence of command of knowledge and skills r bilities, logical and coherent thinking. Show I presentational skills are minimally effective	w very little or no ability to ap			
Communication- intensive Course	N	· ·					
Course Type	Lecture-ba	ased course					
Course Teaching	Activities		Details	No. of Hours			
& Learning Activities	Lectures			36			
	Tutorials			12			
	Reading / Self study			100			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments		Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3,4		
	Examinat	ion	One 3-hour written examination	75	CLO 1,2,3,4		
Required/recommended reading and online materials	2004, 7th Hogg R. \ edition) Arnold S.	edition) /., McKean J. W. & Cra F.: Mathematical Statist J. and Marx M. L.: An	und's Mathematical Statistics with A ig A. T.: Introduction to Mathematic ics (Prentice-Hall, 1990) Introduction to Mathematical Statist	al Statistics (Pearson Pre	entice Hall, 2005, 6th		
Course Website		dle.hku.hk					

STAT3903	Stochas	stic models (6 cr	edits)	Academic Yea	ır 2021			
Offering Department	Statistics							
Course Co-ordinator	Dr K Zhu	Dr K Zhu, Statistics & Actuarial Science (mazhuke@hku.hk)						
Teachers Involved	(Dr K Zhu, Statistics & Actuarial Science)							
Course Objectives	This is an introductory course in stochastic processes. It will cover the basic concepts of the theory of stochastic processes and explore different types of stochastic processes including Markov chains, Poisson processes and Brownian motions.							
Course Contents & Topics	classifica states, Po Brownian formula,	Introduction to probability theory, conditional probability and expectation, Markov chains, random walk models, classification of states in a Markov chain, calculation of limiting probabilities and mean time spent in transient states, Poisson process, distribution of inter-arrival time and waiting time, conditional distribution of the arrival time Brownian Motion, hitting time and maximum variable, geometric Brownian motion, the Black-Scholes option pricing formula, Gaussian bridge, and stationary processes. Birth-and-death process, branching process and renewal process may also be covered (if time permits).						
Course Learning	On succe	essful completion of t	his course, students should be able to:					
Outcomes	CLO 1	apply the conditioning	ng method to calculate the mean and pro	bability				
	CLO 2	understand the esse	entials of Markov chains, the Poisson pro	ocess, and Brownian motio	n			
	CLO 3	understand how stoo	chastic models can be applied to the stu	dy of real-life phenomena				
Pre-requisites (and Co-requisites and Impermissible combinations)	Not for st Not for st		ssed in MATH3603, or have already enrossed in STAT3603, or have already enroudents only.					
Offer in 2021 - 2022		d sem Offer in 202		Examination	May			
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.							
	В	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.						
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.							
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.							
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.							
Communication- intensive Course	N	-						
Course Type	Lecture-b	ased course						
Course Teaching	Activitie	s	Details		No. of Hours			
& Learning Activities	Lectures				36			
	Tutorials				12			
	Reading	/ Self study			100			
Assessment Methods and Weighting	Methods	3	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignm	ents	Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3			

	Examination	One 3-hour written examination	75	CLO 1,2,3
· •	S. M. Ross: Introduction to Probab	ility Models (9th edition)		
reading and online materials				
Course Website	http://moodle.hku.hk			

STAT3904	Corpora	ar 2021							
Offering Department	Statistics 8								
Course Co-ordinator	Dr D Lee, Statistics & Actuarial Science (leedav@hku.hk)								
Teachers Involved	(Dr D Lee, Statistics & Actuarial Science)  This course is designed for actuarial science students to receive finance component of VEE Accounting and								
Course Objectives	This course is designed for actuarial science students to receive finance component of VEE Accounting and Finance from the Society of Actuaries. The objective of this course is to introduce students to the fundamental principles of corporate finance. The course will provide students with a systematic framework within which to evaluate investment and financing decisions for corporations.								
Course Contents & Topics	The first part of the course will give an introduction to corporate finance and provide an overview of some topics covered in STAT2902 and STAT3615. These include financial markets and companies, time value of money, and measures and performance assessment of financial performance. The main part of the course will focus on some important topics of corporate finance including: portfolio theory, Markowitz mean-variance analysis, capital asse pricing model, weighted average cost of capital, market efficiency, capital structure and dividend policy, financial leverage and firm value, and option pricing models.								
Course Learning		On successful completion of this course, students should be able to:							
Outcomes			of a financial manager and the financial d		ition				
			esent and future values in calculating the	• •					
	CLO 3 as	sess financial pe	rformance using various investment crite	ria and techniques of projec	t analysis				
	CLO 4 an	alyze the mean-v	variance portfolio theory, capital asset pri	cing model and arbitrage pr	icing theory				
			to be considered by a company when						
	ро	licy, and also the	impact of financial leverage and long/she	ort term financing policies o	n capital structure				
			s forms of market efficiency						
			of options using the binomial option prici	0					
Pre-requisites (and Co-requisites and Impermissible combinations)			TAT2902) or (Pass in STAT3610 and ST passed in FINA1310, or have already enr						
Offer in 2021 - 2022	Y 2nd	sem Offer in 2	022 - 2023 : Y	Examination	May				
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the cours learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and abilit to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational an presentational skills.								
	В	·							
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.								
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.								
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.								
Communication- intensive Course	N								
Course Type		ased course							
Course Teaching	Activities	•	Details		No. of Hours				
& Learning Activities	Lectures				36				
	Tutorials	0 15 1 1			12				
		Self study			100				
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping				
	Assignme		Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3,4,5,6,7				
	Examinati	ion	One 3-hour written examination	75	CLO 1,2,3,4,5,6,7				
Required/recommended reading and online materials	Berk, J. et	al.: Corporate Fi	les of Corporate Finance (McGraw-Hill, 2 nance (Pearson, 2017, 4th edition) s Markets (Pearson, 2013, 3rd edition)	017, 12th edition)					

STAT3905	Introduction to financial derivatives (6 credits)	Academic Year	2021					
Offering Department	Statistics & Actuarial Science	Quota						
Course Co-ordinator	Dr K C Cheung, Statistics & Actuarial Science (kccg@hku.hk)							
Teachers Involved	(Dr K C Cheung, Statistics & Actuarial Science)							
Course Objectives	This course aims at providing an understanding of the fundamental care on basic trading and hedging strategies, and the no-arbitrage princi		itives. Emphases					
Course Contents & Topics	Derivatives; short-selling; forward contracts; call options; put option hedging; financial forwards and futures; commodity swaps; interest rate		ads and collars;					
Course Learning	On successful completion of this course, students should be able to:							
Outcomes	CLO 1 define and recognize the definitions of terms commonly used in	derivatives markets						
	CLO 2 evaluate the payoff, profit, and properties of basic derivative contracts, including forwards, futures, options, and swaps							
	CLO 3 explain how derivative securities can be used as tools to manage financial risk							

Pre-requisites	Pass in S	ΓΑΤ2902; and						
(and Co-requisites	Not for students who have passed in STAT3618, or have already enrolled in this course; and							
and Impermissible	Not for students who have passed in FINA2322, or have already enrolled in this course; and							
combinations)	For BSc(Actuarial Science) students only.  Y 1st sem Offer in 2022 - 2023 : Y Examination Dec							
Offer in 2021 - 2022								
Grade Descriptors (A+ to F)	A	learning outcomes. Show s	stery at an advanced level of extensive knot strong analytical and critical abilities and logic wide range of complex, familiar and unfamil	cal thinking, with evidence of ori	ginal thought, and ability			
	В	learning outcomes. Show e	ommand of a broad range of knowledge and vidence of analytical and critical abilities and ons. Apply effective organizational and presel	logical thinking, and ability to ap				
	С	outcomes. Show evidence	incomplete command of knowledge and sk of some analytical and critical abilities and oderately effective organizational and present	logical thinking, and ability to a				
	D	Show evidence of some co	ited command of knowledge and skills requi herent and logical thinking, but with limited and hs. Apply limited or barely effective organizati	nalytical and critical abilities. Sh				
	Fail	Demonstrate little or no evi	dence of command of knowledge and skills r bilities, logical and coherent thinking. Show d presentational skills are minimally effective of	equired for attaining the course v very little or no ability to ap				
Communication- intensive Course	N							
Course Type	Lecture-ba	ased course						
Course Teaching	Activities	3	Details	No. of Hours				
& Learning Activities	Lectures				36			
	Tutorials				12			
	Reading /	Self study			100			
Assessment Methods and Weighting	Methods	·	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignme	ents	Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3			
	Examinat	ion	One 2-hour written examination	75	CLO 1,2,3			
Required/recommended reading and online materials	McDonald	, R. L.: Derivatives Mar	kets (Pearson, 2013, 3rd edition), Cl	napters 1-9.	,			
Course Website	http://moo	dle.hku.hk						

STAT3906	Risk the	r 2021						
Offering Department	Statistics							
Course Co-ordinator	Dr K C C	Dr K C Cheung, Statistics & Actuarial Science (kccg@hku.hk)						
Teachers Involved	(Dr K C Cheung, Statistics & Actuarial Science)							
Course Objectives		Risk theory is one of the main topics in actuarial science. Risk theory is the applications of statistical models and stochastic processes to insurance problems such as the premium calculation.						
Course Contents & Topics	Severity models; frequency models; collective risk models; coverage modifications; risk measures.							
Course Learning	On successful completion of this course, students should be able to:							
Outcomes		inderstand the indivexpectation of the total	ridual risk model and the collective al claim amounts	risk model, evaluate the	distribution and			
		estimate the premium imounts made in prev	n of a policyholder and the total claim vious years	n amounts using the inform	ation of the claim			
	CLO 3 c	alculate some comm	only used risk measures and explain the	neir use and limitation				
Pre-requisites (and Co-requisites and Impermissible combinations)		Pass in STAT3903, or already enrolled in this course; or Pass in MATH3603 or STAT3603						
Offer in 2021 - 2022	Y 1s	t sem Offer in 2022	? - 2023 : Y	Examination	Dec			
Grade Descriptors (A+ to F)	Α	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.						
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the cours learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familial and some unfamiliar situations. Apply effective organizational and presentational skills.						
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.						
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.						
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.							
Communication- intensive Course	N							
Course Type	Lecture-b	pased course						
Course Teaching	Activitie	es	Details		No. of Hours			
& Learning Activities	Lectures	<b>;</b>			36			
	Tutorials	<b>;</b>			12			
	Reading	/ Self study			100			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignm	ents	Coursework (assignments,	25	CLO 1,2,3			

		tutorials, and a class test)		
	Examination	One 3-hour written examination	75	CLO 1,2,3
	Klugman S. A., Panjer H. H., & V 2012, 4th edition)	/illmot G. E.: Loss Models: From	Data to Decisions (John V	Viley & Sons, Inc.,
Course Website	http://moodle.hku.hk			

STAT3907	Linear n	nodels and forecast	ing (6 credits)	Academic Year	2021				
Offering Department	Statistics	Quota							
Course Co-ordinator	Prof G Li,								
Teachers Involved	(Prof G Li	(Prof G Li,Statistics & Actuarial Science) This course deals with applied statistical methods of linear models and investigates various forecasting pro-							
Course Objectives	This cour	This course deals with applied statistical methods of linear models and investigates various forecasting procedure through using linear models and time series applied.							
•	through u	through using linear models and time series analysis.							
Course Contents	Regression	Regression and multiple linear regression; predicting; time series models including autoregressive, moverage autoregressive, moverage and integrated models; forecasting							
& Topics	average,	verage, autoregressive-moving average and integrated models; forecasting.  On successful completion of this course, students should be able to:							
Course Learning	On succe	ssful completion of this	course, students should be able to:						
Outcomes	CLO 1	fit a simple or multiple	e linear regression model to real data						
	CLO 2	do ANOVA analysis							
	CLO 3	identify and fit a suita	able AR, MA or ARMA model to real da	ata					
	CLO 4	perform residual ana	lysis						
	CLO 5	do forecasting with th	nese fitted models						
Pre-requisites	Pass in S	TAT2602 or STAT3902.	or already enrolled in this course; and	1					
and Co-requisites	Not for st	udents who have passed	l in STAT3600, or have already enrolle	ed in this course; and					
and Impermissible	Not for st	udents who have passed	d in STAT4601, or have already enrolle	ed in this course; and					
combinations)			d in ECON2280, or have already enroll	led in this course; and					
		Actuarial Science) stude	nts only.						
Offer in 2021 - 2022	Y 2nd	d sem Offer in 2022 - 2		Examination	May				
Grade Descriptors	Α		stery at an advanced level of extensive knowl						
(A+ to F)			trong analytical and critical abilities and logical						
	to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.								
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course								
		learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar							
	and some unfamiliar situations. Apply effective organizational and presentational skills.  C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning								
		outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to mos							
		familiar situations. Apply moderately effective organizational and presentational skills.							
	D	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outco							
		Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited abilities knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.							
	Fail								
		knowledge to solve							
Communication-	N	problems. Organization and	presentational skills are minimally effective or i	nellective.					
intensive Course	IN								
Course Type	Locture h	ased course							
<b>7</b> •			Deteile						
	Activities				No. of Hours				
			Details		No. of Hours				
	Lectures		Details		36				
	Lectures Tutorials	/ Salf study	Details		36 12				
& Learning Activities	Lectures Tutorials Reading	/ Self study		Walada	36 12 100				
& Learning Activities  Assessment Methods	Lectures Tutorials	•	Details	Weighting in final	36 12 100 <b>Assessment</b>				
& Learning Activities  Assessment Methods	Lectures Tutorials Reading	•		Weighting in final course grade (%)	36 12 100 Assessment Methods				
& Learning Activities  Assessment Methods	Lectures Tutorials Reading	•			36 12 100 Assessment Methods to CLO				
& Learning Activities  Assessment Methods	Lectures Tutorials Reading	•	Details		36 12 100 Assessment Methods				
& Learning Activities  Assessment Methods	Lectures Tutorials Reading Methods		Details  Coursework (assignments,	course grade (%)	36 12 100 Assessment Methods to CLO Mapping				
& Learning Activities  Assessment Methods	Lectures Tutorials Reading		Details  Coursework (assignments, tutorials, a computer-based		36 12 100 Assessment Methods to CLO Mapping				
& Learning Activities  Assessment Methods	Lectures Tutorials Reading Methods Assignment	ents	Details  Coursework (assignments, tutorials, a computer-based assessment and a class test)	course grade (%)	36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5				
& Learning Activities  Assessment Methods  and Weighting	Lectures Tutorials Reading Methods  Assignment	ents	Details  Coursework (assignments, tutorials, a computer-based assessment and a class test) One 3-hour written examination	course grade (%) 25 75	36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5 CLO 1,2,3,4,5				
& Learning Activities  Assessment Methods and Weighting  Required/recommended	Lectures Tutorials Reading Methods  Assignment Examina R. S. Pinc	ents tion dyck & D. L. Rubinfeld: E	Details  Coursework (assignments, tutorials, a computer-based assessment and a class test) One 3-hour written examination conometric Models and Economic For	course grade (%)  25  75 recasts (McGraw-Hill, 199	36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5 CLO 1,2,3,4,5 8, 4th edition)				
& Learning Activities  Assessment Methods  and Weighting  Required/recommended reading and	Lectures Tutorials Reading Methods  Assignme Examina R. S. Pinc Abraham	ents tion dyck & D. L. Rubinfeld: E & J. Ledolter: Statistical	Details  Coursework (assignments, tutorials, a computer-based assessment and a class test) One 3-hour written examination conometric Models and Economic Followthods for Forecasting (John Wiley)	course grade (%)  25  75 recasts (McGraw-Hill, 1998 & Sons, 2005, 2nd edition	36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5 CLO 1,2,3,4,5 3, 4th edition)				
& Learning Activities  Assessment Methods  and Weighting  Required/recommended  reading and	Lectures Tutorials Reading Methods  Assignme Examina R. S. Pinc Abraham G. E. P. E	ents tion dyck & D. L. Rubinfeld: E & J. Ledolter: Statistical	Details  Coursework (assignments, tutorials, a computer-based assessment and a class test) One 3-hour written examination conometric Models and Economic For	course grade (%)  25  75 recasts (McGraw-Hill, 1998 & Sons, 2005, 2nd edition	36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5 CLO 1,2,3,4,5 3, 4th edition)				
Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials  Course Website	Lectures Tutorials Reading Methods  Assignment Examinat R. S. Pinc Abraham G. E. P. E edition)	ents tion dyck & D. L. Rubinfeld: E & J. Ledolter: Statistical	Details  Coursework (assignments, tutorials, a computer-based assessment and a class test) One 3-hour written examination conometric Models and Economic Followthods for Forecasting (John Wiley)	course grade (%)  25  75 recasts (McGraw-Hill, 1998 & Sons, 2005, 2nd edition	36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5 CLO 1,2,3,4,5 3, 4th edition)				

STAT3908	Credibility theory and loss distributions (6 credits)	Academic Year	2021			
Offering Department	Statistics & Actuarial Science	Quota				
Course Co-ordinator	Dr K C Cheung, Statistics & Actuarial Science (kccg@hku.hk)					
Teachers Involved	(Dr K C Cheung, Statistics & Actuarial Science)					
Course Objectives	Credibility is an example of a statistical estimate. The idea of credibility is very useful in premium calculation. Insurance loss varies according to the business nature, what distribution should be used to fit a particular loss is both of theoretical interest and practical importance. This course covers important actuarial and statistical methods.					
Course Contents & Topics	Limited fluctuation approach; Buhlman's approach; Bayesian approach; empir construction and selection of parametric models; properties and estimation of determination of the acceptability of a fitted model; comparison of fitted mode continuous random variables.	failure time and I	oss distributions,			
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 apply limited fluctuation (classical) credibility including criteria for both fu CLO 2 perform Bayesian analysis using both discrete and continuous models CLO 3 apply Buhlmann and Buhlmann-Straub models and understand the related	•				

	CLO 4 apply conjugate priors in Bayesian analysis and in particular the Poisson-gamma model							
			sian methods in the nonparametric and s					
	CLO 6 construct and select empirical models CLO 7 determine the acceptability of a fitted model and/or compare models							
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in STAT2602 or STAT3902 or STAT3906							
Offer in 2021 - 2022	Y 2nd sem Offer in 2022 - 2023 : Y Examination May							
Grade Descriptors (A+ to F)	A	learning outcomes. Sh	n mastery at an advanced level of extensive kn now strong analytical and critical abilities and logi o a wide range of complex, familiar and unfami	ical thinking, with evidence of or	iginal thought, and ability			
	В	learning outcomes. Sh	tial command of a broad range of knowledge and now evidence of analytical and critical abilities and ituations. Apply effective organizational and prese	l logical thinking, and ability to ap				
	С	Demonstrate general outcomes. Show evid	but incomplete command of knowledge and slence of some analytical and critical abilities and bly moderately effective organizational and presen	kills required for attaining most				
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes.  Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.							
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.							
Communication- intensive Course	N		<u>'</u>					
Course Tune	Locturo b	pased course						
Course Type	Lecture-b							
Course Teaching	Activitie:		Details		No. of Hours			
Course Teaching		s	Details		No. of Hours			
Course Teaching	Activitie	98	Details					
	Activities Lectures Tutorials	98	Details		36			
Course Teaching & Learning Activities Assessment Methods	Activities Lectures Tutorials	es s s / Self study	Details  Details	Weighting in final course grade (%)	36 12			
Course Teaching & Learning Activities Assessment Methods	Activities Lectures Tutorials Reading	ss s / Self study s			36 12 100 Assessment Methods			
Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting	Activities Lectures Tutorials Reading Methods	/ Self study	Details  Coursework (assignments,	course grade (%)	36 12 100 Assessment Methods to CLO Mapping			
Course Teaching & Learning Activities Assessment Methods	Activitie Lectures Tutorials Reading Methods  Assignme	ss s s s s s s s s s s s s s s s s s s	Details  Coursework (assignments, tutorials, and a class test)	course grade (%)  25  75	36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5,6,7 CLO 1,2,3,4,5,6,7			

STAT3909	Life co	ontingen	cies II (6 cre	edits)				Academic Year	2021	
Offering Department	Statistics & Actuarial Science							Quota		
Course Co-ordinator	Dr D Lee, Statistics & Actuarial Science (leedav@hku.hk)									
Teachers Involved	(Dr D Lee, Statistics & Actuarial Science)									
Course Objectives		This course aims at introducing some topics in non-traditional life insurance. Emphasis will be placed on applications of more advanced theories of life contingencies.								
Course Contents & Topics	This course is a continuation of the materials covered in STAT3901. We shall discuss the following topics: future loss random variable; policy values; expenses and asset shares; multiple state models and their applications; profit testing.									
Course Learning	On successful completion of this course, students should be able to:									
Outcomes	CLO 1	calculate	oolicy values f	or life insur	rances and a	annuities				
			e expenses ir s and annuitie		emium and o	calculate pol	licy values ba	sed on the gross	premium for	r life
	CLO 3	calculate	orobabilities ai	nd actuaria	l present va	lues under tl	he multiple sta	ate model framew	ork	
		analyze n decremer		nent model	s and calcu	ate the life i	nsurances an	d annuities in mo	dels with mul	ltiple
	CLO 5 analyze multiple life models and calculate the life insurances and annuities in models with multiple lives									
	CLO 6 explain the concept of profit testing									
Pre-requisites (and Co-requisites	Pass in STAT3901, or already enrolled in this course; and For BSc(Actuarial Science) students only.									
and Impermissible combinations)	1 01 200	C(Actuaria	Science) stud	lents only.						
and Impermissible		`	Offer in 2022 -	,				Examination	May	
and Impermissible combinations)		2nd sem Demon learning to appl	Offer in 2022 - trate thorough moutcomes. Show	- 2023 : Y nastery at an	tical and critical	al abilities and I	ogical thinking, v	<b>Examination</b> skills required for attyith evidence of origina. Apply highly effectiv	aining all the coal thought, and a	ability
and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 2r	2nd sem  Demon learning to appl present Demon learning	Offer in 2022 - trate thorough moutcomes. Show knowledge to a ational skills.	- 2023 : Y nastery at an v strong analy wide range	rtical and critical of complex, far a broad range analytical and o	al abilities and I miliar and unfa of knowledge critical abilities a	ogical thinking, warmiliar situations.  and skills require and logical thinkir	skills required for att vith evidence of origina. Apply highly effectived for attaining at leasing, and ability to apply	aining all the coal thought, and a corganizational	ability al and course
and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 2r	Pind sem  Demon learning to appl present Demon learning and soi Demon outcom	Offer in 2022 - strate thorough m outcomes. Show knowledge to a ational skills. strate substantial outcomes. Show e unfamiliar situatrate general bu	- 2023 : Y nastery at an vistrong anally wide range command of vevidence of a ations. Apply e ti incomplete be of some ar	rtical and critical of complex, far a broad range analytical and ceffective organicommand of nalytical and ceffectival and ceffetival and ceffectival and ceffetival and	al abilities and I miliar and unfa of knowledge critical abilities a zational and pro- knowledge and critical abilities a	ogical thinking, wamiliar situations.  and skills require and logical thinking esentational skills is skills required and logical thinking thinking thinking was sent thinking the skills required and logical thinking and sent sent thinking was sent thinking the sent thinking the sent thinking was sent thinking the sent thinking the sent thinking was sent thinking the sent thinking the sent thinking was sent thinking the sent thinking was sent the sent thinking was sent the sent thinking was sent thinking was sent the sent thinking was sent the sent thinking was sent the sent thinking was sent the sent thinking was sent thinking was sent the sent thinking was sent the sent thinking was sent the sent thinking was sent the sent thinking was sent the sent thinking was sent the sent thinking was sent the sent thinking was sent the sent thinking was sent the sent thinking was sent the sent thinking was sent the sent thinking was sent the sent thinking was sent the sent thinking was sent the sent thinking was sent the sent thinking was sent thinking was sent the sent thinking was sent the sent thinking was sent the sent thinking was sent the sent thinking was sent the sent thinking was sent the sent thinking was sent the sent thinking was sent the sent thinking was sent the sent thinking was sent the sent thinking was sent the sent thinking was sent the sent the sent thinking was sent the sent thinking was sent the sent the sent thinking was sent the sen	skills required for att vith evidence of origina. Apply highly effectived for attaining at leasing, and ability to apply	aining all the coal thought, and a e organizationa at most of the coknowledge to father course lear	ability al and course amiliar arning
and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 2r	2nd sem  Demon learning to appl present Demon learning and soi Demon outcom familiar Demon Show e	Offer in 2022 - strate thorough m outcomes. Show knowledge to a ational skills. strate substantial outcomes. Show eunfamiliar situations. Apply strate partial but litrate partial but lit	- 2023 : Y - anastery at an y strong analy wide range command of y evidence of a ations. Apply e t incomplete ce of some ar moderately ef imited comma coherent and	rtical and critical of complex, far a broad range analytical and ceffective organic command of inalytical and ciffective organiz and of knowled logical thinking	al abilities and I miliar and unfa of knowledge critical abilities a zational and pro- knowledge and critical abilities a ational and pre- ge and skills re but with limite	ogical thinking, wamiliar situations, and skills require sesentational skills is skills required and logical thinkin sentational skills. Gruired for attain d analytical and analytical and a	skills required for att with evidence of origin. Apply highly effective and for attaining at least g, and ability to apply so for attaining most of ng, and ability to appl ing some of the cours critical abilities. Show	aining all the coal thought, and a e organizationa at most of the coknowledge to father course leady knowledge to e learning outcome learning outcome.	ability al and course amiliar arning o most comes.
and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 2r A B C	2nd sem  Demon learning to appl present Demon learning and soi Demon outcom familiar Demon Show e knowle Demon of anal	Offer in 2022 - trate thorough m outcomes. Show knowledge to a ational skills. trate substantial outcomes. Show ne unfamiliar situa- trate general bu ses. Show evidence situations. Apply is trate partial but li vidence of some of ge to solve proble trate little or no e	- 2023 : Y - astery at an v strong analy wide range command of v evidence of a ations. Apply et t incomplete ce of some armoderately efimited commacocherent and ems. Apply line evidence of co abilities, logi	rtical and critical of complex, fa a broad range analytical and of effective organia command of nalytical and coffective organia; and of knowled logical thinking mitted or barely ommand of kno ical and coher and coher or and coher and br>and coher and and and and and and and and	al abilities and I miliar and unfa of knowledge critical abilities a zational and pre- ritical abilities a attional and pre- ge and skills re, but with limite effective organi wledge and skil ent thinking. S	ogical thinking, wamiliar situations, and skills require seentational skills is skills required ind logical thinkin sentational skills, sequired for attain d analytical and reational and presults required for attain thinking the skills.	skills required for att with evidence of origin. Apply highly effective ed for attaining at leasing, and ability to apply a for attaining most of any and ability to apply and ability to apply ing some of the course ritical abilities. Show the tational skills.	aining all the or all thought, and a e organizationa at most of the or knowledge to fa the course lear y knowledge to e learning outcomitted ability to ming outcomes.	ability al and course amiliar arning o most comes. o apply
and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	Y 2r A B C	2nd sem  Demon learning to appl present Demon learning and soi Demon outcom familiar Demon Show e knowle Demon of anal	Offer in 2022 - ctrate thorough m outcomes. Show is knowledge to a ational skills. trate substantial outcomes. Show he unfamiliar situe trate general but es. Show evidence situations. Apply trate partial but li didence of some of ge to solve proble trate little or no e otical and critical	- 2023 : Y - astery at an v strong analy wide range command of v evidence of a ations. Apply et t incomplete ce of some armoderately efimited commacocherent and ems. Apply linevidence of co abilities, logi	rtical and critical of complex, fa a broad range analytical and of effective organia command of nalytical and coffective organia; and of knowled logical thinking mitted or barely ommand of kno ical and coher and coher or and coher and br>and coher and and and and and and and and	al abilities and I miliar and unfa of knowledge critical abilities a zational and pre- ritical abilities a attional and pre- ge and skills re, but with limite effective organi wledge and skil ent thinking. S	ogical thinking, wamiliar situations, and skills require seentational skills is skills required ind logical thinkin sentational skills, sequired for attain d analytical and reational and presults required for attain thinking the skills.	skills required for att with evidence of origin. Apply highly effective ed for attaining at leasing, and ability to apply a for attaining most of any and ability to apply and ability to apply ing some of the course ritical abilities. Show the taining the course leas or no ability to apply to apply to apply to apply the course leas or no ability to apply to apply the course leas or no ability to apply the course leas or no ability to apply the apply the course leas or no ability to	aining all the or all thought, and a e organizationa at most of the or knowledge to fa the course lear y knowledge to e learning outcomitted ability to ming outcomes.	ability al and course amiliar arning o most comes. o apply

Course Teaching	Activities	Details		No. of Hours
& Learning Activities	Lectures			36
	Tutorials			12
	Reading / Self study			100
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments	Coursework (assignments, tutorials, a computer-based assessment and a class test)	25	CLO 1,2,3,4,5,6
	Examination	One 3-hour written examination	75	CLO 1,2,3,4,5,6
Required/recommended	Bowers, N. L. et al.: Actuarial Math	nematics (Society of Actuaries, 1997,	2nd edition)	
reading and	Dickson, D.C.M. et al.: Actuarial	Mathematics for Life Contingent Risk	s (Cambridge University	Press, 2013, 2nd
online materials	edition)	<u>-</u>	· · · · · ·	
Course Website	http://moodle.hku.hk			

STAT3910	Financia	al economics I	(6 credits)		Academic Year	2021
Offering Department		& Actuarial Science	• •		Quota	
Course Co-ordinator			Actuarial Science <i>(hlyang</i> @ <i>hku.hl</i>	k)		
Teachers Involved			Actuarial Science)	,		
Course Objectives			icing and hedging. The course w	vill concentra	ate on the theory and i	dea of derivatives
		d risk managemer				
Course Contents & Topics	time option volatility; t	n-pricing theory; b he Black-Scholes	and American options; conditiona binomial model and its Greeks; tru formula; implied volatility; option of the assessment is different. The a	ie probabiliti Greeks; mar	es vs. risk-neutral proba ket-making and hedging	abilities; estimating; exotic options.
	(10%) and	d computer-based	assignment (30%).			
Course Learning			f this course, students should be a			
Outcomes	cu	ırrencies, options	ice using binomial tree, includin on futures contracts, and options o	on bonds	, ,	tions, options on
			neutral probability, and how to price	•		
		nderstand the Blac oplied volatility	ck-Scholes formula, including the	assumption	s, the Greek letters, opt	tion elasticity, and
			ging strategies and portfolio, mark	et_maker ris	k self-financing portfoli	0
		nderstand the mar		ct-maker na	ik, soil-illianding portion	0
	CLO 6 un	nderstand exotic o	options, including Asian options, b	barrier optio	ns, compound options,	gap options, and
	CLO 7 un	change options nderstand interest by model	rate models, including Vasicek r	model, Cox-	Ingersoll-Ross model a	nd Black-Dermar
Pre-requisites		TAT2602 or STAT	3902: and			
(and Co-requisites and Impermissible combinations)	Not for stu	idents who have p	passed in STAT3618, or have alreassed in FINA2322, or have alreas			
Offer in 2021 - 2022	Y 1st	sem Offer in 202	22 - 2023 : Y		Examination	Dec
Grade Descriptors	Α	Demonstrate thorou	gh mastery at an advanced level of extensions strong analytical and critical abilities			
(A+ to F)			to a wide range of complex, familiar an			
	В			ledge and skill	Is required for attaining at lea	ast most of the course
		Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the collearning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to fall and some unfamiliar situations. Apply effective organizational and presentational skills.				
	С	Demonstrate genera	al but incomplete command of knowledge	ge and skills r	equired for attaining most o	
			idence of some analytical and critical abi pply moderately effective organizational ar			bly knowledge to mos
	D	Demonstrate partial	but limited command of knowledge and s	skills required f	or attaining some of the cour	
			ome coherent and logical thinking, but with problems. Apply limited or barely effective			limited ability to appl
	Fail	Demonstrate little or	no evidence of command of knowledge a itical abilities, logical and coherent think	and skills requir	red for attaining the course lea	
• • •		problems. Organizat	ion and presentational skills are minimally	effective or ine	effective.	
Communication- intensive Course	N					
Course Type	Lecture-ha	ased course				
Course Teaching	Activities		Details			No. of Hours
& Learning Activities	Lectures	•	Details			36
<b>.</b>	Tutorials					12
		Self study				100
Assessment Methods and Weighting	Methods		Details		Weighting in final course grade (%)	Assessment Methods to CLO
			0.5005.500			Mapping
	Assignme	ents	Coursework (assignm tutorials, a computer assessment and a class to	-based	25	CLO 1,2,3,4,5,6,7
	Examinat	ion	One 3-hour written examir		75	CLO 1,2,3,4,5,6,7
Required/recommended	1. Derivati	ives Markets, Cha	pters 10-14 and 24, 2nd edition, b	y Robert L.	McDonald.	.,_,,,,,,,,,,,
reading and online materials	2. Options	s, Futures and Oth	er Derivatives, 4th or later edition,	, by J. Hull.		

STAT3911	Financia	al economics II (6 cr	redits)	Academic Yea	ar 2021	
Offering Department	Statistics	& Actuarial Science		Quota		
Course Co-ordinator	Prof H L Y	ang, Statistics & Actuar	ial Science (hlyang@hku.hk)			
Teachers Involved	(Prof H L	Yang, Statistics & Actuar	rial Science)			
Course Objectives	This cours	se is an advanced cour	se on the option pricing theory. Th	e course covers Black-Sc	holes equation and	
-	stochastic	calculus, and interest n	nodels.			
Course Contents & Topics	Sharpe ra	atio and risk premium; lasticity and volatility; \ d the Sharpe-ratio equa	o stochastic calculus; arithmetic al Black-Scholes equation; risk-neu /asicek, Cox-Ingersoll-Ross, and I ality constraint; Black's model; optic	tral stock-price process a Black-Derman-Toy models	and option pricing; ; delta-hedging for	
Course Learning	On succes	ssful completion of this of	course, students should be able to:			
Outcomes	CLO 1	understanding measu	ure theory based probability			
	CLO 2	understanding condit	ional probability and martingale			
	CLO 3		motion and its properties			
	CLO 4		lculus and Ito formula			
	CLO 5		-Scholes model and option pricing t	heory		
Pre-requisites			or STAT3903 or STAT3910	<i>y</i>		
(and Co-requisites and Impermissible combinations)	1 405 III W	71110000 01 017110000	GI GITTIOGGG GI GITTIOGTO			
Offer in 2021 - 2022	Y 2nd	I sem Offer in 2022 - 2	2023 : Y	Examination	May	
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.  B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar					
	and some unfamiliar situations. Apply effective organizational and presentational skills.  C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most					
	D	Demonstrate partial but liming Show evidence of some college.	oderately effective organizational and presen ited command of knowledge and skills requ berent and logical thinking, but with limited a is. Apply limited or barely effective organizat	ired for attaining some of the counalytical and critical abilities. Sho		
	Fail	Demonstrate little or no evid of analytical and critical al	dence of command of knowledge and skills i bilities, logical and coherent thinking. Sho presentational skills are minimally effective	required for attaining the course low very little or no ability to app		
Communication- intensive Course	N		, , , , , , , , , , , , , , , , , , , ,			
Course Type	Lecture-ba	ased course				
Course Teaching	Activities	3	Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials				12	
	Reading /	Self study			100	
Assessment Methods and Weighting	Methods	,	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents	Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3,4,5	
	Examinat	ion	One 3-hour written examination	75	CLO 1,2,3,4,5	
Required/recommended	Robert L.	McDonald: Derivatives I	Markets (2nd edition), Chapters 20,	21 and 24.		
reading and online materials		Options, Futures and Coeridge: A Course in Financial	Other Derivatives (2008, 7th edition) ancial Calculus (2002)			
			us for Finance II Continuous-Time N	Models (2008)		
Course Website	http://moo	dle.hku.hk				

STAT3951	Further t	r topic	cs in co	ntingen	cies (6	credits)			Academic Year	2021
Offering Department	Statistics 8	s & Act	tuarial Sci	ence		•			Quota	
Course Co-ordinator	Dr D Lee,	e, Stati	istics & Ac	tuarial Sc	ience (le	edav@hk	u.hk)			
Teachers Involved	(Dr D Lee,	e,Stati	istics & Ac	tuarial Sc	cience)					
Course Objectives	This cours insurance.		vers more	advance	ed stocha	astic mode	ls and actua	rial techniques	used in the field of	of life and non-life
Course Contents & Topics		es and	d options;	equity-lin					d tests; unit-linked eir valuation; simp	
Course Learning	On succes	essful	completio	n of this c	ourse, st	tudents sh	ould be able	to:		
Outcomes			transition dent cash		ities in	continuou	s-time multi	ole state mod	lels and evaluate	expected state
	CLO 2 es	estimat	te age-de	oendent ti	ransition	probabiliti	es			
	CLO 3 ex	explain	the conc	ept of gra	duation a	and apply	statistical tes	ts for mortality	table comparisons	3
	CLO 4 ap	apply th	he Essche	er transfor	m on pro	obability di	stributions a	nd stochastic p	rocesses	
	CLO 5 pri	orice va	arious equ	uity-linked	insuran	ce product	s using Esso	her transforms	s and risk-neutral r	nethods
	CLO 6 for	ormula	ate simple	ruin mod	els and e	evaluate ru	iin probabiliti	es as well as r	elated quantities	
Pre-requisites (and Co-requisites	Pass in ST	STAT3	3910 <sup>°</sup> , or al			this course	; and		·	
and Impermissible combinations)	For BSc(A	(Actual	iriai ocieni	e) studer	its offiy.					
Offer in 2021 - 2022	Y 1st	st sem	Offer in	2022 - 20	023 : Y				Examination	Dec
Grade Descriptors	Α	Dem	nonstrate the	orough mas	tery at an	advanced le	evel of extensiv	e knowledge and	skills required for att	aining all the course

(A+ to F)			rong analytical and critical abilities and logic de range of complex, familiar and unfamili		
	В	learning outcomes. Show ev	mmand of a broad range of knowledge and idence of analytical and critical abilities and lns. Apply effective organizational and preser	logical thinking, and ability to ap	
	С	outcomes. Show evidence of	ncomplete command of knowledge and sk of some analytical and critical abilities and derately effective organizational and present	logical thinking, and ability to a	
	D	Demonstrate partial but limit Show evidence of some coh	ted command of knowledge and skills requir erent and logical thinking, but with limited ar s. Apply limited or barely effective organization	red for attaining some of the conalytical and critical abilities. Sh	
	Fail	Demonstrate little or no evid of analytical and critical ab	ence of command of knowledge and skills re illities, logical and coherent thinking. Show presentational skills are minimally effective of	equired for attaining the course very little or no ability to ap	
Communication- intensive Course	N	·	·		
Course Type	Lecture-b	ased course			
Course Teaching	Activities	S	Details		No. of Hours
& Learning Activities	Lectures				36
	Tutorials				12
	Reading	/ Self study			100
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignme	ents	Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3,4,5,6
			tutoriais, and a diass tost)		
	Examinat	tion	One 3-hour written examination	75	CLO 1,2,3,4,5,6
Required/recommended reading and online materials	Examinat Dickson, I Subject C Actuaries	D. et al.: Actuarial Mather CS2 Risk Modelling and , 2018)		ambridge, 2010) es, Core Reading (Instit	

STAT3952	Investment a	nd asset mar	agement (6 credits)	Academic Year	2021
Offering Department	Statistics & Actu	ıarial Science		Quota	
Course Co-ordinator	TBC, Statistics	& Actuarial Scier	ice ()		
Teachers Involved	(TBC,Statistics	& Actuarial Scie	nce)		
Course Objectives	in the manager	nent of an inves	e is to introduce students to some of the me ment portfolio. Emphasis will be placed or stment strategy formulation and interest rate	methods to tackle p	
Course Contents & Topics	concepts to inv	estment practice	iew on the problems faced by actuaries was. This course will cover the following topid Income Portfolios and Performance Meas	cs: Investment Mana	
Course Learning	On successful of	ompletion of this	course, students should be able to:		
Outcomes	CLO 1 explain	how an investme	ent policy and an investment strategy can he	lp manage risk	
	CLO 2 identify	the obligations o	f a fiduciary in managing investment portfoli	os	
			an investment strategy for an individual institutional investors	and the particular is	sues influencing
	CLO 4 explain	principles of risk	-based capital management		
	CLO 5 describe	asset allocation	strategies that can be used to construct an	asset portfolio	
	CLO 6 identify	and describe fina	ancial and non-financial risks faced by an er	tity	
	investm	ent policy and st			
			mark for a given portfolio or portfolio mar	nagement style, desc	ribe and assess
	perform	ance measurem	ent methodologies for investment portfolios		
Pre-requisites (and Co-requisites	Pass in STAT39  Not for students	*	ed in FINA2320, or have already enrolled in	this source; and	
and Impermissible combinations)	For BSc(Actuar	al Science) stud		ins course, and	
combinations)	,	al Science) stud		Examination	
combinations) Offer in 2021 - 2022	N Offer in 2  A Demolearn to ap	al Science) stud 022 - 2023 : N onstrate thorough m ng outcomes. Show		Examination and skills required for att	al thought, and ability
combinations) Offer in 2021 - 2022 Grade Descriptors	N Offer in 2  A Demilearm to appress  B Demilearm	al Science) stud  022 - 2023 : N  onstrate thorough m  ng outcomes. Show  ply knowledge to a  intational skills.  onstrate substantial  ng outcomes. Show	ents only.  astery at an advanced level of extensive knowledge strong analytical and critical abilities and logical thinki	Examination and skills required for att ng, with evidence of origin tions. Apply highly effectiv equired for attaining at lear inking, and ability to apply	al thought, and ability ve organizational and st most of the course
combinations) Offer in 2021 - 2022 Grade Descriptors	N Offer in 2  A Demilearm to appress  B Demilearm and s  C Demo	al Science) stud  022 - 2023 : N  onstrate thorough m  ng outcomes. Show  ply knowledge to a  intational skills.  onstrate substantial  ng outcomes. Show  ome unfamiliar situa  onstrate general bu  mes. Show evidence.	ents only.  astery at an advanced level of extensive knowledge strong analytical and critical abilities and logical thinki wide range of complex, familiar and unfamiliar situations are strongly and skills revidence of analytical and critical abilities and logical to	Examination and skills required for att ng, with evidence of origin tions. Apply highly effectiv equired for attaining at lear inking, and ability to apply skills. irred for attaining most of hinking, and ability to apply	al thought, and ability re organizational and st most of the course knowledge to familiar the course learning
combinations) Offer in 2021 - 2022 Grade Descriptors	N Offer in 2  A Demlearm to appress  B Demlearm and s  C Demoutce famili  D Demoshor	al Science) stud  022 - 2023 : N  onstrate thorough m  ng outcomes. Show  ply knowledge to a  intational skills.  onstrate substantial  ng outcomes. Show  ome unfamiliar situa  onstrate general bu  mes. Show evidenc  ar situations. Apply i  onstrate partial but li  evidence of some of	ents only.  astery at an advanced level of extensive knowledge strong analytical and critical abilities and logical think wide range of complex, familiar and unfamiliar situal command of a broad range of knowledge and skills revidence of analytical and critical abilities and logical tions. Apply effective organizational and presentational incomplete command of knowledge and skills reque of some analytical and critical abilities and logical to	Examination and skills required for att ng, with evidence of origin tions. Apply highly effectiv equired for attaining at lear inking, and ability to apply skills. irred for attaining most of hinking, and ability to appl skills. skills. skills. skills. skills. skills. show and actificial abilities. Show	al thought, and ability re organizational and st most of the course knowledge to familiar the course learning by knowledge to most se learning outcomes.
combinations) Offer in 2021 - 2022 Grade Descriptors	N Offer in 2  A Demelearn to appress  B Demelearn and s  C Demelearn outcome faill  D Demelearn show know fail	al Science) stud  022 - 2023 : N  onstrate thorough m  ng outcomes. Show  ply knowledge to a  intational skills.  onstrate substantial  ng outcomes. Show  ome unfamiliar situa  onstrate general bu  mes. Show evidence  ar situations. Apply i  onstrate partial but li  cevidence of some c  ledge to solve proble  onstrate little or no e  alytical and critical	ents only.  astery at an advanced level of extensive knowledge strong analytical and critical abilities and logical think wide range of complex, familiar and unfamiliar situal command of a broad range of knowledge and skills revidence of analytical and critical abilities and logical tions. Apply effective organizational and presentational incomplete command of knowledge and skills reque of some analytical and critical abilities and logical tonoderately effective organizational and presentational mitted command of knowledge and skills required for a oherent and logical thinking, but with limited analytical	Examination and skills required for attaning, with evidence of origintions. Apply highly effective equired for attaining at leaninking, and ability to apply skills. It is a considered for attaining most of hinking, and ability to apply skills. It is a course in a critical abilities. Show a presentational skills. For attaining the course leant title or no ability to apply	al thought, and ability re organizational and st most of the course knowledge to familiar the course learning by knowledge to most se learning outcomes. limited ability to apply irning outcomes. Lack
combinations)  Offer in 2021 - 2022  Grade Descriptors (A+ to F)	N Offer in 2  A Demelearn to appress  B Demelearn and s  C Demelearn outcome faill  D Demelearn show know fail	al Science) stud  022 - 2023 : N  onstrate thorough m  ng outcomes. Show  ply knowledge to a  intational skills.  onstrate substantial  ng outcomes. Show  ome unfamiliar situa  onstrate general bu  mes. Show evidence  ar situations. Apply i  onstrate partial but li  cevidence of some c  ledge to solve proble  onstrate little or no e  alytical and critical	ents only.  astery at an advanced level of extensive knowledge strong analytical and critical abilities and logical think wide range of complex, familiar and unfamiliar situal command of a broad range of knowledge and skills revidence of analytical and critical abilities and logical tions. Apply effective organizational and presentational incomplete command of knowledge and skills reque of some analytical and critical abilities and logical tonoderately effective organizational and presentational mitted command of knowledge and skills required for oherent and logical thinking, but with limited analytical ms. Apply limited or barely effective organizational and vidence of command of knowledge and skills required abilities, logical and coherent thinking. Show very I	Examination and skills required for attaning, with evidence of origintions. Apply highly effective equired for attaining at leaninking, and ability to apply skills. It is a consistent of the cours and critical abilities. Show I presentational skills. for attaining the course leattle or no ability to apply ability to apply the course leattle or no ability to apply a course leattle or no ability to apply the course leattle or no ability to apply th	al thought, and ability re organizational and st most of the course knowledge to familiar the course learning by knowledge to most se learning outcomes. limited ability to apply irning outcomes. Lack
combinations) Offer in 2021 - 2022 Grade Descriptors (A+ to F)  Communication- ntensive Course	N Offer in 2  A Dem learn to ap press  B Dem learn and s  C Dem outco famil  D Dem Show know  Fail Dem of ar probl	al Science) studional Science) studional Science) studional situational skills. Onstrate substantial ng outcomes. Show ome unfamiliar situational situational situational situational situations. Show evidencar situations. Apply nonstrate partial but life evidence of some of edge to solve probleonstrate little or no ealytical and critical erms. Organization and	ents only.  astery at an advanced level of extensive knowledge strong analytical and critical abilities and logical think wide range of complex, familiar and unfamiliar situal command of a broad range of knowledge and skills revidence of analytical and critical abilities and logical tions. Apply effective organizational and presentational incomplete command of knowledge and skills reque of some analytical and critical abilities and logical tonoderately effective organizational and presentational mitted command of knowledge and skills required for oherent and logical thinking, but with limited analytical ms. Apply limited or barely effective organizational and vidence of command of knowledge and skills required abilities, logical and coherent thinking. Show very I	Examination and skills required for attaning, with evidence of origintions. Apply highly effective equired for attaining at leaninking, and ability to apply skills. It is a consistent of the cours and critical abilities. Show I presentational skills. for attaining the course leattle or no ability to apply ability to apply the course leattle or no ability to apply a course leattle or no ability to apply the course leattle or no ability to apply th	al thought, and ability re organizational and st most of the course knowledge to familiar the course learning by knowledge to most se learning outcomes. limited ability to apply irning outcomes. Lack
Communication- ntensive Course Course Type	N Offer in 2  A Dem learn to appress  B Dem learn and s  C Dem outco famili  D Dem Shov  Know  Fail Dem of ar probl	al Science) studional Science) studional Science) studional situational skills. Onstrate substantial ng outcomes. Show ome unfamiliar situational situational situational situational situations. Show evidencar situations. Apply nonstrate partial but life evidence of some of edge to solve probleonstrate little or no ealytical and critical erms. Organization and	ents only.  astery at an advanced level of extensive knowledge strong analytical and critical abilities and logical think wide range of complex, familiar and unfamiliar situal command of a broad range of knowledge and skills revidence of analytical and critical abilities and logical tions. Apply effective organizational and presentational incomplete command of knowledge and skills reque of some analytical and critical abilities and logical tonoderately effective organizational and presentational mitted command of knowledge and skills required for oherent and logical thinking, but with limited analytical ms. Apply limited or barely effective organizational and vidence of command of knowledge and skills required abilities, logical and coherent thinking. Show very I	Examination and skills required for attaning, with evidence of origintions. Apply highly effective equired for attaining at leaninking, and ability to apply skills. It is a consistent of the cours and critical abilities. Show I presentational skills. for attaining the course leattle or no ability to apply ability to apply the course leattle or no ability to apply a course leattle or no ability to apply the course leattle or no ability to apply th	al thought, and ability re organizational and st most of the course knowledge to familial the course learning by knowledge to most se learning outcomes. limited ability to apply irning outcomes. Lack
Communication- ntensive Course Course Type Course Teaching	N Offer in 2  A Dem learn to appress  B Dem learn and s  C Dem outco famili  D Dem Shove Know Know  Rail Dem of ar probl  N  Lecture-based of	al Science) studional Science) studional Science) studional situational skills. Onstrate substantial ng outcomes. Show ome unfamiliar situational situational situational situational situations. Show evidencar situations. Apply nonstrate partial but life evidence of some of edge to solve probleonstrate little or no ealytical and critical erms. Organization and	ents only.  astery at an advanced level of extensive knowledge strong analytical and critical abilities and logical thinki wide range of complex, familiar and unfamiliar situal command of a broad range of knowledge and skills revidence of analytical and critical abilities and logical titions. Apply effective organizational and presentational incomplete command of knowledge and skills required of some analytical and critical abilities and logical tonderately effective organizational and presentational smited command of knowledge and skills required for a otherent and logical thinking, but with limited analytical ms. Apply limited or barely effective organizational and vidence of command of knowledge and skills required abilities, logical and coherent thinking. Show very I ad presentational skills are minimally effective or ineffective	Examination and skills required for attaning, with evidence of origintions. Apply highly effective equired for attaining at leaninking, and ability to apply skills. It is a consistent of the cours and critical abilities. Show I presentational skills. for attaining the course leattle or no ability to apply ability to apply the course leattle or no ability to apply a course leattle or no ability to apply the course leattle or no ability to apply th	al thought, and ability re organizational and st most of the course knowledge to familial the course learning by knowledge to most se learning outcomes. limited ability to apply arning outcomes. Lack knowledge to solve
Communication- ntensive Course Course Type Course Teaching	N Offer in 2  A Dem learn to appress B Dem learn and s  C Dem outcome famili  D Dem Show frow Row Now Now Now Now Now Now Now Now Now N	al Science) studional Science) studional Science) studional situational skills. Onstrate substantial ng outcomes. Show ome unfamiliar situational situational situational situational situations. Show evidencar situations. Apply nonstrate partial but life evidence of some of edge to solve probleonstrate little or no ealytical and critical erms. Organization and	ents only.  astery at an advanced level of extensive knowledge strong analytical and critical abilities and logical thinki wide range of complex, familiar and unfamiliar situal command of a broad range of knowledge and skills revidence of analytical and critical abilities and logical titions. Apply effective organizational and presentational incomplete command of knowledge and skills required of some analytical and critical abilities and logical tonderately effective organizational and presentational smited command of knowledge and skills required for a otherent and logical thinking, but with limited analytical ms. Apply limited or barely effective organizational and vidence of command of knowledge and skills required abilities, logical and coherent thinking. Show very I ad presentational skills are minimally effective or ineffective	Examination and skills required for attaning, with evidence of origintions. Apply highly effective equired for attaining at leaninking, and ability to apply skills. It is a consistent of the cours and critical abilities. Show I presentational skills. for attaining the course leattle or no ability to apply ability to apply the course leattle or no ability to apply a course leattle or no ability to apply the course leattle or no ability to apply th	al thought, and ability re organizational and st most of the course knowledge to familial the course learning by knowledge to most se learning outcomes. Limited ability to apply arring outcomes. Lack knowledge to solve
combinations) Offer in 2021 - 2022 Grade Descriptors	N Offer in 2  A Dem learn to ap prese  B Dem learn and s  C Dem outco famill  D Dem Shov know Fail Dem of ar probl  N  Lecture-based of Activities Lectures	al Science) studional Science) studional Science) studional Science Show ply knowledge to a intational skills. Onstrate substantial ng outcomes. Show ome unfamiliar situanstrate general burmes. Show evidence ar situations. Apply in onstrate partial but lievidence of some cledge to solve proble onstrate little or no ealytical and critical erms. Organization alexandors.	ents only.  astery at an advanced level of extensive knowledge strong analytical and critical abilities and logical thinki wide range of complex, familiar and unfamiliar situal command of a broad range of knowledge and skills revidence of analytical and critical abilities and logical titions. Apply effective organizational and presentational incomplete command of knowledge and skills required of some analytical and critical abilities and logical tonderately effective organizational and presentational smited command of knowledge and skills required for a otherent and logical thinking, but with limited analytical ms. Apply limited or barely effective organizational and vidence of command of knowledge and skills required abilities, logical and coherent thinking. Show very I ad presentational skills are minimally effective or ineffective	Examination and skills required for attaning, with evidence of origintions. Apply highly effective equired for attaining at leaninking, and ability to apply skills. It is a consistent of the cours and critical abilities. Show I presentational skills. for attaining the course leattle or no ability to apply ability to apply the course leattle or no ability to apply a course leattle or no ability to apply the course leattle or no ability to apply th	al thought, and ability re organizational and st most of the course knowledge to familial the course learning by knowledge to most see learning outcomes. Ilmited ability to apply arming outcomes. Lack knowledge to solve

and Weighting			course grade (%)	Methods to CLO Mapping
	Assignments	Assignments, tutorials/example classes, group discussions, project and presentation	50	CLO 1,2,3,4,5,6,7,8
	Examination	One 2-hour written examination	50	CLO 1,2,3,4,5,6,7,8
Required/recommended reading and online materials	Z. Bodie, A. Kane, & A. Marcus: Ir Crouhy, Galai, & Mark: Risk Mana F. J. Fabozzi: Handbook of Fixed	nent Management for Insurers (Frank ovestments (McGraw-Hill, 2005, 7th edgement (2001) Income Securities (McGraw-Hill, 2005, nagement: An Equilibrium Approach (2	ition) , 7th edition)	))
Course Website	http://moodle.hku.hk			
Additional Course Information	Other references: J. L. Maginn, Dynamic Process (Wiley, 2007, 3r Tilman: Asset / Liability Manageme	,	eavey: Managing Investm	ent Portfolios, A

r A G Ber or A G Ber or A G Ber or A G Ber nis course sing the a nis course ctuary, Ex aced on a aced on a cocial secu- n success LO 1 pro- exp LO 2 des LO 3 exp LO 4 exp cor LO 5 app LO 6 pro- LO 7 pre- gass in ST.	enchimol, Statistics & e teaches students ictuarial control cycle provides an over ternal Forces, Ris applications to variaurity plans, retirement of the completion of the completion of the completion of the completion of the completion actuarial practuarial practuarial actuarial practual actuarial practual actuarial practual actuarial practual actuarial skills in completion of the compl	rview on selected materials relating in Actuarial Problems, Design arous financial security programmes intitional, investment funds and problems in the plans, in the pl	and exposes them to practical registration of the following topics: Role and Pricing of Actuarial Solutions including individual life insurance operty and casualty insurance. The topic stems, common actuarial technical thods, commonalities, problems of practice all of financial security system as of practice call skills developed in the basic acceptable of Actuaries  Examination in the knowledge and skills required for a size of practice calls.	of the Professionals. Emphasis will be e, group insurance ques and practical and solutions providers or as a actuarial courses
or A G Be nis course sing the a nis course ctuary, Ex aced on a social secu n success LO 1 pro ex LO 2 des LO 3 ex LO 4 ex cor LO 5 app LO 6 pro LO 7 pre ass in ST.	enchimol, Statistics & e teaches students ictuarial control cycle provides an over ternal Forces, Ris applications to variaurity plans, retirement of the completion of the completion of the completion of the completion of the completion actuarial practuarial practuarial actuarial practual actuarial practual actuarial practual actuarial practual actuarial skills in completion of the compl	Actuarial Science) about the business environment le as a framework. rview on selected materials relatir kin Actuarial Problems, Design a bus financial security programmes int plans, investment funds and problescription of financial security systems, principles, approaches, medices across the traditional areas of citices as applied directly on behaviories in nontraditional and emerging area is specific mathematical and technical sional role as an Associate of the	and exposes them to practical registration of the following topics: Role and Pricing of Actuarial Solutions including individual life insurance operty and casualty insurance. The topic stems, common actuarial technical thods, commonalities, problems of practice all of financial security system as of practice call skills developed in the basic acceptable of Actuaries  Examination in the knowledge and skills required for a size of practice calls.	of the Professionals. Emphasis will be e, group insurance ques and practical and solutions providers or as a actuarial courses
nis coursesing the anis course structury, Exaced on a social securical secur	e teaches students actuarial control cycle provides an over xternal Forces, Risapplications to variourity plans, retireme sful completion of the ovide introductory deperiences actuarial practicular actuarial practicular actuarial practicular actuarial practicular actuarial skills in ovide context for the apare for the professional actuarial skills in ovide context for the apare for the professional actuarial skills in ovide context for the apare for the professional actuarial skills in ovide context for the apare for the professional actuarial skills in ovide context for the apare for the professional actuarial skills in ovide context for the apare for the professional actuarial skills in ovide context for the apare for the professional actuarial skills in ovide context for the actuarial skills in ovide context for the actuarial practicular actuarial skills in ovide context for the actuarial practicular actuari	about the business environment ale as a framework. It is a framework as a framework. It is a framework as a framework. It is a framework as a	ng to the following topics: Role of and Pricing of Actuarial Solutions including individual life insurance operty and casualty insurance, et c: stems, common actuarial technications, commonalities, problems of practice alf of financial security system as of practice cal skills developed in the basic as Society of Actuaries    Examination   Examinatio	of the Professionals. Emphasis will be e, group insurance ques and practical and solutions providers or as a actuarial courses
sing the a nis course ctuary, Exaced on a ocial secu n success. ILO 1 pro ext. ILO 2 des. ILO 3 exp. ILO 4 exp. ILO 5 app. ILO 6 pro ILO 7 pre ass in ST.	ectuarial control cycle provides an over external Forces, Risapplications to varicuity plans, retireme sorule completion of the correct of th	ele as a framework.  Inview on selected materials relating it in Actuarial Problems, Design about financial security programmes and plans, investment funds and profis course, students should be abledescription of financial security systems. The properties are security and the security of the security	ng to the following topics: Role of and Pricing of Actuarial Solutions including individual life insurance operty and casualty insurance, et c: stems, common actuarial technications, commonalities, problems of practice alf of financial security system as of practice cal skills developed in the basic as Society of Actuaries    Examination   Examinatio	of the Professionals. Emphasis will be e, group insurance ques and practical and solutions providers or as a actuarial courses
ctuary, Exaced on a cicial secure in success: LO 1 pro-ext. LO 2 dext. LO 3 exp. LO 4 exp. cor. LO 5 app. LO 6 pro-LO 7 pre-eass in ST.	external Forces, Ris applications to variourity plans, retireme sful completion of the voide introductory depriences actuarial practicular actuarial practicular actuarial practicular actuarial practicular actuarial skills in ovide context for the expare for the professional actuarial skills in ovide context for the expare for the professional actuarial skills in ovide context for the expare for the professional actuarial skills in ovide context for the expare for the professional actuarial skills in ovide context for the expare for the professional actuarial skills in ovide context for the professional actuarial skills in ovide context for the professional actuarial skills in ovide context for the professional actuarial professional actuarial practicular actua	k in Actuarial Problems, Design a pus financial security programmes int plans, investment funds and problems, but plans, investment funds and problems in the course, students should be ablescription of financial security systems. The problems are applied directly on behavioristics as applied directly on behavioristic mathematical and technical in the problems and problems are applied as an Associate of the course of th	nd Pricing of Actuarial Solutions including individual life insurance perty and casualty insurance. e to: stems, common actuarial technic thods, commonalities, problems f practice alf of financial security system as of practice cal skills developed in the basic society of Actuaries    Examination   Examinatio	s. Emphasis will be e, group insurance ques and practical and solutions providers or as a actuarial courses
LO 1 pro exp LO 2 des LO 3 exp LO 4 exp cor LO 5 app LO 6 pro LO 7 pre ass in ST.	ovide introductory decriences scribe actuarial practical	description of financial security systems, principles, approaches, medices across the traditional areas obtices as applied directly on behaviders an nontraditional and emerging area especific mathematical and technical sional role as an Associate of the company	thods, common actuarial technical thods, commonalities, problems of practice alf of financial security system as of practice cal skills developed in the basic society of Actuaries    Examination   E	and solutions providers or as a actuarial courses
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LO 3 exp LO 4 exp cor LO 5 app LO 6 pro LO 7 pre ass in ST	plain actuarial practicular practicular actuarial practicular actuarial practicular actuarial skills in poide context for the pare for the profess AT3901.  Seem Offer in 2022	tices across the traditional areas of tices as applied directly on behaviders in nontraditional and emerging area is specific mathematical and technical role as an Associate of the increase.	f practice alf of financial security system as of practice cal skills developed in the basic society of Actuaries  Examination ive knowledge and skills required for a	providers or as a actuarial courses
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ass in ST 1st s	AT3901. sem Offer in 2022	2 - 2023 : Y In mastery at an advanced level of extens	<b>Examination</b> ive knowledge and skills required for a	
1st s	sem Offer in 2022 Demonstrate thorough	mastery at an advanced level of extens	ive knowledge and skills required for a	
	Demonstrate thorough	mastery at an advanced level of extens	ive knowledge and skills required for a	
				attaining all the course
		ow strong analytical and critical abilities a o a wide range of complex, familiar and	nd logical thinking, with evidence of origunfamiliar situations. Apply highly effections	
1	Demonstrate substantillearning outcomes. Sho		es and logical thinking, and ability to app	
;	Demonstrate general outcomes. Show evide	but incomplete command of knowledge ence of some analytical and critical abilities	and skills required for attaining most or and logical thinking, and ability to ap	
1	Demonstrate partial bu Show evidence of som	ut limited command of knowledge and skil ne coherent and logical thinking, but with lin	s required for attaining some of the counited analytical and critical abilities. Show	
ail	Demonstrate little or no of analytical and critic	o evidence of command of knowledge and cal abilities, logical and coherent thinking	skills required for attaining the course leg. Show very little or no ability to app	
ecture-ba	sed course			
ctivities		Details		No. of Hours
ectures				36
utorials				12
eading /	Self study			100
lethods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
resentation	on	oral presentation	25	CLO 4,5,6
		written report	50	CLO 4,5,6,7
est		in-class quizzes	25	CLO 1,2,3,4,5,6,7
ellis, C., I ycle (Insti rown, R.I surance (	Klugman, S., Shep itute of Actuaries of L. and Gottlieb, L (ACTEX Publicatior	herd, J., and Lyon, R.: Únderstar f Australia, 2010, 2nd ed.) R.: Introduction to Ratemaking ns, Inc., 2007, 3rd ed.)	ding Actuarial Management: Th and Loss Reserving for Prope	erty and Casualty
egal, S.: (	Corporate Value of	Enterprise Risk Management: The	e Next Step in Business Manage	ment (Wiley, 2011
r r e u e e e e e e e e e e e e e e e e	cture-bactivities ctures cturials ctorials cading / cthods  essentati oject rep st ugman, \$ cle (Inst count, s curance gal, \$	and some unfamiliar si Demonstrate general outcomes. Show evide familiar situations. App Demonstrate partial bi Show evidence of som knowledge to solve pro Demonstrate little or no of analytical and critic problems. Organization  cuture-based course cutures totrials eading / Self study ethods  esentation oject reports est ugman, S.: Understanding A lilis, C., Klugman, S., Shep cole (Institute of Actuaries or own, R.L. and Gottlieb, L urance (ACTEX Publication	and some unfamiliar situations. Apply effective organizational and Demonstrate general but incomplete command of knowledge outcomes. Show evidence of some analytical and critical abilitie familiar situations. Apply moderately effective organizational and Demonstrate partial but limited command of knowledge and skill Show evidence of some coherent and logical thinking, but with lir knowledge to solve problems. Apply limited or barely effective organizational and of analytical and critical abilities, logical and coherent thinking problems. Organizational and presentational skills are minimally executives.  Ceture-based course  Ceture	of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to app problems. Organizational and presentational skills are minimally effective or ineffective.  cture-based course  ctivities  Details  course  adding / Self study  ethods  Details  Weighting in final course grade (%)  essentation  oral presentation  oject reports  written report  set in-class quizzes  sigman, S.: Understanding Actuarial Practice (Society of Actuaries, 2012)  llis, C., Klugman, S., Shepherd, J., and Lyon, R.: Understanding Actuarial Management: The cle (Institute of Actuaries of Australia, 2010, 2nd ed.)  pown, R.L. and Gottlieb, L.R.: Introduction to Ratemaking and Loss Reserving for Properturance (ACTEX Publications, Inc., 2007, 3rd ed.)  gal, S.: Corporate Value of Enterprise Risk Management: The Next Step in Business Manage

STAT3954	Current topics in actuarial science (6 credits)	Academic Year	2021

Offering Department	Statistics & Actuaria	Science	Quota	а	
Course Co-ordinator	TBC, Statistics & Ac	tuarial Science ()			
Teachers Involved					
Course Objectives	basic capability to u		actuarial students including daily l dle the laws as and when situat		
Course Contents & Topics	Actuaries' Legal Thi	nking.	both areas including 1) Practical r practical topics in both Life ar		,
	Insurance, it covers	s the full picture of actuarial co	ontrol cycle including Product F irrance, it covers the backbone are	Pricing, Val	luation, Financial
	changes in the mar legal materials with course, alongside v	ket for basic legal and general in heavy involvement of actuarial	the course and the full start of a n nsurance skills for actuaries. Into and other general insurance ex and fundamental legal thinking. So infiltrate the course.	ellectually : pertise wo	stimulating recent ould dominate the
Course Learning	On successful comp	letion of this course, students sho	ould be able to:		
Outcomes	Insurance		rial Control Cycle from A to Z for		
	· · · · · · · · · · · · · · · · · · ·		ental actuarial practice through pra	actical proje	ect
		ic understanding of the legal syst	0 0		
	tort		ore legal aspects such as the lav	N of contra	ict and the law of
		damental knowledge of the law of			
		nentary legal researches when fa	· · · ·		
		•	dgment, the matrix of the facts an	d the law ii	nvolved
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in STAT3909,	or already enrolled in this course; or already enrolled in this course; cience) students only.			
Offer in 2021 - 2022	N Offer in 2022	- 2023 · N	Exam	nination	
Grade Descriptors (A+ to F)	A Demonstra learning or	te thorough mastery at an advanced le tcomes. Show strong analytical and critic nowledge to a wide range of complex, f	vel of extensive knowledge and skills re cal abilities and logical thinking, with evid familiar and unfamiliar situations. Apply	equired for att	al thought, and ability
	B Demonstra learning ou	te substantial command of a broad rang tcomes. Show evidence of analytical and	e of knowledge and skills required for at critical abilities and logical thinking, and a		
	C Demonstra outcomes.	Show evidence of some analytical and	knowledge and skills required for attai critical abilities and logical thinking, and		
	D Demonstra Show evid	ence of some coherent and logical thinkin	edge and skills required for attaining some ig, but with limited analytical and critical a	bilities. Show	
	Fail Demonstra	te little or no evidence of command of kn	y effective organizational and presentation owledge and skills required for attaining t erent thinking. Show very little or no ab	the course lea	
Communication-	N	21941112411011 and presentational skills are	minimally checuve of filefiective.		
intensive Course					
Course Type	Lecture-based cours	e			
Course Teaching	Activities	Details			No. of Hours
& Learning Activities	Lectures				36
	Tutorials				12
	Reading / Self study				100
Assessment Methods and Weighting	Methods	Details	Weighting i course grad	de (%)	Assessment Methods to CLO Mapping
	Assignments	Coursework (a practical project &	assignments, 100		CLO 1,2,3,4,5,6,7
Course Website	http://moodle.hku.hk				

STAT3955	Survival analysis (6 credits)		Academic Year	2021
Offering Department	Statistics & Actuarial Science		Quota	
Course Co-ordinator	Dr J F Xu, Statistics & Actuarial Science (xujf@hku.h	nk)		
Teachers Involved	(Dr J F Xu, Statistics & Actuarial Science)			
Course Objectives	This course is concerned with how models which established. This exercise is sometimes referred to			ther entities are
Course Contents & Topics	The nature and properties of parametric and nonparticulate: the introduction of some important basic question and includes the survival distribution by maximum likelihood estimation possibly censored samples by means of the kernel density estimator or the Ramlau-Hansen estimation of the generalized log-rank test; parametric regression model; and multivariate survival analysis.	uantities like the hazard fun ts of censoring and/or trunca on method; nonparametric e Kaplan-Meier estimator, the mator and comparisons of k	ction and surviva ation; parametric stimation of the s Nelson-Aalen es independent surv	al function; some estimation of the survival functions stimator; and the vival functions by
Course Learning	On successful completion of this course, students sh			
Outcomes	CLO 1 acquire a clear understanding of the nature concept of death and life	of failure time data or surv	rival data, a gene	eralization of the
	CLO 2 perform estimation for some commonly	used survival models unde	er different type	s of censoring

online materials  Course Website	Klein, J. I Verlag, N	P. and Moeschberger, lew York, 2005, 2nd ed. odle.hku.hk	M. L.: Survival Analysis: Techniques )	for Censored and Trunc	cated Data (Springer
Required/recommended reading and			sis of Survival Data (Chapman and H S.: Applied Survival Analysis: Regree		o Event Data (Wiley,
,	Examina		One 3-hour written examination	75	CLO 1,2,3,4
	Assignme		Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3,4
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
		/ Self study			100
	Tutorials				12
& Learning Activities	Lectures				36
Course Teaching	Activitie	s	Details		No. of Hours
Course Type	Lecture-b	ased course			
Communication- intensive Course	N				
	Fail	of analytical and critical a	idence of command of knowledge and skills re abilities, logical and coherent thinking. Show d presentational skills are minimally effective of	v very little or no ability to ap	
	D	Show evidence of some control knowledge to solve problem	nited command of knowledge and skills requi pherent and logical thinking, but with limited ar ms. Apply limited or barely effective organization	nalytical and critical abilities. Shonal and presentational skills.	ow limited ability to apply
	С	outcomes. Show evidence familiar situations. Apply m	incomplete command of knowledge and ske of some analytical and critical abilities and loderately effective organizational and present	logical thinking, and ability to a ational skills.	apply knowledge to most
	В	learning outcomes. Show and some unfamiliar situation	ommand of a broad range of knowledge and evidence of analytical and critical abilities and ions. Apply effective organizational and preser	logical thinking, and ability to ap	pply knowledge to familiar
Grade Descriptors (A+ to F)	A	learning outcomes. Show to apply knowledge to a presentational skills.	stery at an advanced level of extensive knostrong analytical and critical abilities and logic wide range of complex, familiar and unfamiliar	cal thinking, with evidence of or iar situations. Apply highly effe	iginal thought, and ability ective organizational and
Offer in 2021 - 2022		er in 2022 - 2023 : N		Examination	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in S Not for st	TAT3600 or STAT3901 udents who have passe	nrolled in this course; or ; d in STAT3955, or already enrolled in	n this course.	
			o a multivariate setup to accommoda	te multivariate survival da	ata
			ng the Cox's semiparametric proporti		
	1.0	echanisms			

STAT3956	Pension	funds and pension mathematics (6 credits)	Academi	c Year	2021
Offering Department	Statistics	& Actuarial Science	Quota		
Course Co-ordinator	Prof G Ma	a, Statistics & Actuarial Science (gma328@hku.hk)			
Teachers Involved	(Prof G M	la,Statistics & Actuarial Science)			
Course Objectives	of pension	se covers the basics of pension plan design and pension func n plan valuations using different actuarial cost methods. The s al valuation techniques to the funding and accounting of pensi	students will be intro		
Course Contents & Topics	The follow obligation	wing topics will be covered: Fundamentals of private pensic s; actuarial cost methods and their effects on cost patterns; s and liability management.	on plans; pricing a		
Course Learning	On succe	ssful completion of this course, students should be able to:			
Outcomes	CLO 1	calculate the pension benefits in accordance with the provision	ns of a pension plar	ı	
	CLO 2	calculate the normal cost and actuarial liabilities using differen	t actuarial cost met	hods	
	CLO 3	perform gain and loss analyses for pension valuations			
	CLO 4	select appropriate assumptions and methods for funding or ac	counting purposes		
	CLO 5	interpret the valuation results presented in actuarial valuation	reports		
	CLO 6	understand the principles of asset and liability modeling as rel	ated to pension plai	ns	
		TAT3909; and			
(and Co-requisites and Impermissible combinations)	For BSc(A	Actuarial Science) students only.			
Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2021 - 2022	For BSc(A	Actuarial Science) students only.  sem Offer in 2022 - 2023 : Y	Examinat		Dec
(and Co-requisites and Impermissible combinations)	For BSc(A	Actuarial Science) students only.  sem Offer in 2022 - 2023 : Y  Demonstrate thorough mastery at an advanced level of extensive know learning outcomes. Show strong analytical and critical abilities and logical to apply knowledge to a wide range of complex, familiar and unfamiliar	ledge and skills require thinking, with evidence	d for att of origin	aining all the course al thought, and ability
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	For BSc(A	Actuarial Science) students only.  sem Offer in 2022 - 2023 : Y  Demonstrate thorough mastery at an advanced level of extensive know learning outcomes. Show strong analytical and critical abilities and logical	ledge and skills require thinking, with evidence situations. Apply highly kills required for attainin gical thinking, and ability	d for att of origin effectiv	aining all the course al thought, and ability e organizational and st most of the course
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	For BSc(A	Actuarial Science) students only.  sem Offer in 2022 - 2023 : Y  Demonstrate thorough mastery at an advanced level of extensive know learning outcomes. Show strong analytical and critical abilities and logical to apply knowledge to a wide range of complex, familiar and unfamiliar presentational skills.  Demonstrate substantial command of a broad range of knowledge and s learning outcomes. Show evidence of analytical and critical abilities and log	ledge and skills require thinking, with evidence situations. Apply highly kills required for attainin gical thinking, and ability titional skills. s required for attaining gical thinking, and ability	of or att of origin of effective g at least to apply most of	aining all the course al thought, and ability re organizational and st most of the course knowledge to familial the course learning
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	For BSc(A	Actuarial Science) students only.  Sem Offer in 2022 - 2023 : Y  Demonstrate thorough mastery at an advanced level of extensive know learning outcomes. Show strong analytical and critical abilities and logical to apply knowledge to a wide range of complex, familiar and unfamiliar presentational skills.  Demonstrate substantial command of a broad range of knowledge and si learning outcomes. Show evidence of analytical and critical abilities and log and some unfamiliar situations. Apply effective organizational and presentate Demonstrate general but incomplete command of knowledge and skills outcomes. Show evidence of some analytical and critical abilities and log	ledge and skills require thinking, with evidence situations. Apply highly kills required for attaining gical thinking, and ability titional skills. s required for attaining gical thinking, and ability ional skills. d for attaining some of t lytical and critical abilitie	od for att of origin y effective g at leas to apply most of y to appl he cours s. Show	aining all the course al thought, and ability re organizational and st most of the course knowledge to familial the course learning y knowledge to most se learning outcomes.
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	For BSc(A  Y 1st  A  B  C	Actuarial Science) students only.  Sem Offer in 2022 - 2023 : Y  Demonstrate thorough mastery at an advanced level of extensive know learning outcomes. Show strong analytical and critical abilities and logical to apply knowledge to a wide range of complex, familiar and unfamiliar presentational skills.  Demonstrate substantial command of a broad range of knowledge and si learning outcomes. Show evidence of analytical and critical abilities and log and some unfamiliar situations. Apply effective organizational and presentationes. Show evidence of some analytical and critical abilities and log familiar situations. Apply moderately effective organizational and presentation Demonstrate partial but limited command of knowledge and skills required. Show evidence of some coherent and logical thinking, but with limited anal	ledge and skills require thinking, with evidence situations. Apply highly kills required for attaining jical thinking, and ability titonal skills. It is required for attaining jical thinking, and ability ional skills. If or attaining some of the total and presentational skills al and presentational skills al and presentational skills. It is also provided the total and presentational skills al and presentational skills. It is also provided the total and presentational skills also provided the total and presentational skills.	d for att of origin / effectiv g at least to apply most of y to appl he cours s. Show ills.	aining all the course al thought, and ability re organizational and st most of the course knowledge to familial the course learning y knowledge to most the learning outcomes. limited ability to apply rming outcomes. Lack
(and Co-requisites and Impermissible combinations) Offer in 2021 - 2022 Grade Descriptors	For BSc(A  Y 1st  A  B  C	Actuarial Science) students only.  Sem Offer in 2022 - 2023 : Y  Demonstrate thorough mastery at an advanced level of extensive know learning outcomes. Show strong analytical and critical abilities and logical to apply knowledge to a wide range of complex, familiar and unfamiliar presentational skills.  Demonstrate substantial command of a broad range of knowledge and si learning outcomes. Show evidence of analytical and critical abilities and log and some unfamiliar situations. Apply effective organizational and presentation Demonstrate general but incomplete command of knowledge and skills outcomes. Show evidence of some analytical and critical abilities and log familiar situations. Apply moderately effective organizational and presentation Demonstrate partial but limited command of knowledge and skills required Show evidence of some coherent and logical thinking, but with limited anal knowledge to solve problems. Apply limited or barely effective organization Demonstrate little or no evidence of command of knowledge and skills req of analytical and critical abilities, logical and coherent thinking. Show of analytical and critical abilities, logical and coherent thinking.	ledge and skills require thinking, with evidence situations. Apply highly kills required for attaining jical thinking, and ability titonal skills. It is required for attaining jical thinking, and ability ional skills. If or attaining some of the total and presentational skills al and presentational skills al and presentational skills. It is also provided the total and presentational skills al and presentational skills. It is also provided the total and presentational skills also provided the total and presentational skills.	d for att of origin / effectiv g at least to apply most of y to appl he cours s. Show ills.	aining all the course al thought, and ability re organizational and st most of the course knowledge to familial the course learning y knowledge to most the learning outcomes. limited ability to apply rming outcomes. Lack

Course Teaching	Activities Details			No. of Hours
& Learning Activities	Lectures			36
	Tutorials			12
	Reading / Self study			100
Assessment Methods and Weighting	Methods Details Weighting in final course grade (%)			Assessment Methods to CLO Mapping
	Assignments	Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3,4,5,6
	Examination	One 3-hour written examination	75	CLO 1,2,3,4,6
reading and online materials	William H. Aitken: Problem-Solving Morneau Sobeco: Handbook of Ca Actuarial Standard of Practice No. Actuarial Standard of Practice No. Measuring Pension Obligations Actuarial Standard of Practice No. David Farber, ASA, EA, MSPA, W Cost Methods-A Review, 3rd Editiz 2001 Supplement to Actuarial Cos	J.J., Schieber, S.J.: Fundamentals of Approach to Pension Funding and anadian Pension & Benefit Plans (20, 27, Selection of Economic Assumption 35, Selection of Demographic 44, Selection and Use of Asset Valufilliam Farrimond, FSPA, Duane Maon, 1999, ACTEX Publications at Methods-A Review, ACTEX Public Pension Funds and Pension Mathe	Valuation, (2nd edition). 106, 16th Edition) tions for Measuring Pens and Other Noneconom uation Methods for Pensi- tyer, MSPA, George Mati- tations	ion Obligations ic Assumptions for on Valuations ray, FSPA: Actuarial
Course Website	http://moodle.hku.hk			(== (== (== )

STAT4011	Natural	language proces	sing (6 credits)	Academic Ye	ar 2021	
Offering Department	Statistics	& Actuarial Science		Quota	15	
Course Co-ordinator	Dr L Yu, S	Dr L Yu, Statistics & Actuarial Science (Iqyu@hku.hk)				
Teachers Involved	(Dr L Yu, Statistics & Actuarial Science)					
Course Objectives	Natural language processing (NLP) is a subfield of artificial intelligence, focusing on understanding humar language. In essence, NLP is interested in building a tool that can use language like humans. This course wi introduce the mathematical, statistical and computational challenges in natural language processing. It covers mai applications of NLP techniques and a range of models in structured prediction and deep learning. In this course students will gain a thorough introduction to cutting-edge machine learning and deep learning techniques for NLP.					
Course Contents & Topics	This course covers a broad range of topics in natural language processing (NLP), including text classification sentiment analysis, neural network, word embedding, sequence models, language models, neural encode decoder models, machine translation, question answering, and contextualized world representation. The underlyin techniques from probability, statistics, machine learning and deep learning will also be introduced.					
Course Learning			nis course, students should be able to:			
Outcomes	CLO 1	learn about the te	echniques behind modern NLP			
	CLO 2	implement basic	algorithms and methods on real-world of	lata		
	CLO 3	gain hands-on ex	perience on building NLP models			
	CLO 4		ds to understand current research			
	CLO 5		nguistic concepts and tasks in NLP			
Pre-requisites (and Co-requisites and Impermissible combinations)			P2113 or COMP2119 or COMP2396).  n deep learning or machine learning; str	rong programming skills (e	e.g., Python)	
Offer in 2021 - 2022	Y 2nd	d sem Offer in 2022	2 - 2023 : Y	Examination	May	
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.					
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.				
		Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.				
	С					
	D	familiar situations. Appl Demonstrate partial but Show evidence of some	y moderately effective organizational and present t limited command of knowledge and skills requi e coherent and logical thinking, but with limited ar	tational skills. red for attaining some of the con nalytical and critical abilities. She	pply knowledge to most	
	D Fail	familiar situations. Appl Demonstrate partial bu Show evidence of some knowledge to solve prol Demonstrate little or no of analytical and critic	y moderately effective organizational and present t limited command of knowledge and skills requi	tational skills.  red for attaining some of the conalytical and critical abilities. Shonal and presentational skills.  equired for attaining the course wery little or no ability to ap	apply knowledge to most burse learning outcomes. ow limited ability to apply learning outcomes. Lack	
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intensive Course Course Type Course Teaching	D Fail N Lecture-b	familiar situations. Appl Demonstrate partial bu Show evidence of some knowledge to solve prol Demonstrate little or no of analytical and critic problems. Organization	y moderately effective organizational and present t limited command of knowledge and skills requi e coherent and logical thinking, but with limited at blems. Apply limited or barely effective organizatio evidence of command of knowledge and skills rall abilities, logical and coherent thinking. Show and presentational skills are minimally effective or	tational skills.  red for attaining some of the conalytical and critical abilities. Shonal and presentational skills.  equired for attaining the course wery little or no ability to ap	upply knowledge to most surse learning outcomes, ow limited ability to apply learning outcomes. Lack ply knowledge to solve	
intensive Course Course Type Course Teaching	D Fail N Lecture-b Activities	familiar situations. Appl Demonstrate partial bu Show evidence of some knowledge to solve prol Demonstrate little or no of analytical and critic problems. Organization	y moderately effective organizational and present t limited command of knowledge and skills requi e coherent and logical thinking, but with limited at blems. Apply limited or barely effective organizatio evidence of command of knowledge and skills rall abilities, logical and coherent thinking. Show and presentational skills are minimally effective or	tational skills.  red for attaining some of the conalytical and critical abilities. Shonal and presentational skills.  equired for attaining the course wery little or no ability to ap	upply knowledge to most surse learning outcomes. by limited ability to apply learning outcomes. Lack ply knowledge to solve	
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Communication- intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting	D Fail N Lecture-b Activitie Lectures Tutorials	familiar situations. Appl Demonstrate partial bu Show evidence of some knowledge to solve prol Demonstrate little or no of analytical and critic problems. Organization  pased course  S  / Self study	y moderately effective organizational and present t limited command of knowledge and skills requi e coherent and logical thinking, but with limited at blems. Apply limited or barely effective organizatio evidence of command of knowledge and skills rall abilities, logical and coherent thinking. Show and presentational skills are minimally effective or	tational skills.  red for attaining some of the conalytical and critical abilities. Shonal and presentational skills.  equired for attaining the course wery little or no ability to ap	upply knowledge to most surse learning outcomes ow limited ability to apply learning outcomes. Lack ply knowledge to solve  No. of Hours  36 12	
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	D Fail N Lecture-b Activitie Lectures Tutorials Reading	familiar situations. Appl Demonstrate partial bu Show evidence of some knowledge to solve prol Demonstrate little or no of analytical and critic problems. Organization  passed course  S  / Self study	y moderately effective organizational and present t limited command of knowledge and skills requi e coherent and logical thinking, but with limited at blems. Apply limited or barely effective organizatio evidence of command of knowledge and skills rall abilities, logical and coherent thinking. Show and presentational skills are minimally effective or the command of the command o	tational skills. red for attaining some of the conalytical and critical abilities. Shonal and presentational skills. equired for attaining the course were very little or no ability to apor ineffective.  Weighting in final	pply knowledge to most surse learning outcomes ow limited ability to apply learning outcomes. Lack ply knowledge to solve  No. of Hours  36  12  100  Assessment Methods	
ntensive Course Course Type Course Teaching & Learning Activities Assessment Methods	D Fail N Lecture-b Activitie Lectures Tutorials Reading Methods	familiar situations. Appl Demonstrate partial bu Show evidence of some knowledge to solve prol Demonstrate little or no of analytical and critic problems. Organization  passed course  \$  / Self study  sents	y moderately effective organizational and present timited command of knowledge and skills require coherent and logical thinking, but with limited at blems. Apply limited or barely effective organization evidence of command of knowledge and skills real abilities, logical and coherent thinking. Show and presentational skills are minimally effective of the command of knowledge and coherent thinking. Show and presentational skills are minimally effective of the command of knowledge and presentational skills are minimally effective of the command of knowledge and presentational skills are minimally effective of the command of knowledge and skills are minima	tational skills. red for attaining some of the conalytical and critical abilities. Sho onal and presentational skills. equired for attaining the course were very little or no ability to apor ineffective.  Weighting in final course grade (%)	pply knowledge to most surse learning outcomes by limited ability to apply learning outcomes. Lack ply knowledge to solve  No. of Hours  36  12  100  Assessment Methods to CLO Mapping	

STAT4022	Omics data analysis (6 credits)	Academic Year	2021
Offering Department	Statistics & Actuarial Science	Quota	15

Course Co-ordinator	Dr D Y Zhang, Statistics & Actuarial Science (doraz@hku.hk)				
Teachers Involved	(Dr D Y Zhang, Statistics & Actuarial Science) (Dr Y Huang, Statistics & Actuarial Science)				
Course Objectives	This course introduces omics data acquisition techniques and emphasizes advanced statistical tools to analyze the high-throughput omics data. This course is designed for learners with basic background knowledge in molecular biology who are interested in different aspects of omics and bioinformatics. This course aims to introduce the tools and techniques needed to obtain, analyze, and interpret a variety of modern genome-scale data types.				
Course Contents & Topics	Introduction to molecular biology, omics, and high throughput technologies, analysis of microarray data, analysis of high-throughput data, experimental design commonly encountered in genomic data analysis, functional genomics, enrichment analysis.				
Course Learning	On successful completion of this course, students should be able to:				
Outcomes			current computational systems biology a	• •	
	C	latasets	les behind data pre-processing, quality	<b>,</b>	arge-scale biological
			onal and statistical tools to analyze multip		
n			chine learning analysis for omics sample	e clustering and classific	ation
Pre-requisites (and Co-requisites and Impermissible combinations)	Knowled		or already enrolled in STAT3612 biology/biochemistry/bioinformatics, ur l.	dergraduate level statis	stics knowledge and
Offer in 2021 - 2022	N O	ffer in 2022 - 2023 : N		Examination	
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.				
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.			
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.			
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.			
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.				
Communication- intensive Course	N	-	·		
Course Type	Lecture-l	pased course			
Course Teaching	Activitie	es	Details		No. of Hours
& Learning Activities	Lectures	3			
	Tutorials				12
	Reading / Self study				100
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignm	nents	Coursework (assignments; may include project report)	60	CLO 1,2,3,4
	Examina	ation	One 2-hour written examination	40	CLO 1,2,3,4
Course Website	http://mo	odle.hku.hk			

STAT4601	Time-se	eries analysi	s (6 credits)			Academic Year	2021
Offering Department	Statistics	& Actuarial Sc	ience			Quota	
Course Co-ordinator	Prof G Li, Statistics & Actuarial Science (gdli@hku.hk)						
Teachers Involved	(Prof G Li, Statistics & Actuarial Science)						
Course Objectives	climatolog series are different ty	A time series consists of a set of observations on a random variable taken over time. Time series arise naturally in climatology, economics, environment studies, finance and many other disciplines. The observations in a time series are usually correlated; the course establishes a framework to discuss this. This course distinguishes different type of time series, investigates various representations for the processes and studies the relative merits of different forecasting procedures. Students will analyse real time-series data on the computer.					
Course Contents & Topics				ctions; linear stationecking; seasonal m			
Course Learning	On succes	essful completion	on of this course, s	students should be	able to:		
Outcomes	CLO 1 recognize a stationary vs non-stationary time series						
	CLO 2 understand some basic properties of commonly used time series models such as AR (autoregressive), MA (moving average) and ARMA models						
	CLO 3 transform non-stationary time series into stationary ones						
	CLO 4 identify different time series models based on autocorrelation functions						
	CLO 5 fit a suitable AR, MA or ARMA model to real data using SAS (after transforming to stationarity if necessary)						
	CLO 6 perform goodness of fit tests for such models						
	CLO 7 do forecasting with these fitted time series models						
Pre-requisites	Pass in S	STAT3600; and					
(and Co-requisites	Not for stu	udents who ha	ve passed in STA	T3614, or have alre	ady enrolled in this	course; and	
and Impermissible combinations)	Not for stu	udents who ha	ve passed in STA	T3907, or have alre	ady enrolled in this	course.	
Offer in 2021 - 2022	Y 2nd	d sem Offer i	n 2022 - 2023 : Y			Examination	May
Grade Descriptors (A+ to F)	A	learning outcon	nes. Show strong anal edge to a wide range	n advanced level of ext ytical and critical abilities of complex, familiar ar	s and logical thinking, v	rith evidence of origina	al thought, and ability
	В			f a broad range of know analytical and critical ab			

		and some unfamiliar situations. Apply effective organizational and presentational skills.						
	С	Demonstrate general but outcomes. Show evidence	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the cour outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowle familiar situations. Apply moderately effective organizational and presentational skills.					
	D	Show evidence of some co	nited command of knowledge and skills re herent and logical thinking, but with limited hs. Apply limited or barely effective organiz	d analytical and critical abilities. Sh				
	Fail	of analytical and critical a	dence of command of knowledge and skil bilities, logical and coherent thinking. S d presentational skills are minimally effecti	how very little or no ability to ap				
Communication- intensive Course	N							
Course Type	Lecture-b	pased course						
Course Teaching	Activitie	es	Details	No. of Hours				
& Learning Activities	Lectures			36				
	Tutorials			12				
	Reading / Self study				100			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignm	nents	Coursework (assignments, tutorials, and a class test)	40	CLO 1,2,3,4,5,6,7			
	Examina	ation	One 2-hour written examination	60	CLO 1,2,3,4,6,7			
Required/recommended reading and online materials	Bovas Al W. W .S. W. K. Li:	J. D. Cryer & K.S. Chan: Time Series Analysis with Applications in R (Springer, 2008, 2nd edition) Bovas Abraham & Johannes Ledolter: Statistical Methods for Forecasting (John Wiley & Sons, 2005, 2nd edition) W. W. S. Wei: Time Series Analysis: Univariate and Multivariate Methods (Addison-Wesley, 2006, 2nd edition) W. K. Li: Diagnostic Checks in Time Series (Chapman & Hall/CRC, 2004) Howell Tong: Non-linear Time Series: A Dynamical System Approach (Oxford University Press, 1990)						
Course Website	http://mo	odle.hku.hk						

STAT4602	Multiva	riate data analysis	(6 credits)	Academic Yea	r 2021		
Offering Department	Statistics	& Actuarial Science	•	Quota	50		
Course Co-ordinator	Prof T W	Prof T W K Fung, Statistics & Actuarial Science (wingfung@hku.hk)					
Teachers Involved	(Prof T V	(Prof T W K Fung, Statistics & Actuarial Science)					
Course Objectives	In many designed experiments or observational studies, the researchers are dealing with multivariate data, where each observation is a set of measurements taken on the same individual. These measurements are often correlated. The correlation prevents the use of univariate statistics to draw inferences. This course develops the statistical methods for analysing multivariate data through examples in various fields of application and hands-or experience with the statistical software SAS.						
Course Contents & Topics	covarian	Problems with multivariate data. Multivariate normality and transforms. Mean structure for one sample. Tests of covariance matrix. Correlations: Simple, partial, multiple and canonical. Multivariate regression. Principal components analysis. Factor analysis. Problems for means of several samples. Multivariate analysis of variance. Discriminant analysis. Classification. Multivariate linear model.					
Course Learning	On successful completion of this course, students should be able to:						
Outcomes		,	• • • • • • • • • • • • • • • • • • • •	such as PROC IML, PROC RE R, PROC DISCRIM, PROC CAN	,		
	n	multivariate MANOVA a	nd profile analysis	nts for one or more than one	, ,		
	C	correlation and multivari	ate regression	p(s) of variables by multiple, pa			
	CLO 4 explore the latent linear structure of a data set with multiple measurements by principal components analysis and factor analysis						
	CLO 5 classify observations of a population with one or more than one measurements by discriminant analysis  Pass in STAT3600 or STAT3907						
(and Co-requisites and Impermissible combinations)							
Offer in 2021 - 2022		nd sem Offer in 2022 -		Examination	May		
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.						
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.						
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.						
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.						
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.						
Communication- intensive Course	N						
Course Type	Lecture-l	based course					
Course Teaching	Activitie	es	Details	Details			
& Learning Activities	Lectures				36		
	Tutorials	3			12		
	Reading	/ Self study			100		
		) ···			100		

	Assignments	Coursework (assignments, tutorials, and a class test)	40	CLO 1,2,3,4,5
	Examination	One 3-hour written examination	60	CLO 1,2,3,4,5
Required/recommended reading and online materials	Mardia K. V., Kent J. T., and Bibby Seber G. A. F.: Multivariate Obser Morrison D. F.: Multivariate Statisti Hair J. F., Anderson R. E., Tatham	vJ. M.: Multivariate Analysis (Acade vations (John Wiley & Sons, 1984) ical Methods (McGraw-Hill, 1990, 3r I R. L., & Black W. C.: Multivariate D variate Statistics (John Wiley and S	mic Press, 1979) d ed.) Data Analysis (Prentice-Hal	,
Course Website	http://moodle.hku.hk			

STAT4603	Current	topics in risk management (6 credits)	Academic Yea	ar 2021			
Offering Department		& Actuarial Science	Quota				
Course Co-ordinator	Dr O T K	Dr O T K Choi, Statistics & Actuarial Science (ochoi@hku.hk)					
Teachers Involved	(Dr O T K Choi, Statistics & Actuarial Science)						
Course Objectives	managem	This course is to broaden the students knowledge of risk management by considering current topics in risk management. These topics will build on the theory and methods covered in the core courses. The topics offered each year depend on staff availability.					
Course Contents		iquidity risk; Operational risk; Model risk; Enterprise risk management; Cutting edge risk analytics and innovations					
& Topics	in risk ma	n risk management.					
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1	gain insights into current advances in risk management					
	CLO 2	understand current risk management pitfalls and development					
	CLO 3	make effective use of models and techniques for managing va	arious kinds of risk				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in (S	STAT3618 or FINA2322)					
Offer in 2021 - 2022	Y 1st	sem Offer in 2022 - 2023 : Y	Examination	Dec			
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive knowl- learning outcomes. Show strong analytical and critical abilities and logical to apply knowledge to a wide range of complex, familiar and unfamiliar presentational skills.	thinking, with evidence of original	ginal thought, and ability			
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.						
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most						
		familiar situations. Apply moderately effective organizational and presentation		oply knowledge to most			
	D	familiar situations. Apply moderately effective organizational and presentation Demonstrate partial but limited command of knowledge and skills required Show evidence of some coherent and logical thinking, but with limited analy knowledge to solve problems. Apply limited or barely effective organizations	onal skills.  I for attaining some of the cou ytical and critical abilities. Sho al and presentational skills.	urse learning outcomes.			
	D Fail	familiar situations. Apply moderately effective organizational and presentation.  Demonstrate partial but limited command of knowledge and skills required Show evidence of some coherent and logical thinking, but with limited analysis.	onal skills.  If or attaining some of the couptical and critical abilities. Sho al and presentational skills.  uired for attaining the course learny little or no ability to app	urse learning outcomes.  w limited ability to apply earning outcomes. Lack			
		familiar situations. Apply moderately effective organizational and presentation Demonstrate partial but limited command of knowledge and skills required Show evidence of some coherent and logical thinking, but with limited analy knowledge to solve problems. Apply limited or barely effective organizations Demonstrate little or no evidence of command of knowledge and skills requor of analytical and critical abilities, logical and coherent thinking. Show v	onal skills.  If or attaining some of the couptical and critical abilities. Sho al and presentational skills.  uired for attaining the course learny little or no ability to app	urse learning outcomes.  w limited ability to apply earning outcomes. Lack			
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ntensive Course Course Type	Fail N Lecture-b	familiar situations. Apply moderately effective organizational and presentation Demonstrate partial but limited command of knowledge and skills required Show evidence of some coherent and logical thinking, but with limited analy knowledge to solve problems. Apply limited or barely effective organizations Demonstrate little or no evidence of command of knowledge and skills requof analytical and critical abilities, logical and coherent thinking. Show v problems. Organization and presentational skills are minimally effective or in assed course	onal skills.  If or attaining some of the couptical and critical abilities. Sho al and presentational skills.  uired for attaining the course learny little or no ability to app	urse learning outcomes. w limited ability to apply earning outcomes. Lack oly knowledge to solve			
ntensive Course Course Type Course Teaching	Fail N Lecture-b Activities	familiar situations. Apply moderately effective organizational and presentation Demonstrate partial but limited command of knowledge and skills required Show evidence of some coherent and logical thinking, but with limited analy knowledge to solve problems. Apply limited or barely effective organizations Demonstrate little or no evidence of command of knowledge and skills required of analytical and critical abilities, logical and coherent thinking. Show vigroblems. Organization and presentational skills are minimally effective or in ased course	onal skills.  If or attaining some of the couptical and critical abilities. Sho al and presentational skills.  uired for attaining the course learny little or no ability to app	urse learning outcomes. w limited ability to apply earning outcomes. Lack oly knowledge to solve  No. of Hours			
intensive Course Course Type Course Teaching	Fail N Lecture-b	familiar situations. Apply moderately effective organizational and presentation Demonstrate partial but limited command of knowledge and skills required Show evidence of some coherent and logical thinking, but with limited analy knowledge to solve problems. Apply limited or barely effective organizations. Demonstrate little or no evidence of command of knowledge and skills required for analytical and critical abilities, logical and coherent thinking. Show vigoroblems. Organization and presentational skills are minimally effective or in assed course    Details   Details	onal skills.  If or attaining some of the couptical and critical abilities. Sho al and presentational skills.  uired for attaining the course learny little or no ability to app	urse learning outcomes. w limited ability to apply earning outcomes. Lack oly knowledge to solve			
Communication- intensive Course Course Type Course Teaching & Learning Activities	Fail  N  Lecture-b  Activities Lectures Tutorials	familiar situations. Apply moderately effective organizational and presentation Demonstrate partial but limited command of knowledge and skills required Show evidence of some coherent and logical thinking, but with limited analy knowledge to solve problems. Apply limited or barely effective organizations. Demonstrate little or no evidence of command of knowledge and skills required for analytical and critical abilities, logical and coherent thinking. Show vigoroblems. Organization and presentational skills are minimally effective or in assed course    Details   Details	onal skills.  If or attaining some of the couptical and critical abilities. Sho al and presentational skills.  uired for attaining the course learny little or no ability to app	urse learning outcomes.  w limited ability to apply earning outcomes. Lack ally knowledge to solve  No. of Hours  36			
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail  N  Lecture-b  Activities Lectures Tutorials	familiar situations. Apply moderately effective organizational and presentation Demonstrate partial but limited command of knowledge and skills required Show evidence of some coherent and logical thinking, but with limited analy knowledge to solve problems. Apply limited or barely effective organizations. Demonstrate little or no evidence of command of knowledge and skills required for analytical and critical abilities, logical and coherent thinking. Show vigoroblems. Organization and presentational skills are minimally effective or in assed course    Details	onal skills.  If or attaining some of the couptical and critical abilities. Sho al and presentational skills.  uired for attaining the course learny little or no ability to app	urse learning outcomes.  w limited ability to apply earning outcomes. Lack abily knowledge to solve  No. of Hours  36  12			
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail  N  Lecture-b  Activitie: Lectures Tutorials Reading	familiar situations. Apply moderately effective organizational and presentation Demonstrate partial but limited command of knowledge and skills required Show evidence of some coherent and logical thinking, but with limited analy knowledge to solve problems. Apply limited or barely effective organizations. Demonstrate little or no evidence of command of knowledge and skills required of analytical and critical abilities, logical and coherent thinking. Show v problems. Organization and presentational skills are minimally effective or in assed course  S	onal skills.  I for attaining some of the county of the co	virse learning outcomes.  In imited ability to apply earning outcomes. Lack ply knowledge to solve  No. of Hours  36  12  100  Assessment Methods			
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Fail  N  Lecture-b  Activities Lectures Tutorials Reading  Methods	familiar situations. Apply moderately effective organizational and presentation Demonstrate partial but limited command of knowledge and skills required Show evidence of some coherent and logical thinking, but with limited analy knowledge to solve problems. Apply limited or barely effective organizations. Demonstrate little or no evidence of command of knowledge and skills required of analytical and critical abilities, logical and coherent thinking. Show v problems. Organization and presentational skills are minimally effective or in assed course  S	onal skills.  If or attaining some of the countries of th	virse learning outcomes.  In the control of the con			
intensive Course Course Type Course Teaching	Fail  N  Lecture-b  Activities Lectures Tutorials Reading  Methods  Assignme  Examinat Dowd, K: Fiedler, R: Franzetti, Basel Co standards Basel Co	familiar situations. Apply moderately effective organizational and presentation Demonstrate partial but limited command of knowledge and skills required Show evidence of some coherent and logical thinking, but with limited analy knowledge to solve problems. Apply limited or barely effective organizations. Demonstrate little or no evidence of command of knowledge and skills required of analytical and critical abilities, logical and coherent thinking. Show v problems. Organization and presentational skills are minimally effective or in assed course  S	onal skills.  If or attaining some of the couvical and critical abilities. Sho al and presentational skills. United for attaining the course levery little or no ability to apprenent of the course grade (%)  Weighting in final course grade (%)  50  50  14, 16)  & Hall/CRC Finance Seriamework for liquidity in a course grade (%)	No. of Hours 36 12 100 Assessment Methods to CLO 1,2,3 CLO 1,2,3 des, 2010) risk measurement,			

STAT4606	Risk management and Basel Accords in banking and finance (6 credits)	Academic Year	2021
Offering Department	Statistics & Actuarial Science	Quota	
Course Co-ordinator	Mr P K Y Pang, Statistics & Actuarial Science (the_pang@yahoo.com)		
Teachers Involved	(Mr P K Y Pang, Statistics & Actuarial Science)		
Course Objectives	To provide comprehensive knowledge and in-depth understanding of risk mar industry to students. The focus is on management with basic measurement fur course. Accordingly, minimal background in quantitative methods will be req financial product (eg: bonds, swaps, options) knowledge will be required.	ndamentals only for	ming a part of the
Course Contents & Topics	The course introduces and explains: - the importance of risk management, - risk nature and types,		

	- design a	nd establishment of a	risk management framework,			
	- the importance of people and corporate culture,					
	- the complete risk management cycle,					
	- measurement and management of credit, market and operational risks,					
			treatments for credit, market and ope			
	- key deve	elopments (eg: Know-\	our-Customers, Anti-Money launderi	ng, Sarbanes-Oxley) and	critical issues,	
		rtance of business cor		-		
	- design and implementation of a business continuity plan. On successful completion of this course, students should be able to:					
Course Learning		•				
Outcomes	an	nd cycle	nce, nature and classification of vario	ous risks, and the risk ma	nagement principle	
			isk management framework			
			and understanding of the measurem		•	
			sel accords and its capital treatments		erational risks	
	CLO 5 ap	preciate the importan	ce of, design and implement a busine	ss continuity plan		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in S	TAT3618 or STAT391	0 or STAT3905 or (FINA2322 and an	y University level 3 course	)	
Offer in 2021 - 2022	N Offe	er in 2022 - 2023 : N		Examination		
Grade Descriptors	Α		nastery at an advanced level of extensive kn			
(A+ to F)			strong analytical and critical abilities and logi wide range of complex, familiar and unfami			
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course					
	learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar					
	and some unfamiliar situations. Apply effective organizational and presentational skills.  C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning					
	outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most					
	familiar situations. Apply moderately effective organizational and presentational skills.					
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack					
	of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply kno problems. Organization and presentational skills are minimally effective or ineffective.					
Communication-	N	problems. Organization a	nd presentational skills are minimally effective	or menective.		
intensive Course	i N					
Course Type	Lecture-ha	ased course				
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures	•	Details		36	
a	Tutorials				12	
		Self study			100	
Assessment Methods	Methods	oen stady	Details	Weighting in final	Assessment	
and Weighting	Wethous		Details	course grade (%)	Methods to CLO Mapping	
	Assignments		Coursework (assignments, tutorials, and a class test)	40	CLO 1,2,3,4	
	Examinat		One 2-hour written examination	60	CLO 1,2,3,4,5	
Required/recommended	Crouhy, M	I., Galai, D. and Mark,	R.: The Essentials of Risk Managem	ent (McGraw-Hill, 2006)		
reading and			ger Handbook + Test Bank: FRM part			
online materials		•	nd Financial Institutions (Pearson High		edition)	
O			nd Capital Adequacy (McGrawHill, 20	03)		
Course Website		dle.hku.hk	OTATO200 #	- OTATOOO		
Additional Course Information	inis cours	se is previously called	STAT2320 as the prerequisite chang	eu to 51A13303.		

STAT4607	Credit risk analysis (6 credits)	Academic Year	2021				
Offering Department	Statistics & Actuarial Science	Quota					
Course Co-ordinator	Dr K P Wat, Statistics & Actuarial Science (watkp@hku.hk)						
Teachers Involved	(Dr K P Wat, Statistics & Actuarial Science)						
Course Objectives	Credit risk has always been a significant financial risk in the banking industry. It is related to the possibility of loss arising from defaults on debts, swaps, or other counterparty instruments. Credit risk may also result from a change in the value of an asset resulting from a change in the counterparty's creditworthiness. This course will introduce students to quantitative models for measuring and managing credit risk. It also aims to provide students with an understanding of the credit risk methodology used in the financial industry and the regulatory framework in which the credit risk models operate.						
Course Contents & Topics	Probabilities of default, recovery rates and loss given default; Default and c internal rating models; Credit portfolio models such as CreditMetrics, Credit approach; Credit derivatives.						
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 understand the Basel requirements for credit risk						
	CLO 2 estimate credit scores using the logit model						
	CLO 3 understand and estimate default probabilities using various approaches such as Moody's KMV and the mortality method						
	CLO 4 understand the concept of credit Value-at-Risk and the CreditMetrics approach						
	CLO 5 estimate default correlations						
	CLO 6 assess credit rating systems						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in STAT3618 or STAT3905 or STAT3910 or (FINA2322 and any University	/ level 3 course)					

Offer in 2021 - 2022		sem Offer in 2022 - 2		Examination	May	
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.				
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.				
	С	outcomes. Show evidence	ncomplete command of knowledge and short of some analytical and critical abilities and derately effective organizational and presen	logical thinking, and ability to a		
	D	Show evidence of some col	ted command of knowledge and skills requinerent and logical thinking, but with limited as. Apply limited or barely effective organizati	nalytical and critical abilities. Sho		
	Fail	of analytical and critical at	lence of command of knowledge and skills rollities, logical and coherent thinking. Show presentational skills are minimally effective	v very little or no ability to ap		
Communication- intensive Course	N	· •				
Course Type		sed course				
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials				12	
	Reading /	Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	nts	Coursework (assignments, tutorials, and class test(s))	40	CLO 1,2,3,4,5,6	
	Examinati	on	One 2-hour written examination	60	CLO 1,2,3,4,5,6	
Required/recommended reading and online materials	Bluhm, C., Overbeck, L., and Wagner, C. (2010). Introduction to Credit Risk Modeling (2nd Edition). CRC Press. Löffler, G. and Posch, P. N. (2011). Credit Risk Modeling using Excel and VBA (2nd Edition). Wiley. Resti, A. and Sironi, A. (2007). Risk Management and Shareholders' Value in Banking: From Risk Measureme Models to Capital Allocation Policies. Wiley.  Saunders, A. and Allen, L. (2010). Credit Risk Measurement In and Out of the Financial Crisis: New Approaches Value at Risk and Other Paradigms (3rd Edition). Wiley.  Crouhy, M., Galai, D., and Mark, R. (2001). Risk Management. McGraw-Hill.  Jorion, P. (2011). Financial Risk Manager Handbook (6th Edition). Wiley.  Hull, J. C. (2018). Risk Management and Financial Institutions (5th Edition). Wiley.  Hull, J. C. (2018). Options, Futures, and Other Derivatives (10th Edition). Pearson.  Gujarati, D. N. and Porter, D. C. (2009). Basic Econometrics (5th Edition). McGraw-Hill.  Gregory, J. (2015). The xVA Challenge: Counterparty Credit Risk, Funding, Collateral and Capital (3rd Edition Wiley.				/ileý. Risk Measuremen New Approaches t	
	Malz, A. M	l. (2011). Financial Risk	Management: Models, History, and	Institutions, Wilev.		

STAT4608	Market r	isk analysis (6 credits)	Academic Year	2021		
Offering Department	Statistics	& Actuarial Science	Quota			
Course Co-ordinator	Dr K Zhu,	Statistics & Actuarial Science (mazhuke@hku.hk)				
Teachers Involved	(Dr K Zhu	Statistics & Actuarial Science)				
Course Objectives	methods technique	Financial risk management has experienced a revolution in the last decade thanks to the introduction of new methods for measuring risk, particularly Value-at-Risk (VaR). This course introduces modern risk management techniques covering the measurement of market risk using VaR models and financial time series models, and stress testing.				
Course Contents & Topics	factor map	Risk Measures; Value-at-Risk (VaR) models (parametric, Monte Carlo simulation and Historical simulation); Risk factor mapping; Advanced VaR models (GARCH-type models, extreme-value theory and normal-mixture); Principal Component Analysis and VaR; Backtesting and stress testing.				
Course Learning	On succes	ssful completion of this course, students should be able to:				
Outcomes	CLO 1	understand VaR and expected shortfall as risk measures				
	CLO 2	compute VaR and expected shortfall				
	CLO 3	model volatility using GARCH-type models				
	CLO 4	understand extreme-value theory				
	CLO 5	understand backtesting and stress testing				
(and Co-requisites and Impermissible combinations)	Pass in S	TAT4601 and (FINA2320 or STAT3609)				
Offer in 2021 - 2022	Y 2nd	I sem Offer in 2022 - 2023 : Y	Examination	May		
Grade Descriptors (A+ to F)	Α	Demonstrate thorough mastery at an advanced level of extensive knowl learning outcomes. Show strong analytical and critical abilities and logical to apply knowledge to a wide range of complex, familiar and unfamiliar presentational skills.	thinking, with evidence of originate	al thought, and ability		
	В	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.				
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.				
	D Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail	Demonstrate little or no evidence of command of knowledge and skills requ of analytical and critical abilities, logical and coherent thinking. Show v problems. Organization and presentational skills are minimally effective or in	ery little or no ability to apply			
Communication- intensive Course	N					

Course Type	Lecture-based course				
Course Teaching	Activities Details		No. of Hours		
& Learning Activities	Lectures			36	
	Tutorials			12	
	Reading / Self study			100	
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignments	Coursework (assignments, tutorials, and a class test)	40	CLO 1,2,3,4,5	
	Examination	One 2-hour written examination	60	CLO 1,2,3,4,5	
Required/recommended reading and online materials	Jorion, P.: Value-at-Risk: The New Benchmark for Managing Financial Risk (McGraw-Hill, 2007, 3rd edition) Alexander, C.: Market Models: A Guide to Financial Data Analysis (Wiley, 2001) Alexander, C.: Market Risk Analysis: Practical Financial Econometrics (Wiley, 2008) Alexander, C.: Market Risk Analysis: Value-at-Risk Models (Wiley, 2009) Tsay, R. S.: Analysis of Financial Time Series (Wiley, 2005, 2nd edition)				
Course Website	http://moodle.hku.hk	, ,	,		

	Big data	analytics (6 credits	s)	Academic Ye	ar 2021	
Offering Department	Statistics 8	& Actuarial Science		Quota	50	
Course Co-ordinator	Dr M M Y	Zhang, Statistics & Actu	uarial Science (mzhang18@hku.hk	)		
Teachers Involved		Zhang, Statistics & Actu				
Course Objectives	social web	the past decade, huge volume of data with highly complicated structure has appeared in every aspect, such as ocial web logs, e-mails, video, speech recordings, photographs, tweets and others. The efficient extraction of situable information from these data sources becomes a challenging task. This course focuses on the practical nowledge and skills of some advanced analytics and statistical modeling for solving big data problems.				
Course Contents & Topics		ecommender systems, Link analysis, Social network analysis, Text analytics, Sentiment analysis, Topic odeling, Deep Learning, and Reinforcement learning n successful completion of this course, students should be able to:				
Course Learning Outcomes	CLO 1 un	derstand and apply a engths and weaknesses	wide range of data analytic tech	nniques, and recognize th	neir characteristics,	
	str	ucture of the data and t	ate data analytic techniques for he goals of the user of the discove	red knowledge		
		aluate the quality of dis sk being performed and	scovered knowledge, taking into a the goals of the user	account the requirements of	of the data analytic	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in S	ass in STAT3612 or STAT4904				
Offer in 2021 - 2022	Y 2nd	sem Offer in 2022 - 2	2023 : Y	Examination	No Exam	
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.  B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course					
	learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.  C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	С	Demonstrate general but in outcomes. Show evidence	ncomplete command of knowledge and s of some analytical and critical abilities and	skills required for attaining most d logical thinking, and ability to a	of the course learning	
	D	Demonstrate general but in outcomes. Show evidence familiar situations. Apply mo Demonstrate partial but limi Show evidence of some cod knowledge to solve problem	ncomplete command of knowledge and sof some analytical and critical abilities and oderately effective organizational and preseited command of knowledge and skills requerent and logical thinking, but with limited as. Apply limited or barely effective organizations.	skills required for attaining most d logical thinking, and ability to a ntational skills. uired for attaining some of the co analytical and critical abilities. Shi tional and presentational skills.	of the course learning ppply knowledge to most ourse learning outcomes. ow limited ability to apply	
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	D	Demonstrate general but in outcomes. Show evidence familiar situations. Apply mo Demonstrate partial but limi Show evidence of some col knowledge to solve problem. Demonstrate little or no evic of analytical and critical at	ncomplete command of knowledge and sof some analytical and critical abilities and oderately effective organizational and preseited command of knowledge and skills requerent and logical thinking, but with limited is. Apply limited or barely effective organization of command of knowledge and skills bilities, logical and coherent thinking. Sho	skills required for attaining most I logical thinking, and ability to a ntational skills. uired for attaining some of the co analytical and critical abilities. Shi titonal and presentational skills. required for attaining the course low very little or no ability to ap	of the course learning apply knowledge to most ourse learning outcomes. ow limited ability to apply learning outcomes. Lack	
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intensive Course Course Type Course Teaching	D Fail N Lecture-ba Activities Lectures Tutorials	Demonstrate general but is outcomes. Show evidence familiar situations. Apply mc Demonstrate partial but limi Show evidence of some cot knowledge to solve problem Demonstrate little or no evic of analytical and critical at problems. Organization and ased course	ncomplete command of knowledge and sof some analytical and critical abilities and oderately effective organizational and presetited command of knowledge and skills requerent and logical thinking, but with limited is. Apply limited or barely effective organization of command of knowledge and skills bilities, logical and coherent thinking. She presentational skills are minimally effective	skills required for attaining most I logical thinking, and ability to a ntational skills. uired for attaining some of the co analytical and critical abilities. Shi titonal and presentational skills. required for attaining the course low very little or no ability to ap	of the course learning pipply knowledge to most burse learning outcomes. ow limited ability to apply learning outcomes. Lack ply knowledge to solve  No. of Hours  36 12	
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intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	D Fail  N Lecture-ba Activities Lectures Tutorials Reading / Methods  Assignme	Demonstrate general but is outcomes. Show evidence familiar situations. Apply mc Demonstrate partial but limi Show evidence of some cohe knowledge to solve problem Demonstrate little or no evic of analytical and critical at problems. Organization and ased course  Self study	ncomplete command of knowledge and sof some analytical and critical abilities and oderately effective organizational and preseited command of knowledge and skills requerent and logical thinking, but with limited is. Apply limited or barely effective organizations of command of knowledge and skills bilities, logical and coherent thinking. Shop presentational skills are minimally effective.  Details  Details  May include project proposal	kills required for attaining most digical thinking, and ability to a national skills.  uired for attaining some of the coanalytical and critical abilities. Shi tional and presentational skills.  required for attaining the course ow very little or no ability to apport or ineffective.  Weighting in final course grade (%)	of the course learning opply knowledge to most ourse learning outcomes. Sow limited ability to apply learning outcomes. Lack ply knowledge to solve  No. of Hours  36  12  100  Assessment Methods to CLO Mapping CLO 1,2,3,4	
Communication- intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	D Fail  N Lecture-ba Activities Lectures Tutorials Reading / Methods  Assignme Project re Test Geron, A. Technique Aggarwal, Sarkar, D.	Demonstrate general but is outcomes. Show evidence familiar situations. Apply mo Demonstrate partial but limi Show evidence of some cot knowledge to solve problem Demonstrate little or no evic of analytical and critical all problems. Organization and ased course  Self study  Self study  (2019). Hands-On Mass to Build Intelligent Systems (2016). Recomme (2016). Text Analytics of the similar situation of the second selection of the seco	ncomplete command of knowledge and sof some analytical and critical abilities and oderately effective organizational and preservent and logical thinking, but with limited iss. Apply limited or barely effective organizational six. Apply limited or barely effective organizational six of command of knowledge and skills bilities, logical and coherent thinking. Shot presentational skills are minimally effective organizational skills are	kills required for attaining most diogical thinking, and ability to a national skills.  uired for attaining some of the coanalytical and critical abilities. Shi tional and presentational skills.  required for attaining the course ow very little or no ability to apport or ineffective.  Weighting in final course grade (%)  30  30  40  Keras & TensorFlow: Co	of the course learning apply knowledge to most burse learning outcomes. ow limited ability to apply learning outcomes. Lack ply knowledge to solve  No. of Hours  36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 CLO 3,4	

STAT4610	Bayesian learning (6 credits)	Academic Year	2021
Offering Department	Statistics & Actuarial Science	Quota	
Course Co-ordinator	Prof G Yin, Statistics & Actuarial Science (gyin@hku.hk)		

		(Prof G Yin, Statistics & Actuarial Science) This course aims to introduce Bayesian methodologies and computational techniques of Markov Chain Monte				
Course Objectives		rse aims to introduce Bathods, and applications in		tational techniques of Ma	arkov Chain Monte	
Course Contents & Topics	This course covers the fundamental Bayesian formulation, prior elicitation, posterior inference. For Markov Chain Monte Carlo methods, the contents include the Gibbs sampler, the Metropolis-Hastings algorithm, approximate Bayesian computation, the Hamiltonian Monte Carlo algorithm. For more advanced Bayesian modeling, hierarchical models and nonparametric Bayes are covered.					
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1	generate samples	from any distribution			
	CLO 2	5				
	CLO 3	apply MCMC meth	ods to real problems			
	CLO 4	develop nonparam	etric Bayesian models			
	CLO 5	apply Bayesian me	thods in machine learning tasks			
Pre-requisites (and Co-requisites and Impermissible combinations)			or STAT3603 or STAT3902			
Offer in 2021 - 2022		fer in 2022 - 2023 : Y		Examination		
Grade Descriptors (A+ to F)	A	learning outcomes. Show st	stery at an advanced level of extensive kno trong analytical and critical abilities and logic ide range of complex, familiar and unfamili	al thinking, with evidence of orig	inal thought, and ability	
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.					
	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.					
			pilities, logical and coherent thinking. Show	very little or no ability to app		
intensive Course	N	problems. Organization and	pilities, logical and coherent thinking. Show	very little or no ability to app		
intensive Course Course Type			pilities, logical and coherent thinking. Show	very little or no ability to app		
intensive Course Course Type Course Teaching		problems. Organization and pased course	pilities, logical and coherent thinking. Show	very little or no ability to app	ly knowledge to solve	
intensive Course Course Type Course Teaching	Lecture-b	problems. Organization and pased course	oilities, logical and coherent thinking. Show presentational skills are minimally effective o	very little or no ability to app	ly knowledge to solve	
intensive Course Course Type Course Teaching	Lecture-b Activitie Lectures Tutorials	problems. Organization and pased course s	oilities, logical and coherent thinking. Show presentational skills are minimally effective o	very little or no ability to app	ly knowledge to solve  No. of Hours	
intensive Course Course Type Course Teaching	Lecture-b Activitie Lectures Tutorials	problems. Organization and pased course s	oilities, logical and coherent thinking. Show presentational skills are minimally effective o	very little or no ability to app	No. of Hours	
Communication- intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting	Lecture-b Activitie Lectures Tutorials	problems. Organization and pased course s	presentational skills are minimally effective of the presentational skills are minimally effective of the presentational skills are minimally effective of the presentation of the present	very little or no ability to app	No. of Hours 36 12 100 Assessment Methods	
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Lecture-b Activitie Lectures Tutorials Reading	problems. Organization and passed course s	pilities, logical and coherent thinking. Show presentational skills are minimally effective o	very little or no ability to apprineffective.	No. of Hours 36 12 100 Assessment	

STAT4710	Capstone experience for statistics undergraduates (6 credits)	Academic Year	2021			
Offering Department	Statistics & Actuarial Science Quota 50					
Course Co-ordinator	Prof G Yin, Statistics & Actuarial Science (ug_enquiry@saas.hku.hk)					
Teachers Involved	(Various teachers as the assessors of oral presentations and written reports, Statistics & Actuarial Science)					
Course Objectives	This project-based course aims to provide students with capstone experience to formulate and investigate real life problems in the area of statistics, risk management, finance, climate, social science, medicine and scientific research by integrating and applying the statistical theories and quantitative techniques learnt in their junior university years.					
Course Contents & Topics	No formal teaching. Students are expected to devote 120-140 hours working or groups of three to five under the supervision of a teacher. Students are requivered two to three weeks before the end of the semester, and submit their final rule it aims to help the students to establish a good and solid foundation of life-	ired to give a preseport at the end of	sentation on their the semester.			
	students to equip with hands-on experience in solving real life problems stavariable(s) of interest, literature search, model formulation, data analysis or sin presentation of the results. Students will need to find an interesting topic of regarding the most recent research related to the problem, make suggestions even solve the problem identified in their project.	nulation, technical their own, conduct	report writing and literature search			
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 formulate a problem using statistical or risk management ideas for a particular issue we are facing with and determine ways in which statistics/risk management can be used to solve the problems or to make predictions					
	CLO 2 integrate theory and practice, and to understand limitations of their curre	ent knowledge				
	CLO 3 work in a team and to collaborate with people with different background					
	CLO 4 express ideas effectively in both written and oral forms					
	CLO 5 develop further logical, critical thinking, creativity, technical report writin skills	g, communication	and consultation			
	CLO 6 advocate to others the appreciation of statistics/risk management as to its relevance to our daily life					
Pre-requisites (and Co-requisites and Impermissible	Students are expected to have satisfactorily completed at least 24 credits of advanced level disciplinary core/elective courses in the Decision Analytics/Risk Management/Statistics Majors. Students who are interested in taking the course should submit their applications to the Department.					
combinations)	This capstone course is only for students majoring in Decision Analytics/R mutually exclusive with STAT3799, STAT4766 and STAT4799.  The earliest that a student is allowed to take this capstone course is their year 3		Statistics, and is			
	· · · · · · · · · · · · · · · · · · ·					

Offer in 2021 - 2022	Y 19	st sem 2nd sem Of	fer in 2022 - 2023 : Y	Examination	No Exam		
Grade Descriptors (A+ to F)	A	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.					
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.					
	С	outcomes. Show evider	out incomplete command of knowledge and since of some analytical and critical abilities and moderately effective organizational and preservational and preservations and preservations are also and preservations and preservations and preservations are also and preservations are also and preservations are also and preservations and preservations are also and preservations are also and preservations are also and preservations are also and preservations are also and preservations are also and preservations are also and preservations are also and preservations are also and preservations are also and preservations are also and preservations are also and preservations are also and preservations are also and preservations are also also and preservations are also are also and preservations are also are also also and also are also also are also	I logical thinking, and ability to a			
	D	Show evidence of some	limited command of knowledge and skills reques coherent and logical thinking, but with limited ablems. Apply limited or barely effective organiza	analytical and critical abilities. Sho			
	Fail	of analytical and critical	evidence of command of knowledge and skills al abilities, logical and coherent thinking. Sho and presentational skills are minimally effective	w very little or no ability to app			
Communication-	N	., ,					
intensive Course							
intensive Course Course Type	Project-l	based course					
Course Type Course Teaching	Project-l		Details		No. of Hours		
Course Type	Activiti		<b>Details</b> Tutorials, group work/project, rea	ding/self-study	No. of Hours		
Course Type Course Teaching	Activiti	<b>es</b> g / Self study		ding/self-study  Weighting in final course grade (%)			
Course Type Course Teaching & Learning Activities Assessment Methods	Activitie Reading Method	<b>es</b> g / Self study	Tutorials, group work/project, rea	Weighting in final	120 Assessment Methods		
Course Type Course Teaching & Learning Activities Assessment Methods	Activitie Reading Method	<b>es</b> g / Self study <b>ls</b>	Tutorials, group work/project, rea  Details  oral presentation, progress, attendance, and in-class	Weighting in final course grade (%)	120 Assessment Methods to CLO Mapping		
Course Type Course Teaching & Learning Activities Assessment Methods	Activitic Reading Method	es g / Self study ls esentation ch report cific list of textbooks a	Tutorials, group work/project, rea  Details  oral presentation, progress, attendance, and in-class discussion	Weighting in final course grade (%)  50  50  ged to obtain information v	Assessment Methods to CLO Mapping CLO 1,2,3,4,5,6 CLO 1,2,3,4,5,6		

STAT4711	Capstone exp	erience for actuarial science undergradua	tes (6	Academic Year	2021
Offering Department	Statistics & Actu	arial Science		Quota	50
Course Co-ordinator		stics & Actuarial Science (ug_enquiry@saas.hku.hk)			
Teachers Involved		s as the assessors of oral presentations and written		atistics & Actuarial	Science)
Course Objectives	problems in actu years. It aims to students to equ	ed course aims to provide students with capstone ex arial science by integrating and applying actuarial th help the students to establish a good and solid for p with hands-on experience in solving practical p lution, and presentation of the results.	eories and undation o	techniques learnt of self-learning skill	in their universitys, and to enable
Course Contents & Topics	project. Student supervisor. Stud semester, and su Topics acceptab as life insurance also encouraged and/or industry serelevance to actu Students will ne	ng will be given for this course. Students are expess will work in groups of three to five under the ents are required to give a presentation on their walbmit their final report at the end of the semester. The for projects in this course can be related to any of pension, finance, investment, enterprise risk manal to suggest topics in non-traditional actuarial area supervisor. All topics for this course will be subject varial science.  The decide on the topic for a practical project, to the topic, and make suggestion on a solution of the	supervision ork two to fithe tradition agement a as provide to final approximation of the conduct in the conduc	on of a teacher and three weeks before the weeks before the control of the weeks before the weeks before actuarial areas and general insurand they can find a proval by the Department of the weeks	d/or an industry re the end of the s of practice such ice. Students are suitable teacher intruent to ensure
Course Learning		ompletion of this course, students should be able to:	•		,
Outcomes	solutions CLO 2 integrate CLO 3 work in a CLO 4 deliver a CLO 5 develop skills CLO 6 explain f	practical problem, discuss the issues faced by of the problems theoretical results and practical approaches, and to team and to collaborate with members with different ctuarial results effectively in a written report and in offurther logical, critical thinking, creativity, technical roo a non-actuarial audience the approaches of ac security system	specify lim t backgrou ral present eport writir	nitations of current of nd ations of communication	developments and consultation
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in at least 24 credits of advanced level disciplinary core/elective courses in BSc(Actuarial Science) programme including (Pass in STAT3901, or already enrolled in this course; or Pass in STAT3909, or already enrolled in this course); and This capstone course is only for BSc(Actuarial Science) students, and is mutually exclusive with STAT4767 and STAT4798.  The earliest that a student is allowed to take this capstone course is their year 3 study.				
Offer in 2021 - 2022	Y 1st sem	2nd sem Offer in 2022 - 2023 : Y		Examination	No Exam
Grade Descriptors (A+ to F)	learnir to app preser  B Demo learnir and sc  C Demo outcor	nstrate thorough mastery at an advanced level of extensive kry outcomes. Show strong analytical and critical abilities and logily knowledge to a wide range of complex, familiar and unfamiliatational skills.  Instrate substantial command of a broad range of knowledge an goutcomes. Show evidence of analytical and critical abilities and me unfamiliar situations. Apply effective organizational and presenstrate general but incomplete command of knowledge and sees. Show evidence of some analytical and critical abilities and ristuations. Apply moderately effective organizational and presens instituations. Apply moderately effective organizational and presense instituations.	ical thinking, iliar situations d skills requint I logical thinkientational skil kills required I logical think	with evidence of originals. Apply highly effective and for attaining at leasing, and ability to apply s. for attaining most of ing, and ability to apply ing, and ability to apply ing, and ability to apply ing, and ability to apply ing.	al thought, and ability e organizational and at most of the course knowledge to familian the course learning

		of some coherent and logical thinking, but with limited and live problems. Apply limited or barely effective organizatio		ow limited ability to apply
	of analytical and	e or no evidence of command of knowledge and skills re d critical abilities, logical and coherent thinking. Show ization and presentational skills are minimally effective or	very little or no ability to app	
Communication- intensive Course	N			
Course Type	Project-based course			
Course Teaching	Activities	Details	Details	
& Learning Activities	Reading / Self study	Tutorials, group work/project, readii	Tutorials, group work/project, reading/self-study	
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Oral presentation	oral presentation, progress, attendance and in-class discussion	50	CLO 1,2,3,4,5,6
	Research report	written report	50	CLO 1,2,3,4,5
Course Website	http://moodle.hku.hk			

Course Website	mup.//moodi	e.iiku.iik				
STAT4766	Statistics	internship (6 cred	its)	Academic Ye	ar 2021	
Offering Department	Statistics &	Actuarial Science	,	Quota		
Course Co-ordinator	Dr C W Kwa	an, Statistics & Actuari	al Science <i>(cwkwan@hku.hk)</i>			
Teachers Involved			s of oral presentations and writter			
Course Objectives	take on a m	ninimum of 160 hours operience in the applic	majoring in Decision Analytics/Ris of internship work related to his/l ations of academic knowledge in a	her major disciplines. It pro a real-life work environmen	ovides students with	
Course Contents & Topics	his/her inte	Upon completion of the internship, each student is required to submit a written report and to give a presentation on his/her internship experience. The report should emphasize important working/educational experiences encountered by the student during his/her internship. In many situations, this would mean a report of the project(s) that the student has been involved in during his/her internship.  On successful completion of this course, students should be able to:				
Course Learning Outcomes	CLO 1 gain CLO 2 appl	first-hand work exper	ourse, students should be able to ience in an industry related to dec ion analytics, risk management of	ision analytics, risk manage		
	CLO 3 unde	•	pecific quantitative skills develope	d in basic decision analytic	s, risk managemen	
	worl	k environment	nowledge in decision analytics, ris			
Pre-requisites (and Co-requisites	Managemer	nt/Statistics Majors.	dvanced level disciplinary core/el		·	
and Impermissible combinations)	mutually exc	clusive with STAT4710	r students majoring in Decision  . red to take this capstone course is	,	nt/Statistics; and is	
Offer in 2021 - 2022			ner Offer in 2022 - 2023 : Y	Examination	No Exam	
Grade Descriptors Distinction/Pass/Fail	Distincti on	Distincti  Demonstrates excellent ability in applying knowledge to solve problems in the workplace. Demonstrates excellent				
	Pass Fail	Able to apply knowledge to solve problems in the workplace. Successfully handles and carries out the work required in the job or assigned by supervisor(s). Establishes effective collaboration and communication with supervisor(s), colleagues, and clients in the job. Successfully fulfills the requirements set out in the Course Description regarding working hours, written and oral report, and evaluation by supervisor(s), etc. Students demonstrating excellent performance in the above would be awarded a grade of "Distinction".				
Communication-	N	report, or evaluation by so	upervisor(s), etc.			
intensive Course Course Type	Internship					
Course Type Course Teaching	Activities		Dotaile		No. of Hours	
& Learning Activities		vork	Details it is expected that students are to work at least 160 hours (or equivalent to 4 weeks full-time)		160	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
			oral presentation and in-class discussion	40	CLO 1,2,3,4	
			written report	60	CLO 1,2,3,4	
Course Website Additional Course Information	Upon comp presentation during the ir student base	CLO 1,2,3,4   Close requirements   Close requirem				

STAT4767	Actuarial	science internship	o (6 credits)	Academic Ye	ar 2021		
Offering Department	Statistics &	Actuarial Science	· ·	Quota			
Course Co-ordinator	Dr K P Wat,	Statistics & Actuarial	Science (watkp@hku.hk)				
Teachers Involved	(Various tea	chers as the assessor	rs of oral presentations and written	reports, Statistics & Actuar	al Science)		
Course Objectives	objective is	for a student to compl	al science students who take on a ete this course as a project based	on his/her internship.	'		
Course Contents & Topics	encountered	This course will include a written report which should emphasize important working/ educational experiences encountered by the student during his/her internship. In many situations, this would mean a report of the project(s) hat the student has been involved in during his/her internship.					
Course Learning	On success	ful completion of this of	course, students should be able to:				
Outcomes	CLO 1 ga	ain practical experienc	es during internship				
	CLO 2 de	escribe basic actuarial	practices learned during the intern	nship			
	CLO 3 ex	xplain how actuarial th	eories learned in University can be	e applied in practice			
	CLO 4 pr	rovide context for spec	cific technical skills developed in ba	asic actuarial courses			
Pre-requisites (and Co-requisites and Impermissible combinations)	programme This capsto	Pass in at least 24 credits of advanced level disciplinary core/elective courses in BSc(Actuarial Science) programme including STAT3901; and This capstone course is only for BSc(Actuarial Science) students; and is mutually exclusive with STAT4711. The earliest that a student is allowed to take this capstone course is their year 3 study.					
Offer in 2021 - 2022	Y 1st se	em 2nd sem Offer	in 2022 - 2023 : Y	Examination	No Exam		
Grade Descriptors Distinction/Pass/Fail	Distincti on	newfarmance in bondling and counting out the west required in the ich or accioused by automicay(a). Catablishes highly					
	Pass  Able to apply knowledge to solve problems in the workplace. Successfully handles and carries out the work required in the job or assigned by supervisor(s). Establishes effective collaboration and communication with supervisor(s), colleagues, and clients in the job. Successfully fulfills the requirements set out in the Course Description regarding working hours, written and oral report, and evaluation by supervisor(s), etc. Students demonstrating excellent performance in the above would be awarded a grade of "Distinction".						
	Fail  Very limited or no ability to solve problems in the workplace. Fails to handle or carry out the work required in the job or assigned by supervisor(s). Fails to establish effective collaboration or communication with supervisor(s), other colleagues, or clients in the job. Fails to satisfy the requirements set out in the Course Description regarding working hours, written and oral report, or evaluation by supervisor(s), etc.						
Communication- intensive Course	N						
Course Type	Internship						
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Internship v	vork	it is expected that students are t or 120 working days	o work at least 6 months	960		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Oral preser	ntation	oral presentation and in-class discussion	40	CLO 1,2,3,4		
	Written report		written report	60	CLO 1,2,3,4		
Course Website	http://moodl	e.hku.hk					
Additional Course Information	employer/di Satisfactory be recorded interested to Enrolment of	rect supervisor is requision of this cound on the student's trace enrol in this course soft this course is not course is not course.	sessment component, the comple ired for passing the course. urse can be counted towards the Conscript. This course will be assesse hould contact the Department to onducted via the online course selest after approval has been obtained	Capstone requirement. Det ssed on "Pass/Fail" basis. btain the approval. ection system and should b	ails of internship will Students who are e made through the		

STAT4798	Statistics and actuarial science project (6 credits)	Academic Year	2021				
Offering Department	Statistics & Actuarial Science	Quota	50				
Course Co-ordinator	Prof S M S Lee, Statistics & Actuarial Science (smslee@hku.hk)						
Teachers Involved	(Various teachers as the assessors of oral presentations and written reports	Statistics & Actuarial	Science)				
Course Objectives		Each year a few projects suitable for Actuarial Science students will be offered to provide students with practical experience in approaching a real problem, in report writing and in oral presentation.					
Course Contents & Topics	These projects, under the supervision of individual staff members, involve the applications of statistics and/or probability in a wide range of problems of practical and/or academic interests.						
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 formulate meaningful research problems						
	CLO 2 learn and apply advanced techniques in probability and/or statistics	to solve real life prob	lems				
	CLO 3 summarize and present research findings in a professional manner						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in at least 24 credits of advanced level disciplinary core/electiv programme including STAT3902 and STAT3907; and Pass or already enrolled in at least one of the following courses: STAT3911 This capstone course is only for BSc(Actuarial Science) students; and subjet This course is mutually exclusive with STAT4711.	, STAT4602, STAT490 ct to the consent of co	)4; and				
Offer in 2024 2022	The earliest that a student is allowed to take this capstone course is their ye		Na Evana				
Offer in 2021 - 2022 Grade Descriptors (A+ to F)	Y 1st sem 2nd sem Offer in 2022 - 2023 : Y  Demonstrate thorough grasp of the subject. Show strong analytical and critical original thought. Insightful use and critical analysis / evaluation of information dr to quote/reference aptly. Critical use of data and results to draw appropriate a organizational and presentational skills. [Work of A+ should show considerable areas relevant to the topic.]	awn from a full range of high and insightful conclusions. A	h quality sources and Apply highly effective				
	B Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Critical use of relevant information from sources, showing ability to make meaningful comparisons between different secondary interpretations and to quote/reference aptly. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.						
	C Demonstrate general but incomplete grasp of the subject. Evidence of some an Use of relevant information from sources, showing ability to make compar						

			stly correct but some erroneous use of izational and presentational skills.	data and results to draw appro	opriate conclusions. Apply			
	D	logical thinking, but with I through summary rather the	nited grasp, with retention of some relevant mited analytical and critical abilities. Dem an analysis and comparison. Limited abili ctive organizational and presentational skil	onstrate use and reference of s by to use data and results to dra	everal sources, but mainly			
	Fail							
Communication- intensive Course	N							
Course Type	Project-ba	ased course						
Course Teaching	Activities		Details	No. of Hours				
& Learning Activities	Reading / Self study				120			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Oral pres	entation	oral presentation & in-class discussion	40	CLO 1,2,3			
	Research	report	written report	60	CLO 1,2,3			
Course Website	http://mod	dle.hku.hk						
Additional Course Information	Approval	is subject to past acade	emic performance.					

STAT4799	Statistic	cs project (12 cred	dits)	Academic Yo	ear 2021			
Offering Department	Statistics	tistics & Actuarial Science Quota 50						
Course Co-ordinator	Prof S M	Prof S M S Lee, Statistics & Actuarial Science (smslee@hku.hk)						
Teachers Involved	(Various t	(Various teachers as the assessors of oral presentations and written reports, Statistics & Actuarial Science)						
Course Objectives	offered to	Each year a few projects suitable for students majoring in Decision Analytics/ Risk Management/ Statistics will be offered to provide students with practical experience in approaching a real problem, in report writing and in oral presentation.						
Course Contents & Topics		These projects, under the supervision of individual staff members, involve the applications of statistics and/or probability in a wide range of problems of practical and/or academic interests.						
Course Learning Outcomes	On succe CLO 1 ga CLO 2 de st CLO 3 w	On successful completion of this course, students should be able to: CLO 1 gain first-hand experience in solving a research or applied problem in statistics or related areas CLO 2 develop skills in important technical tools, including the use of computer software or programs, for typical statistical research and data analyses CLO 3 write succinct reports on the findings of a research study						
		•	sentation of the findings of a research	•				
Pre-requisites (and Co-requisites and Impermissible combinations)	Managem Pass or a and Not for stu This caps to the con This cours	Not for students who have already enrolled in STAT3799 in this academic year. This capstone course is only for students majoring in Decision Analytics/Risk Management/Statistics; and subject to the consent of course coordinator. This course is mutually exclusive with STAT4710.						
Offer in 2021 - 2022		ar long Offer in 2022	lowed to take this capstone course is	Examination	No Exam			
Grade Descriptors (A+ to F)	B C	original thought. Insightf to quote/reference aptly organizational and prese areas relevant to the top Demonstrate substantia relevant information fror and to quote/reference presentational skills.  Demonstrate general bu	grasp of the subject. Show strong analytical a ulu use and critical analysis / evaluation of inform. Critical use of data and results to draw app entational skills. [Work of A+ should show con ic.] if grasp of the subject. Evidence of analytical m sources, showing ability to make meaningful aptly. Correct use of data of results to draw apput ut incomplete grasp of the subject. Evidence o ation from sources, showing ability to make Wostly correct but some erroneous use of dranizational and presentational skills. limited grasp, with retention of some relevant in	mation drawn from a full range or opriate and insightful conclusion siderable additional work beyond and critical abilities and logical comparisons between different oppropriate conclusions. Apply efforms and critical abilities and critical abilities and critical abilities and critical abilities are comparisons between different at and results to draw appropriate and results to draw appropriate control of the comparisons between different and results to draw appropriate control of the critical and results to draw appropriate control of the critical and results to draw appropriate control of the critical and results to draw appropriate control of the critical and results to draw appropriate control of the critical and results to draw appropriate control of the critical and the c	f high quality sources and ns. Apply highly effective d that is required in wider I thinking. Critical use of secondary interpretations fective organizational and lities and logical thinking. It interpretations and to oriate conclusions. Apply			
	Fail	logical thinking, but with through summary rather Apply limited or barely e Demonstrate evidence analytical and critical al	n limited analytical and critical abilities. Demoi than analysis and comparison. Limited ability ffective organizational and presentational skills of little or no grasp of the knowledge and un bilities, logical and coherent thinking. Limited and results and/or unable to draw appropriate	nstrate use and reference of se to use data and results to draw. nderstanding of the subject. Ev use of secondary sources and	veral sources, but mainly appropriate conclusions idence of little or lack of no critical comparison of			
Communication- Intensive Course	N							
Course Type	Project-ba	ased course						
Course Teaching	Activities	S	Details		No. of Hours			
& Learning Activities	Reading	/ Self study	the student is expected to m supervisor regularly in the course		240			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Dissertati	ion	written report	60	CLO 1,2,3			
	Dissertati Oral pres		written report oral presentation & in-class discussion	60 40	CLO 1,2,3 CLO 1,2,4			
	Oral pres		oral presentation & in-class					

Information

Statistics 8			0 1			
TBC, Stati		Risk theory II (6 credits) Statistics & Actuarial Science Quota				
TBC, Statistics & Actuarial Science ()						
This course is an advanced course in risk theory which extends various topics discussed in STAT3906. It discusses utility theory, ruin theory, aggregate claims process, and related topics.						
coefficient Poisson p	; Lundbergs inequ rocess; inflation m	ality; Tijms approximation; non-homoger nodel; IBNR (Incurred But Not Reported)	neous birth process; conta	gion model; mixed		
CLO 1 ur ar	iderstand utility the id utility maximizat	eory including some commonly used utilition	y functions, Jensens inequ	ıality, risk aversior		
			Tijms approximation in rui	n theory		
		<u> </u>	• •			
CLO 6 un	derstand mixed Po	oisson process and its applications includ	ing the inflation model and	•		
		,				
N Offe	er in 2022 - 2023 :	N	Examination			
A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.						
B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.						
Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.						
Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.						
Pail Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.						
N						
Lecture-ba	ased course					
	•	Details		No. of Hours		
				36		
	0-16-4			12		
	Self study			100		
Methods		Details	weighting in final course grade (%)	Assessment Methods to CLO Mapping		
Assignme	ents	Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3,4,5,6		
		One 3-hour written examination	75	CLO 1,2,3,4,5,6		
edition). Kaas R., (Bowers N edition). Willmot G	Klugman S.A., Panjer H.H., & Willmot G.E.: Loss Models: From Data to Decisions (John Wiley & Sons, 2007, 3rd edition). Kaas R., Goovaerts M., Dhaene J., & Denuit M.: Modern Actuarial Risk Theory (Springer, 2004, 1st edition). Bowers N.L., Gerber H.U., Hickman J.C. & Jones D.A.: Actuarial Mathematics (Society of Actuaries, 1997, 2nd					
	coefficient Poisson p moments; On success CLO 1 uran aran CLO 2 de CLO 3 ca CLO 4 uran CLO 5 uran CLO 6 uran CLO 7 de Pass in STA A Signment Pass In STA Activities Lectures Tutorials Reading / Methods  Assignment Klugman Sedition). Kaas R., On Sedition Sedition Standard Company Willmot Company Springer, S	coefficient; Lundbergs inequeroisson process; inflation moments; equilibrium distrib On successful completion of CLO 1 understand utility the and utility maximizat CLO 2 define discrete and of CLO 3 calculate the adjustin CLO 4 understand the effect CLO 5 understand mixed Poly CLO 7 derive the relationsh Pass in STAT3906  N Offer in 2022 - 2023: A Demonstrate thorough learning outcomes. So to apply knowledge presentational skills. B Demonstrate substant learning outcomes. So and some unfamiliar C Demonstrate genera outcomes. Show evidemees. Show evidemee of so knowledge to solve problems. Organizati N Lecture-based course Activities Lectures Tutorials Reading / Self study Methods  Examination Klugman S.A., Panjer H.H., edition). Kaas R., Goovaerts M., Dha Bowers N.L., Gerber H.U., edition). Willmot G.E. & Lin X.S.: Lin M.S.:	coefficient; Lundbergs inequality; Tijms approximation; non-homoger Poisson process; inflation model; IBNR (Incurred But Not Reported) moments; equilibrium distributions.  On successful completion of this course, students should be able to: CLO 1 understand utility theory including some commonly used utility and utility maximization  CLO 2 define discrete and continuous ruin models  CLO 3 calculate the adjustment coefficient, Lundbergs inequality and CLO 4 understand the effect of reinsurance and change of parameter of clo 5 understand non-homogeneous birth process and its application includ CLO 6 understand mixed Poisson process and its applications includ CLO 7 derive the relationship between stop-loss moments and equility Pass in STAT3906  N Offer in 2022 - 2023: N  A Demonstrate thorough mastery at an advanced level of extensive known learning outcomes. Show strong analytical and critical abilities and logic to apply knowledge to a wide range of complex, familiar and unfamility presentational skills.  B Demonstrate substantial command of a broad range of knowledge and skoutcomes. Show evidence of analytical and critical abilities and learning outcomes. Show evidence of analytical and critical abilities and learning outcomes. Show evidence of analytical and critical abilities and learning outcomes. Show evidence of analytical and critical abilities and learning outcomes. Show evidence of analytical and critical abilities and learning outcomes. Show evidence of analytical and critical abilities and learning outcomes. Show evidence of some analytical and critical abilities and learning outcomes. Show evidence of some analytical and critical abilities and learning outcomes. Show evidence of some analytical and critical abilities have a command of knowledge and skills required by the strong of the strong of the strong of the strong of the strong of the strong of the strong of the strong of the strong of the strong of the strong of the strong of the strong of the strong of the strong of the strong of the strong o	On successful completion of this course, students should be able to:  CLO 1 understand utility theory including some commonly used utility functions, Jensens inequand utility maximization  CLO 2 define discrete and continuous ruin models  CLO 3 calculate the adjustment coefficient, Lundbergs inequality and Tijms approximation in rui  CLO 4 understand the effect of reinsurance and change of parameters on ruin probability  CLO 5 understand non-homogeneous birth process and its applications as contagion models for  CLO 6 understand mixed Poisson process and its applications including the inflation model and  CLO 7 derive the relationship between stop-loss moments and equilibrium distributions  Pass in STAT3906  N Offer in 2022 - 2023 : N  Examination  A bemonstrate thorough mastery at an advanced level of extensive knowledge and skills required for a learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of origin to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effect presentational skills.  B bemonstrate substantial command of a broad range of knowledge and skills required for attaining at the learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to app and some unfamiliar situations. Apply effective organizational and presentational skills.  C bemonstrate partial but limited command of knowledge and skills required for attaining most outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to app and some unfamiliar situations. Apply medically effective organizational and presentational skills.  D bemonstrate partial but limited command of knowledge and skills required for attaining most outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show evidence of some coh		

STAT4902	Selected	d topics	in actuarial	science (	(6 credits)		Academic Year	2021
Offering Department	Statistics 8	Statistics & Actuarial Science					Quota	
Course Co-ordinator	Dr J T Y V	Wong, Sta	atistics & Actua	rial Science	(jefftywong	@hku.hk)		
Teachers Involved	(Dr J T Y \	Wong,Sta	atistics & Actua	rial Science	<del>)</del>			
Course Objectives	students v	This course is an advanced course in actuarial science which discusses selected topics which potential graduate students will find useful. It focuses on tools that are in the frontier of actuarial risk management with examples on applications.						
Course Contents & Topics	Enterprise	The contents will be chosen from the following topics:  Enterprise risk management; Risk identification and taxonomy; Copulas; Extreme value theory; Applications to risk management with emphasis in insurance; Other topics as determined by the instructor						
Course Learning	On succes	essful com	pletion of this o	course, stud	lents should	be able to:		
Outcomes	CLO 1	unde	rstand, identify	and classif	y different ty	pes of risks		
	CLO 2	CLO 2 understand and apply copula to model risk dependence						
	CLO 3	CLO 3 understand and apply extreme value theory						
	CLO 4 explain approaches for managing risks							
Pre-requisites (and Co-requisites	Pass in S	STAT3906						

combinations)											
Offer in 2021 - 2022	Y 2nd	sem Offer in 2022 -	2023 : N	Examination	May						
Grade Descriptors (A+ to F)	A	learning outcomes. Show	astery at an advanced level of extensive kn strong analytical and critical abilities and logic wide range of complex, familiar and unfamil	cal thinking, with evidence of ori	ginal thought, and ability						
	В	learning outcomes. Show	command of a broad range of knowledge and evidence of analytical and critical abilities and tions. Apply effective organizational and prese	logical thinking, and ability to ap							
	С	outcomes. Show evidence	t incomplete command of knowledge and skee of some analytical and critical abilities and moderately effective organizational and present	logical thinking, and ability to a							
	D	Show evidence of some of	mited command of knowledge and skills requi coherent and logical thinking, but with limited a ems. Apply limited or barely effective organizati	nalytical and critical abilities. Sho							
	Fail	of analytical and critical	vidence of command of knowledge and skills r abilities, logical and coherent thinking. Show and presentational skills are minimally effective	w very little or no ability to ap							
Communication- intensive Course	N	· · · · · · · · · · · · · · · · · · ·									
Course Type	Lecture-ba	ased course			Lecture-based course						
Course Teaching	Activities		I								
Course reaching	Activities	5	Details		No. of Hours						
	Activities Lectures	3	Details		No. of Hours 36						
		5	Details								
	Lectures Tutorials	Self study	Details		36						
& Learning Activities  Assessment Methods and Weighting	Lectures Tutorials	/ Self study	Details	Weighting in final course grade (%)	36 12						
& Learning Activities  Assessment Methods	Lectures Tutorials Reading /	/ Self study			36 12 100 Assessment Methods						
& Learning Activities  Assessment Methods	Lectures Tutorials Reading / Methods	/ Self study ents	Details  Coursework (assignments,	course grade (%)	36 12 100 Assessment Methods to CLO Mapping						
& Learning Activities  Assessment Methods and Weighting	Lectures Tutorials Reading / Methods  Assignme Examinat - Financia - Actuarial	/ Self study ents ion I Enterprise Risk Mana I Theory for Dependen	Details  Coursework (assignments, tutorials and class test(s))	course grade (%)  25  75  niversity Press, 2017, 2nd erts M., Kaas R., (Wiley, 2	36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 edition) 2005, 1st edition)						

STAT4903	Actuarial te	chniques for general insurance	(6 credits)	Academic Year	2021		
Offering Department	Statistics & Ac	uarial Science	· ·	Quota			
Course Co-ordinator	Dr A G Bench	Or A G Benchimol, Statistics & Actuarial Science (benchi@hku.hk)					
Teachers Involved	(Dr A G Bench	mol,Statistics & Actuarial Science)	•				
Course Objectives	liabilities for g	f this course is to develop knowledge eneral insurance. Application of the ac I. The course also provides general kn is will acquire the fundamental conce culations.	tuarial techniques to resol nowledge on the general in	ve general insura surance markets i	nce problems wi n Hong Kong an		
Course Contents & Topics	1. General Ins- Introduction Regulations 2. Basic techr How to read Ratemaking Ratemaking Calculate the Pure premiu Loss ratio m Rating differ Consideratio 3. Estimating Data require Build and ar Reserving te Consideratic Estimate rec Appraise an	urance Markets in Hong Kong, Taiwar of general insurance markets on general insurance iques for ratemaking and use manual rate pages related to exposures related to premiums related to loss and loss adjustment expended with the control of the con	penses xpenses Insurance				
Course Learning	On successful	completion of this course, students she	ould be able to:				
Outcomes		erstand the feature and underlying risk		ucts			
		ulate the premium rate for basic gener mate the claims liabilities for general ir					
Dra raguiaitas		ū	isurance products				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in STAT	900					
Offer in 2021 - 2022	Y 1st sem	Offer in 2022 - 2023 : Y		Examination	Dec		
Grade Descriptors (A+ to F)	lear to a	nonstrate thorough mastery at an advanced le ning outcomes. Show strong analytical and criti pply knowledge to a wide range of complex, entational skills.	cal abilities and logical thinking, v	with evidence of origina	al thought, and ability		

	В	learning outcomes. Show ev	mmand of a broad range of knowledge and vidence of analytical and critical abilities and ons. Apply effective organizational and preser	logical thinking, and ability to ap	
	С	Demonstrate general but i outcomes. Show evidence	ncomplete command of knowledge and sk of some analytical and critical abilities and oderately effective organizational and present	ills required for attaining most logical thinking, and ability to a	
	D	Show evidence of some col	ited command of knowledge and skills requinerent and logical thinking, but with limited ares. Apply limited or barely effective organizations.	nalytical and critical abilities. She	ourse learning outcomes. ow limited ability to apply
	Fail	Demonstrate little or no evid of analytical and critical al	dence of command of knowledge and skills re bilities, logical and coherent thinking. Show presentational skills are minimally effective of	equired for attaining the course very little or no ability to ap	
Communication- intensive Course	N	· ·	·		
Course Type	Lecture-ba	ased course			
Course Teaching	Activities	3	Details		No. of Hours
& Learning Activities	Lectures				36
	Tutorials				12
	Reading /	/ Self study			100
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignme	ents	Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3
	Examinat	ion	One 3-hour written examination	75	CLO 2,3
Required/recommended reading and online materials	2010		d Claims Using Basic Techniques, C Ratemaking, Casualty Actuarial Soc	,	
Course Website	http://moo	dle.hku.hk			
Additional Course Information	References: Actuarial Standard Board of the American Academy of Actuaries, Actuarial Standard of Practice No. 13, Trending Procedures in Property/Casualty Insurance Ratemaking American Academy of Actuaries Committee on Risk Classification, Risk Classification Statement of Principles, June 1980				
	Casualty I Feldblum, PCAS LXX	Insurance Ratemaking, ( S., Personal Automobil XXIII, 1996, pp. 190-256	uittee on Ratemaking Principles, Sta Casualty Actuarial Society, May 198 le Premiums: An Asset Share Pricin 6 (excluding Secions 7-9) ersonal Automobile Manual (Effectiv	8 ng Approach for Property-	Casualty Insurance,

STAT4904	Statist	ical learning for risk n	nodelling (6 credits)	Academic Year	2021		
Offering Department	Statistic	s & Actuarial Science	<u> </u>	Quota			
Course Co-ordinator	Dr C Wa	Or C Wang, Statistics & Actuarial Science (stacw@hku.hk)					
Teachers Involved	(Dr C W	ang,Statistics & Actuarial S	Science)				
Course Objectives	have a f useful p	To make sense of the vast and complex data sets that have emerged in insurance and finance, it is essential to have a firm understanding of the basic statistical modelling and prediction techniques. This course introduces some useful predictive analytics techniques, such as principal component analysis, naive Bayes classification, decision tree models, and cluster analysis. The R programming language will be used for actual implementation.					
Course Contents & Topics	methods boosting	Basics of statistical learning, cross-validation, linear model selection and regularization (subset selection, shrinkage methods, dimensional reduction methods), generalised linear model, tree-based methods (decision trees, bagging, boosting, random forests), principal component analysis, naive Bayes classification, cluster analysis (K-means clustering, hierarchical clustering)					
Course Learning	On succ	cessful completion of this co	ourse, students should be able to	):			
Outcomes	CLO 1	understand and apply a w	ride range of predictive analytics	techniques for risk modelling			
	CLO 2	apply the techniques by u	sing the R programming language	ge and interpret the outputs			
	CLO 3 recognize and compare the characteristics, strengths and weaknesses of different meth						
Pre-requisites (and Co-requisites and Impermissible combinations)	Not for s	Pass in STAT3907 or STAT3600; and Not for students who have passed in STAT3612, or already enrolled in this course; and For BSc(Actuarial Science) students only.					
Offer in 2021 - 2022	Y 2	nd sem Offer in 2022 - 20	023 : Y	Examination	May		
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.					
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.					
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	D						
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.						
Communication- intensive Course	N						
Course Type	Lecture-	-based course					
course rype	Activities		Details		No. of Hours		
<u> </u>	ACTIVITI	00			ito. Oi ilouis		
Course Teaching	Lecture	· · ·			36		
Course Type Course Teaching & Learning Activities		S					

and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments	Coursework (assignments, class test(s) and computer-based project (s))	25	CLO 1,2,3
	Examination	One 2-hour written examination	75	CLO 1,2,3
Required/recommended reading and online materials	An Introduction to Statistical Learn Springer	ning, with Applications in R, James, \	Witten, Hastie, Tibshirani,	2013, New York:
Course Website	http://moodle.hku.hk			

STAT7609	Research	n methods in statis	stics (6 credits)	Academic Ye	ear 2021		
Offering Department	Statistics 8	Quota					
Course Co-ordinator	Prof J J F	rof J J F Yao, Statistics & Actuarial Science (jeffyao@hku.hk)					
Teachers Involved		Prof J J F Yao, Statistics & Actuarial Science)					
Course Objectives	preparing	This course introduces some statistical concepts and methods which potential graduate students will find useful in preparing for work on a research degree in statistics. Focus is on applications of state-of-the-art statistical techniques and their underlying theory.					
Course Contents & Topics	(1) Basic theorems; (2) Parame signed like (3) Nonpa nonparame (4) Compu (5) Robust (6) U-statis (7) Other to	delta method; Edgewo etric and nonparametri lihood ratio statistics; e retric regression; densit tationally-intensive me methods: measures o stics, projection method opics as determined by	nference: sample quantiles; sign a y estimation; kernel methods. hthods: cross-validation; bootstrap; pa f robustness; M-estimator; L-estimateds. y the instructor.	mations. roximations; profile likelih and rank tests; Kolmog ermutation methods.	nood and its variants; gorov-Smirnov test;		
Course Learning			course, students should be able to:				
Outcomes			age and technicalities found in statist				
			standard mathematical tools for cond				
		,	rch tools to solve standard statistical				
		· · · · · · · · · · · · · · · · · · ·	me developments in contemporary st	tatistical research			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in ST	AT3600 or STAT3907					
Offer in 2021 - 2022	Y 1st s	sem Offer in 2022 - 2	2023 : Y	Examination	Dec		
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.						
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.					
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.						
Communication- intensive Course	N						
Course Type		sed course	- ·				
Course Teaching	Activities		Details	No. of Hours			
& Learning Activities	Lectures				36		
	Tutorials	0 15 1 1			12		
. ,	Reading /	Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme		Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3,4		
	Examination		One 2-hour written examination	75	CLO 1,2,3,4		
Required/recommended reading and online materials	Owen, A.B Shao, J. (1	. (2001). Empirical Lik 999). Mathematical St	<ol> <li>An Introduction to the Bootstrap elihood. Chapman &amp; Hall: Boca Rato atistics. Springer: New York. istics. Cambridge: Cambridge Univer</li> </ol>	n.	ork.		
		dle.hku.hk					

STAT7610	Advanced probability (6 credits)	Academic Year	2021		
Offering Department	Statistics & Actuarial Science	Quota			
Course Co-ordinator	Prof H L Yang, Statistics & Actuarial Science (hlyang@hku.hk)				
Teachers Involved	(Prof H L Yang, Statistics & Actuarial Science)				
Course Objectives	This course provides an introduction to measure theory and probability. The	course will focus	on some basic		

	concepts in theoretical probability which are important for students to do research in actuarial science, probability and statistics.					
Course Contents & Topics	Contents space, m	Contents include: sigma-algebra, measurable space, measure and probability, measure space and probability space, measurable functions, random variables, integration theory, characteristic functions, convergence of random variables, Hilbert spaces, conditional expectation, martingales.				
Course Learning	On successful completion of this course, students should be able to:					
Outcomes			ental measure theory and probability th			
	aı	nd dominated converg	ept of integration, understand the mon pence theorem t of conditional expectation	notone convergence theor	em, Fatou's Iemma	
Pre-requisites (and Co-requisites and Impermissible combinations)		CLO 4 have some elementary knowledge of martingale Pass in STAT3603 or STAT3903				
Offer in 2021 - 2022	Y 1st	t sem Offer in 2022 -	2023 : Y	Examination	Dec	
Grade Descriptors (A+ to F)	A	learning outcomes. Show	mastery at an advanced level of extensive know strong analytical and critical abilities and logic a wide range of complex, familiar and unfamili	cal thinking, with evidence of ori	ginal thought, and ability	
	В	learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.				
	С	C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.				
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.				
	Fail	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. L of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to so problems. Organization and presentational skills are minimally effective or ineffective.				
Camana	N			or menective.		
ntensive Course	<u> </u>			or menective.		
ntensive Course Course Type	Lecture-b	pased course		or inenective.	ply knowledge to solve	
ntensive Course Course Type Course Teaching	Lecture-b	s	Details	or menecuve.	ply knowledge to solve	
ntensive Course Course Type Course Teaching	Lecture-b Activities Lectures	es	Details	or menective.	No. of Hours	
intensive Course Course Type Course Teaching	Lecture-b  Activities Lectures Tutorials	es :	Details	or menective.	No. of Hours 36 12	
ntensive Course Course Type Course Teaching & Learning Activities	Lecture-b Activitie Lectures Tutorials Reading	/ Self study			No. of Hours 36 12 100	
Intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Lecture-b  Activities Lectures Tutorials	/ Self study	Details  Details	Weighting in final course grade (%)	No. of Hours 36 12	
Intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Lecture-b Activitie Lectures Tutorials Reading	os : : / Self study s		Weighting in final course grade (%)	No. of Hours 36 12 100 Assessment Methods to CLO 1,2,3,4	
intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Lecture-b Activitie Lectures Tutorials Reading Methods	es s d / Self study s	Details  Coursework (assignments,	Weighting in final course grade (%)	No. of Hours  36 12 100  Assessment Methods to CLO Mapping	
Communication- intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting  Required/recommended reading and online materials	Lecture-b Activitie Lectures Tutorials Reading Methods  Assignme Examina Jean Jaco	/ Self study Selents  Ition od and Phillip Protter: F	Details  Coursework (assignments, tutorials, and a class test)	Weighting in final course grade (%) 25 75 ringer-Verlag,	No. of Hours 36 12 100 Assessment Methods to CLO Mapping	

STAT7611	Computational statistics (6 credits)  Academic Year						
Offering Department		Statistics & Actuarial Science Quota					
Course Co-ordinator	Prof G Yin, Statistics & Actuarial Science (gyin@hku.hk)						
Teachers Involved	(Prof G Yin, Statistics & Actuarial Science)						
Course Objectives	This course aims to give undergraduate and postgraduate students in statistics a background in modern computationally intensive methods in statistics. It emphasizes the role of computation as a fundamental tool of discovery in data analysis, of statistical inference, and for development of statistical theory and methods.						
Course Contents & Topics	Hastings rejection s method, e Integration	Contents include: Bayesian statistics, Markov chain Monte Carlo methods including Gibbs sampler, the Metropolis-Hastings algorithm, and data augmentation; Generation of random variables including the inversion methods, rejection sampling, the sampling/importance resampling method; Optimization techniques including Newton's method, expectation-maximization (EM) algorithm and its variants, and minorization-maximization (MM) algorithms; Integration including Laplace approximations, Gaussian quadrature, the importance sampling method; and other topics such as Hidden Markov models, neural networks, and Bootstrap methods.					
Course Learning Outcomes	CLO 1 un Ca CLO 2 re alç CLO 3 un	ssful completion of this course, students should be able to: iderstand the importance of the technique for generating ran arlo integration and bootstrapping methods alize the advantages and disadvantages of the Newton-R gorithm and apply them to fit generalized linear models iderstand the essence and basic principle of the EM-type a	Raphson algorithm and the algorithms and MM-type al	e Fisher scoring			
	CLO 4 ap ge CLO 5 ap	eir range of application, and apply them to solve practical pro pply EM-type algorithms to find the posterior mode and ap enerate posterior samples pply Bootstrap methods to obtain estimated standard errors trameters for both parametric and non-parametric cases	ply Markov chain Monte C				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in S	Pass in STAT3600 or STAT3907					
Offer in 2021 - 2022	Y 1st	sem Offer in 2022 - 2023 : Y	Examination	Dec			
Grade Descriptors (A+ to F)	A						

	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.				
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.				
	D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outco Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to a knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.				
	Fail	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.				
Communication- intensive Course	N	N				
Course Type	Lecture-ba	sed course				
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials				12	
	Reading / Self study				100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	nts	Coursework (assignments, practical work, and a term test)	50	CLO 1,2,3,4,5	
	Examinati	on	One 2-hour written examination	50	CLO 1,2,3,4,5	
Required/recommended	Tan, M.,	ian, G.L. and Ng, K.W	: Bayesian Missing Data Problems	: EM, Data Augmentatio	n and Non-iterative	
reading and	Computati	on (Chapman & Hall/CR	C, Boca Raton, 2010).	-		
online materials		Givens, G.H. and Hoeting, J.A.: Computational Statistics (Wiley, 2005)  Robert, C.P. and Casella, G.: Monte Carlo Statistical Methods (Springer, 2005, 2nd edition)				
Course Website	http://moo	dle.hku.hk				

STAT7614	Advance	ed statistical mod	delling (6 credits)	Academic Yea	r 2021	
Offering Department	Statistics & Actuarial Science Quota					
Course Co-ordinator	Prof G Yin	n, Statistics & Actuar	ial Science (gyin@hku.hk)	1		
Teachers Involved	(Dr E K F Lam, Statistics & Actuarial Science)					
	(Dr Y K Chung, Statistics & Actuarial Science)					
		n,Statistics & Actuar				
Course Objectives	This course introduces modern methods for constructing and evaluating statistical models and their imp					
	using pop	oular computing soft	ware, such as R or Python. It will co	over both the underlying	principles of eac	
	modelling approach and the model estimation procedures.					
Course Contents	Topics from: (i) Linear regression models; (ii) Generalized linear models; (iii) Model selection and regularization					
& Topics	(iv) Kernel and local polynomial regression; selection of smoothing parameters; (v) Generalized additive					
	_ ` '		d Bayesian networks.			
Course Learning			nis course, students should be able to:			
Outcomes		•	sic characteristic and rationale behind t		istical model	
		, ,	of data the most suitable statistical mod			
			y of using computing software for build			
			ns involving binary and counting response	nses; employing the power	erful tool of kerne	
			Python for real data mining problems			
Pre-requisites	Pass in S	TAT3600 or STAT39	07			
and Co-requisites						
and Impermissible						
combinations)						
Offer in 2021 - 2022			ffer in 2022 - 2023 : Y	Examination	Dec May	
Grade Descriptors	Α		mastery at an advanced level of extensive knows strong analytical and critical abilities and logic			
(A+ to F)			a wide range of complex, familiar and unfamili			
		presentational skills.				
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar				
		learning outcomes. Snow evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.				
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning				
		outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most				
		familiar situations. Apply moderately effective organizational and presentational skills.  Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes.				
	D	Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to ap				
		knowledge to solve pro	blems. Apply limited or barely effective organization	onal and presentational skills.	,	
	Fail	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve				
			al abilities, logical and conerent thinking. Show and presentational skills are minimally effective o		y knowledge to solv	
		problemo. Organization	and presentational skills are minimally encouve e	in inchedity.		
Communication-	N N					
	N					
ntensive Course		ased course				
ntensive Course Course Type	Lecture-ba	ased course	Details		No. of Hours	
ntensive Course Course Type Course Teaching	Lecture-ba		Details		No. of Hours	
ntensive Course Course Type Course Teaching	Lecture-ba		Details		24	
ntensive Course Course Type Course Teaching	Lecture-ba Activities Lectures Tutorials	3	Details		24 12	
ntensive Course Course Type Course Teaching & Learning Activities	Lecture-ba Activities Lectures Tutorials Reading /	Self study			24 12 100	
Intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Lecture-ba Activities Lectures Tutorials	Self study	Details  Details	Weighting in final	24 12 100 <b>Assessment</b>	
ntensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Lecture-ba Activities Lectures Tutorials Reading /	Self study		Weighting in final course grade (%)	24 12 100 Assessment Methods	
Communication- intensive Course Course Type Course Teaching & Learning Activities  Assessment Methods and Weighting	Lecture-ba Activities Lectures Tutorials Reading /	Self study	Details		24 12 100 Assessment Methods	
Intensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Lecture-ba Activities Lectures Tutorials Reading /	Self study	Details  Coursework (assignments and		24 12 100 Assessment Methods	
ntensive Course Course Type Course Teaching & Learning Activities Assessment Methods	Lecture-ba Activities Lectures Tutorials Reading / Methods	Self study	Details	course grade (%)	24 12 100 Assessment Methods to CLO Mapping	

online materials	W. Hardle et al., 2004: Nonparametric and Semi-parametric Models. Springer W. Zucchini & I.L. MacDonald, 2009: Hidden Markov Models for Time Series: An Introduction Using R, CRC Press M. Scutari & J. Denis, 2015: Bayesian Networks: with Examples in R, CRC Press
Course Website	http://moodle.hku.hk

STAT7615	Advanced quantitative risk management and finance (6 Academic Year credits)				2021	
Offering Department	Statistics & Actuarial Science Quota					
Course Co-ordinator	Dr Z Zha					
Teachers Involved	(Dr Z Zhang,Statistics & Actuarial Science)					
Course Objectives	This course covers statistical methods and models of importance to risk management and finance and links finance theory to market practice via statistical modeling and decision making. Emphases will be put on empirical analyses to address the discrepancy between finance theory and market data.					
Course Contents & Topics	Contents include: Elementary Stochastic Calculus; Basic Monte Carlo and Quasi-Monte Carlo Methods; Variance Reduction Techniques; Simulating the value of options and the value-at-risk for risk management; Review univariate volatility models; multivariate volatility models; Value-at-risk and expected shortfall; estimation, bartesting and stress testing; Extreme value theory for risk management.					
Course Learning	On successful completion of this course, students should be able to:					
Outcomes		•	ethods to determine the value of options	and other derivative secu	ırities	
			set of securities using appropriate models			
	CLO 3	estimate the value-a	t-risk under extreme value theory			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in S	STAT4608				
Offer in 2021 - 2022	Y 2n	d sem Offer in 202		Examination	May	
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.					
	B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.					
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.					
	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.					
Communication- intensive Course	N					
Course Type	Lecture-b	pased course				
Course Teaching	Activitie		Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials					
					12	
	-	/ Self study			100	
	Reading Methods	•	Details	Weighting in final course grade (%)	100 Assessment Methods	
	-	s	Details  Coursework (assignments, tutorials, and a class test)		100 Assessment Methods	
Assessment Methods and Weighting	Method	s nents	Coursework (assignments,	course grade (%)	100 Assessment Methods to CLO Mapping	
	Assignm Examina McLeish, Glassern Danielss McNeil, A Tsay, R.S	nents ation  , Don L.: Monte Carlo nan, Paul: Monte Car on Jon: Financial Ris A. J., Frey, R. & Emb	Coursework (assignments, tutorials, and a class test)	course grade (%)  25  75  ringer, 2003). t (Princeton, 2005)	Assessment Methods to CLO Mapping	

# **Degree Regulations**

# SCIENCE

# SECTION X Degree Regulations

# REGULATIONS FOR THE DEGREE OF BACHELOR OF SCIENCE (BSc)

These regulations apply to students admitted under the 4-year curriculum to the BSc degree curriculum to the first year in the academic year 2017-18 and thereafter, students admitted directly to the second year in the academic year 2018-19 and thereafter, and students admitted directly to the third year in the academic year 2019-20 and thereafter.

(See also General Regulations and Regulations for First Degree Curricula)

### **Definitions**

Sc1<sup>1</sup> For the purpose of these regulations and the syllabuses for the BSc degree, unless the context otherwise requires:

"Science course" means any course offered by the Faculty of Science, and the School of Biomedical Sciences.

"Advanced Science course" means any level 3, 4 or above course offered by the Faculty of Science and the School of Biomedical Sciences.

"Course" means a course of study, with a credit value expressed as a number of credit-units as specified in the syllabuses for a degree curriculum.

"Syllabus" means courses taught by departments, centres, and schools, offered under a degree curriculum.

"Credits" or "credit-units" means the value assigned to each course to indicate its study load relative to the total study load under a degree curriculum. The study load refers to the hours of student learning activities and experiences, both within and outside the classroom, and includes contact hours and time spent on assessment tasks and examinations. Candidates who satisfactorily complete courses with a credit value earn the credits assigned to these courses.

### Admission to the BSc degree

- Sc2 To be eligible for admission to the BSc degree, candidates shall:
- (a) comply with the General Regulations;
- (b) comply with the Regulations for First Degree Curricula; and
- (c) satisfy all the requirements of the curriculum in accordance with these regulations and the syllabuses.

### **Period of study**

**Sc3** The curriculum for the BSc degree shall normally require eight semesters of full-time study, extending over not fewer than four academic years, and shall include any assessment to be held during and/or at the end of each semester. Candidates shall not in any case be permitted to extend their studies beyond the maximum period of registration of six academic years.

This regulation should be read in conjunction with UG1 of the Regulations for First Degree Curricula.

### **Selection of courses**

**Sc4** Candidates shall select their courses in accordance with these regulations and the guidelines specified in the syllabuses before the beginning of each semester. Any change to the selection of courses shall be made only during the add/drop period of the semester in which the course begins, and such changes shall not be reflected in the transcript of the candidate. Requests for changes after the designated add/drop period of the semester shall not be considered.

# Curriculum requirements and progression in curriculum

### Sc5

- (a) Candidates shall satisfy the requirements prescribed in UG5 of the Regulations of First Degree Curricula.
- (b) Candidates shall take not fewer than 240 credits, in the manner specified in these regulations and the syllabuses.
- (c) Candidates shall take at least 96 credits of Science courses including all required courses of the major programme of the BSc degree curriculum.
- (d) Candidates shall normally be required to take not fewer than 24 credits nor more than 30 credits in any one semester (except the summer semester) unless otherwise permitted or required by the Board of the Faculty, or except in the last semester of study when the number of outstanding credits required to complete the curriculum requirements may be fewer than 24 credits.
- (e) Candidates may, of their own volition, take additional credits not exceeding 6 credits in each semester, and/or further credits during the summer semester, accumulating up to a maximum of 72 credits in one academic year. With the special permission of the Board of the Faculty, candidates may exceed the annual study load of 72 credits in a given academic year provided that the total number of credits taken does not exceed the maximum curriculum study load of 288 credits for the normative period of study specified in the curriculum regulations, save as provided for under Sc5(f).
- (f) Where candidates are required to make up for failed credits, the Board of the Faculty may give permission for candidates to exceed the annual study load of 72 credits provided that the total number of credits taken does not exceed the maximum curriculum study load of 432 credits for the maximum period of registration specified in the curriculum regulations.
- (g) Candidates may, with the approval of the Board of the Faculty, transfer credits for courses completed at other institutions at any time during their candidature. The number of transferred credits will be recorded on the transcript of the candidate, but the results of courses completed at other institutions shall not be included in the calculation of the GPA. The number of credits to be transferred shall not exceed half of the total credits normally required under the degree curricula of the candidates during their candidature at the University.
- (h) Candidates shall be recommended for discontinuation of their studies if they have:
  - (i) failed to complete successfully 36 or more credits in two consecutive semesters (not including the summer semester), except where they are not required to take such a number of credits in the two given semesters, or
  - (ii) failed to achieve an average Semester GPA of 1.0 or higher for two consecutive semesters (not including the summer semester), or
  - (iii) exceeded the maximum period of registration specified in Sc3, unless otherwise permitted by the Board of the Faculty.

# **Advanced standing**

**Sc6** Advanced standing may be granted to candidates in recognition of studies completed successfully before admission to the curriculum in accordance with UG2 of the Regulations for First Degree Curricula. Credits granted for advanced standing will be recorded on the transcript of the candidate but shall not be included in the calculation of the GPA.

#### Assessment

### Sc7

- (a) Candidates shall be assessed for each of the courses for which they have registered, and assessment may be conducted in any combination of continuous assessment of coursework, written examinations and/or any other assessable activities. Only passed courses will earn credits.
- (b) Candidates who are unable, because of illness, to be present at the written examination of any course may apply for permission to present themselves at a supplementary examination of the same course to be held before the beginning of the First Semester of the following academic year. Any such application shall be made on the form prescribed within two weeks of the first day of the candidate's absence from any examination. Any supplementary examination shall be part of that academic year's examinations, and the provisions made in the regulations for failure at the first attempt shall apply accordingly.
- (c) Candidates shall not be permitted to repeat a course for which they have received a D grade or above for the purpose of upgrading.
- (d) Candidates are required to make up for failed courses in the following manner: repeating the failed course by undergoing instruction and satisfying the assessment, or for elective courses, taking another course in lieu and satisfying the assessment requirements.
- (e) There shall be no appeal against the results of examinations and all other forms of assessment.

# Award of BSc Degree

- **Sc8** To be eligible for the award of the BSc degree, candidates shall have:
- (a) satisfied the requirements in UG5 of the Regulations for First Degree Curricula;
- (b) passed not fewer than 240 credits, comprising 96 credits of the required courses as prescribed in the regular major programme, or 144 credits (or a higher credit requirement by the accredited bodies) of the prescribed courses in the intensive major programme, of the BSc degree curriculum.

# **Honours classification**

## Sc9

(a) Honours classifications shall be awarded in five divisions: First Class Honours, Second Class Honours Division One, Second Class Honours Division Two, Third Class Honours, and Pass. The classification of honours shall be determined by the Board of Examiners for the Degree of BSc in accordance with the following Graduation GPA scores, with all courses taken (including failed courses, but not including courses approved by the Senate graded as 'Pass', 'Fail' or 'Distinction') carrying weightings which are proportionate to their credit values<sup>2</sup>:

<u>Class of honours</u>	GGPA range
First Class Honours	3.60 - 4.30
Second Class Honours	(2.40 - 3.59)
Division One	3.00 - 3.59
Division Two	2.40 - 2.99
Third Class Honours	1.70 - 2.39
Pass	1.00 - 1.69

- (b) Honours classification may not be determined solely on the basis of a candidate's Graduation GPA and the Board of Examiners for the Degree of BSc may, at its absolute discretion and with justification, award a higher class of honours to a candidate deemed to have demonstrated meritorious academic achievement but whose Graduation GPA falls below the range stipulated in UG9(a) of the higher classification by not more than 0.1 Grade Point.
- (c) A list of candidates who have successfully completed all degree requirements shall be posted on Faculty noticeboards.

For students in the 2017-18 intake and thereafter who have successfully completed six Common Core courses, the calculation of Graduation GPA is subject to the proviso that either five Common Core course with the highest grades (covering all four Areas of Inquiry), or all six courses will be counted towards Graduation GPA, depending on which generates the higher Graduation GPA.

# REGULATIONS FOR THE DEGREE OF BACHELOR OF SCIENCE (BSc)

These regulations apply to students admitted under the 4-year curriculum to the BSc degree curriculum to the first year in the academic year 2015-16 and 2016-17, students admitted directly to the second year in the academic year 2017-18, and students admitted directly to the third year in the academic years 2017-18 and 2018-19.

(See also General Regulations and Regulations for First Degree Curricula)

#### **Definitions**

Sc1<sup>1</sup> For the purpose of these regulations and the syllabuses for the BSc degree, unless the context otherwise requires:

"Science course" means any course offered by the Faculty of Science, and the School of Biomedical Sciences.

"Advanced Science course" means any level 3, 4 or above course offered by the Faculty of Science and the School of Biomedical Sciences.

"Course" means a course of study, with a credit value expressed as a number of credit-units as specified in the syllabuses for a degree curriculum.

"Syllabus" means courses taught by departments, centres, and schools, offered under a degree curriculum.

"Credits" or "credit-units" means the value assigned to each course to indicate its study load relative to the total study load under a degree curriculum. The study load refers to the hours of student learning activities and experiences, both within and outside the classroom, and includes contact hours and time spent on assessment tasks and examinations. Candidates who satisfactorily complete courses with a credit value earn the credits assigned to these courses.

### Admission to the BSc degree

- Sc2 To be eligible for admission to the BSc degree, candidates shall:
- (a) comply with the General Regulations;
- (b) comply with the Regulations for First Degree Curricula; and
- (c) satisfy all the requirements of the curriculum in accordance with these regulations and the syllabuses.

# Period of study

**Sc3** The curriculum for the BSc degree shall normally require eight semesters of full-time study, extending over not fewer than four academic years, and shall include any assessment to be held during and/or at the end of each semester. Candidates shall not in any case be permitted to extend their studies beyond the maximum period of registration of six academic years.

This regulation should be read in conjunction with UG1 of the Regulations for First Degree Curricula.

#### **Selection of courses**

**Sc4** Candidates shall select their courses in accordance with these regulations and the guidelines specified in the syllabuses before the beginning of each semester. Any change to the selection of courses shall be made only during the add/drop period of the semester in which the course begins, and such changes shall not be reflected in the transcript of the candidate. Requests for changes after the designated add/drop period of the semester shall not be considered.

# Curriculum requirements and progression in curriculum

#### Sc5

- (a) Candidates shall satisfy the requirements prescribed in UG5 of the Regulations of First Degree Curricula.
- (b) Candidates shall take not fewer than 240 credits, in the manner specified in these regulations and the syllabuses.
- (c) Candidates shall take at least 96 credits of Science courses including all required courses of the major programme of the BSc degree curriculum.
- (d) Candidates shall normally be required to take not fewer than 24 credits nor more than 30 credits in any one semester (except the summer semester) unless otherwise permitted or required by the Board of the Faculty, or except in the last semester of study when the number of outstanding credits required to complete the curriculum requirements may be fewer than 24 credits.
- (e) Candidates may, of their own volition, take additional credits not exceeding 6 credits in each semester, and/or further credits during the summer semester, accumulating up to a maximum of 72 credits in one academic year. With the special permission of the Board of the Faculty, candidates may exceed the annual study load of 72 credits in a given academic year provided that the total number of credits taken does not exceed the maximum curriculum study load of 288 credits for the normative period of study specified in the curriculum regulations, save as provided for under Sc5(f).
- (f) Where candidates are required to make up for failed credits, the Board of the Faculty may give permission for candidates to exceed the annual study load of 72 credits provided that the total number of credits taken does not exceed the maximum curriculum study load of 432 credits for the maximum period of registration specified in the curriculum regulations.
- (g) Candidates may, with the approval of the Board of the Faculty, transfer credits for courses completed at other institutions at any time during their candidature. The number of transferred credits will be recorded on the transcript of the candidate, but the results of courses completed at other institutions shall not be included in the calculation of the GPA. The number of credits to be transferred shall not exceed half of the total credits normally required under the degree curricula of the candidates during their candidature at the University.
- (h) Candidates shall be recommended for discontinuation of their studies if they have:
  - (i) failed to complete successfully 36 or more credits in two consecutive semesters (not including the summer semester), except where they are not required to take such a number of credits in the two given semesters, or
  - (ii) failed to achieve an average Semester GPA of 1.0 or higher for two consecutive semesters (not including the summer semester), or
  - (iii) exceeded the maximum period of registration specified in Sc3, unless otherwise permitted by the Board of the Faculty.

# **Advanced standing**

**Sc6** Advanced standing may be granted to candidates in recognition of studies completed successfully before admission to the curriculum in accordance with UG2 of the Regulations for First Degree Curricula. Credits granted for advanced standing will be recorded on the transcript of the candidate but shall not be included in the calculation of the GPA.

#### Assessment

#### Sc7

- (a) Candidates shall be assessed for each of the courses for which they have registered, and assessment may be conducted in any combination of continuous assessment of coursework, written examinations and/or any other assessable activities. Only passed courses will earn credits.
- (b) Candidates who are unable, because of illness, to be present at the written examination of any course may apply for permission to present themselves at a supplementary examination of the same course to be held before the beginning of the First Semester of the following academic year. Any such application shall be made on the form prescribed within two weeks of the first day of the candidate's absence from any examination. Any supplementary examination shall be part of that academic year's examinations, and the provisions made in the regulations for failure at the first attempt shall apply accordingly.
- (c) Candidates shall not be permitted to repeat a course for which they have received a D grade or above for the purpose of upgrading.
- (d) Candidates are required to make up for failed courses in the following manner: repeating the failed course by undergoing instruction and satisfying the assessment, or for elective courses, taking another course in lieu and satisfying the assessment requirements.
- (e) There shall be no appeal against the results of examinations and all other forms of assessment.

### Award of BSc Degree

- **Sc8** To be eligible for the award of the BSc degree, candidates shall have:
- (a) satisfied the requirements in UG5 of the Regulations for First Degree Curricula;
- (b) passed not fewer than 240 credits, comprising 96 credits of the required courses as prescribed in the regular major programme, or 144 credits (or a higher credit requirement by the accredited bodies) of the prescribed courses in the intensive major programme, of the BSc degree curriculum.

# **Honours classification**

### Sc9

(a) Honours classifications shall be awarded in five divisions: First Class Honours, Second Class Honours Division One, Second Class Honours Division Two, Third Class Honours, and Pass. The classification of honours shall be determined by the Board of Examiners for the Degree of BSc in accordance with the following Graduation GPA scores, with all courses taken (including failed courses, but not including courses approved by the Senate graded as 'Pass', 'Fail' or 'Distinction') carrying equal weighting:

<u>Class of honours</u>	GGPA range
First Class Honours	3.60 - 4.30
Second Class Honours	(2.40 - 3.59)
Division One	3.00 - 3.59
Division Two	2.40 - 2.99
Third Class Honours	1.70 - 2.39
Pass	1.00 - 1.69

- (b) Honours classification may not be determined solely on the basis of a candidate's Graduation GPA and the Board of Examiners for the Degree of BSc may, at its absolute discretion and with justification, award a higher class of honours to a candidate deemed to have demonstrated meritorious academic achievement but whose Graduation GPA falls below the range stipulated in UG9(a) of the higher classification by not more than 0.1 Grade Point.
- (c) A list of candidates who have successfully completed all degree requirements shall be posted on Faculty noticeboards.

# REGULATIONS FOR THE DEGREE OF BACHELOR OF SCIENCE (BSc)

These regulations apply to students admitted under the 4-year curriculum to the BSc degree curriculum to the first year in the academic years 2014-15, and students admitted directly to the third year in the academic years 2016-17.

(See also General Regulations and Regulations for First Degree Curricula)

# **Definitions**

Sc1<sup>1</sup> For the purpose of these regulations and the syllabuses for the BSc degree, unless the context otherwise requires:

"Science course" means any course offered by the Faculty of Science, and the School of Biomedical Sciences.

"Advanced Science course" means any level 3, 4 or above course offered by the Faculty of Science and the School of Biomedical Sciences.

"Course" means a course of study, with a credit value expressed as a number of credit-units as specified in the syllabuses for a degree curriculum.

"Syllabus" means courses taught by departments, centres, and schools, offered under a degree curriculum.

"Credits" or "credit-units" means the value assigned to each course to indicate its study load relative to the total study load under a degree curriculum. The study load refers to the hours of student learning activities and experiences, both within and outside the classroom, and includes contact hours and time spent on assessment tasks and examinations. Candidates who satisfactorily complete courses with a credit value earn the credits assigned to these courses.

# Admission to the BSc degree

- Sc2 To be eligible for admission to the BSc degree, candidates shall:
- (a) comply with the General Regulations;
- (b) comply with the Regulations for First Degree Curricula; and
- (c) satisfy all the requirements of the curriculum in accordance with these regulations and the syllabuses.

# **Period of study**

**Sc3** The curriculum for the BSc degree shall normally require eight semesters of full-time study, extending over not fewer than four academic years, and shall include any assessment to be held during and/or at the end of each semester. Candidates shall not in any case be permitted to extend their studies beyond the maximum period of registration of six academic years.

#### **Selection of courses**

This regulation should be read in conjunction with UG1 of the Regulations for First Degree Curricula.

**Sc4** Candidates shall select their courses in accordance with these regulations and the guidelines specified in the syllabuses before the beginning of each semester. Any change to the selection of courses shall be made only during the add/drop period of the semester in which the course begins, and such changes shall not be reflected in the transcript of the candidate. Requests for changes after the designated add/drop period of the semester shall not be considered.

# Curriculum requirements and progression in curriculum

#### Sc5

- (a) Candidates shall satisfy the requirements prescribed in UG5 of the Regulations of First Degree Curricula.
- (b) Candidates shall take not fewer than 240 credits, in the manner specified in these regulations and the syllabuses.
- (c) Candidates shall take at least 96 credits of Science courses including all required courses of the major programme of the BSc degree curriculum.
- (d) Candidates shall normally be required to take not fewer than 24 credits nor more than 30 credits in any one semester (except the summer semester) unless otherwise permitted or required by the Board of the Faculty, or except in the last semester of study when the number of outstanding credits required to complete the curriculum requirements may be fewer than 24 credits.
- (e) Candidates may, of their own volition, take additional credits not exceeding 6 credits in each semester, and/or further credits during the summer semester, accumulating up to a maximum of 72 credits in one academic year. With the special permission of the Board of the Faculty, candidates may exceed the annual study load of 72 credits in a given academic year provided that the total number of credits taken does not exceed the maximum curriculum study load of 288 credits for the normative period of study specified in the curriculum regulations, save as provided for under Sc5(f).
- (f) Where candidates are required to make up for failed credits, the Board of the Faculty may give permission for candidates to exceed the annual study load of 72 credits provided that the total number of credits taken does not exceed the maximum curriculum study load of 432 credits for the maximum period of registration specified in the curriculum regulations.
- (g) Candidates may, with the approval of the Board of the Faculty, transfer credits for courses completed at other institutions at any time during their candidature. The number of transferred credits will be recorded on the transcript of the candidate, but the results of courses completed at other institutions shall not be included in the calculation of the GPA. The number of credits to be transferred shall not exceed half of the total credits normally required under the degree curricula of the candidates during their candidature at the University.
- (h) Candidates shall be recommended for discontinuation of their studies if they have:
  - (i) failed to complete successfully 36 or more credits in two consecutive semesters (not including the summer semester), except where they are not required to take such a number of credits in the two given semesters, or
  - (ii) failed to achieve an average Semester GPA of 1.0 or higher for two consecutive semesters (not including the summer semester), or
  - (iii) exceeded the maximum period of registration specified in Sc3, unless otherwise permitted by the Board of the Faculty.

# **Advanced standing**

**Sc6** Advanced standing may be granted to candidates in recognition of studies completed successfully before admission to the curriculum in accordance with UG2 of the Regulations for First Degree Curricula. Credits granted for advanced standing will be recorded on the transcript of the candidate but shall not be included in the calculation of the GPA.

### Assessment

#### Sc7

- (a) Candidates shall be assessed for each of the courses for which they have registered, and assessment may be conducted in any combination of continuous assessment of coursework, written examinations and/or any other assessable activities. Only passed courses will earn credits.
- (b) Candidates who are unable, because of illness, to be present at the written examination of any course may apply for permission to present themselves at a supplementary examination of the same course to be held before the beginning of the First Semester of the following academic year. Any such application shall be made on the form prescribed within two weeks of the first day of the candidate's absence from any examination. Any supplementary examination shall be part of that academic year's examinations, and the provisions made in the regulations for failure at the first attempt shall apply accordingly.
- (c) Candidates shall not be permitted to repeat a course for which they have received a D grade or above for the purpose of upgrading.
- (d) Candidates are required to make up for failed courses in the following manner: repeating the failed course by undergoing instruction and satisfying the assessment, or for elective courses, taking another course in lieu and satisfying the assessment requirements.
- (e) There shall be no appeal against the results of examinations and all other forms of assessment.

# Award of BSc Degree

- **Sc8** To be eligible for the award of the BSc degree, candidates shall have:
- (a) satisfied the requirements in UG5 of the Regulations for First Degree Curricula;
- (b) passed not fewer than 240 credits, comprising 96 credits of the required courses as prescribed in the major programme of the BSc degree curriculum.

### **Honours classification**

# Sc9

(a) Honours classifications shall be awarded in five divisions: First Class Honours, Second Class Honours Division One, Second Class Honours Division Two, Third Class Honours, and Pass. The classification of honours shall be determined by the Board of Examiners for the Degree of BSc in accordance with the following Cumulative GPA scores, with all courses taken (including failed courses, but not including courses approved by the Senate graded as 'Pass', 'Fail' or 'Distinction') carrying equal weighting:

Class of honours	<u>CGPA range</u>
First Class Honours	3.60 - 4.30
Second Class Honours	(2.40 - 3.59)
Division One	3.00 - 3.59
Division Two	2.40 - 2.99
Third Class Honours	1.70 - 2.39
Pass	1.00 - 1.69

- (b) Honours classification may not be determined solely on the basis of a candidate's Cumulative GPA and the Board of Examiners for the Degree of BSc may, at its absolute discretion and with justification, award a higher class of honours to a candidate deemed to have demonstrated meritorious academic achievement but whose Cumulative GPA falls below the range stipulated in UG9(a) of the higher classification by not more than 0.1 Grade Point.
- (c) A list of candidates who have successfully completed all degree requirements shall be posted on Faculty noticeboards.

# REGULATIONS FOR THE DEGREE OF BACHELOR OF SCIENCE (BSc)

These regulations apply to students admitted under the 4-year curriculum to the BSc degree curriculum to the first year in the academic year 2013-14, and students admitted directly to the third year in the academic year 2015-16.

(See also General Regulations and Regulations for First Degree Curricula)

### **Definitions**

Sc1<sup>1</sup> For the purpose of these regulations and the syllabuses for the BSc degree, unless the context otherwise requires:

"Science course" means any course offered by the Faculty of Science, and the School of Biomedical Sciences.

"Advanced Science course" means any level 3, 4 or above course offered by the Faculty of Science and the School of Biomedical Sciences.

"Course" means a course of study, with a credit value expressed as a number of credit-units as specified in the syllabuses for a degree curriculum.

"Syllabus" means courses taught by departments, centres, and schools, offered under a degree curriculum.

"Credits" or "credit-units" means the value assigned to each course to indicate its study load relative to the total study load under a degree curriculum. The study load refers to the hours of student learning activities and experiences, both within and outside the classroom, and includes contact hours and time spent on assessment tasks and examinations. Candidates who satisfactorily complete courses with a credit value earn the credits assigned to these courses.

### Admission to the BSc degree

- Sc2 To be eligible for admission to the BSc degree, candidates shall:
- (a) comply with the General Regulations;
- (b) comply with the Regulations for First Degree Curricula; and
- (c) satisfy all the requirements of the curriculum in accordance with these regulations and the syllabuses.

# **Period of study**

**Sc3** The curriculum for the BSc degree shall normally require eight semesters of full-time study, extending over not fewer than four academic years, and shall include any assessment to be held during and/or at the end of each semester. Candidates shall not in any case be permitted to extend their studies beyond the maximum period of registration of six academic years.

This regulation should be read in conjunction with UG1 of the Regulations for First Degree Curricula.

### **Selection of courses**

**Sc4** Candidates shall select their courses in accordance with these regulations and the guidelines specified in the syllabuses before the beginning of each semester. Any change to the selection of courses shall be made only during the add/drop period of the semester in which the course begins, and such changes shall not be reflected in the transcript of the candidate. Requests for changes after the designated add/drop period of the semester shall not be considered.

# Curriculum requirements and progression in curriculum

# Sc5

- (a) Candidates shall satisfy the requirements prescribed in UG5 of the Regulations of First Degree Curricula.
- (b) Candidates shall take not fewer than 240 credits, in the manner specified in these regulations and the syllabuses.
- (c) Candidates shall take at least 96 credits of Science courses including all required courses of the major programme of the BSc degree curriculum.
- (d) Candidates shall normally be required to take not fewer than 24 credits nor more than 30 credits in any one semester (except the summer semester) unless otherwise permitted or required by the Board of the Faculty, or except in the last semester of study when the number of outstanding credits required to complete the curriculum requirements may be fewer than 24 credits.
- (e) Candidates may, of their own volition, take additional credits not exceeding 6 credits in each semester, and/or further credits during the summer semester, accumulating up to a maximum of 72 credits in one academic year. With the special permission of the Board of the Faculty, candidates may exceed the annual study load of 72 credits in a given academic year provided that the total number of credits taken does not exceed the maximum curriculum study load of 288 credits for the normative period of study specified in the curriculum regulations, save as provided for under Sc5(f).
- (f) Where candidates are required to make up for failed credits, the Board of the Faculty may give permission for candidates to exceed the annual study load of 72 credits provided that the total number of credits taken does not exceed the maximum curriculum study load of 432 credits for the maximum period of registration specified in the curriculum regulations.
- (g) Candidates may, with the approval of the Board of the Faculty, transfer credits for courses completed at other institutions at any time during their candidature. The number of transferred credits will be recorded on the transcript of the candidate, but the results of courses completed at other institutions shall not be included in the calculation of the GPA. The number of credits to be transferred shall not exceed half of the total credits normally required under the degree curricula of the candidates during their candidature at the University.
- (h) Candidates shall be recommended for discontinuation of their studies if they have:
  - (i) failed to complete successfully 36 or more credits in two consecutive semesters (not including the summer semester), except where they are not required to take such a number of credits in the two given semesters, or
  - (ii) failed to achieve an average Semester GPA of 1.0 or higher for two consecutive semesters (not including the summer semester), or
  - (iii) exceeded the maximum period of registration specified in Sc3, unless otherwise permitted by the Board of the Faculty.

# **Advanced standing**

**Sc6** Advanced standing may be granted to candidates in recognition of studies completed successfully in an approved institution of higher education elsewhere in accordance with UG2 of the Regulations for First Degree Curricula. Credits granted for advanced standing will be recorded on the transcript of the candidate but shall not be included in the calculation of the GPA.

#### Assessment

### Sc7

- (a) Candidates shall be assessed for each of the courses for which they have registered, and assessment may be conducted in any combination of continuous assessment of coursework, written examinations and/or any other assessable activities. Only passed courses will earn credits.
- (b) Candidates who are unable, because of illness, to be present at the written examination of any course may apply for permission to present themselves at a supplementary examination of the same course to be held before the beginning of the First Semester of the following academic year. Any such application shall be made on the form prescribed within two weeks of the first day of the candidate's absence from any examination. Any supplementary examination shall be part of that academic year's examinations, and the provisions made in the regulations for failure at the first attempt shall apply accordingly.
- (c) Candidates shall not be permitted to repeat a course for which they have received a D grade or above for the purpose of upgrading.
- (d) Candidates are required to make up for failed courses in the following manner: repeating the failed course by undergoing instruction and satisfying the assessment, or for elective courses, taking another course in lieu and satisfying the assessment requirements.
- (e) There shall be no appeal against the results of examinations and all other forms of assessment.

# Award of BSc Degree

- **Sc8** To be eligible for the award of the BSc degree, candidates shall have:
- (a) satisfied the requirements in UG5 of the Regulations for First Degree Curricula;
- (b) passed not fewer than 240 credits, comprising 96 credits of the required courses as prescribed in the major programme of the BSc degree curriculum.

### **Honours classification**

# Sc9

(a) Honours classifications shall be awarded in five divisions: First Class Honours, Second Class Honours Division One, Second Class Honours Division Two, Third Class Honours, and Pass. The classification of honours shall be determined by the Board of Examiners for the Degree of BSc in accordance with the following Cumulative GPA scores, with all courses taken (including failed courses, but not including courses approved by the Senate graded as 'Pass', 'Fail' or 'Distinction') carrying equal weighting:

Class of honours	<u>CGPA range</u>
First Class Honours	3.60 - 4.30
Second Class Honours	(2.40 - 3.59)
Division One	3.00 - 3.59
Division Two	2.40 - 2.99
Third Class Honours	1.70 - 2.39
Pass	1.00 - 1.69

- (b) Honours classification may not be determined solely on the basis of a candidate's Cumulative GPA and the Board of Examiners for the Degree of BSc may, at its absolute discretion and with justification, award a higher class of honours to a candidate deemed to have demonstrated meritorious academic achievement but whose Cumulative GPA falls below the range stipulated in UG9(a) of the higher classification by not more than 0.1 Grade Point.
- (c) A list of candidates who have successfully completed all degree requirements shall be posted on Faculty noticeboards.

# REGULATIONS FOR FIRST DEGREE CURRICULA 1

Regulations for First Degree Curricula (for students admitted under the 4-year curriculum to the first year in the academic year 2019-20 and thereafter, and students admitted directly to the second year in the academic year 2020-21 and thereafter, and students admitted directly to the third year in the academic year 2021-22)

(See also General Regulations)

### **UG1** Definitions:

For the purpose of regulations and syllabuses for all first degree curricula unless otherwise defined —

An 'academic year' comprises two semesters, the first semester to commence in September and end in December, and the second semester to commence in January and end in May/June, on dates as prescribed by the Senate. It includes, normally at the end of each semester, a period during which candidates are assessed. For some curricula, a 'summer semester' may be organized in addition to the normal two semesters. Clinical curricula have extended semesters.

A 'summer semester' normally comprises seven to eight weeks of intensive timetabled teaching and assessment to commence four weeks after the end of the second semester assessment period, and to conclude about one week before the start of the next academic year.

The 'maximum period of registration' is equivalent to a period which is 150% of the curriculum's normative period of study as specified in the degree regulations, provided that where this results in a residual fraction of an academic year, the fractional period shall be extended to one full academic year.

'Degree curriculum' means the entire study requirements for the award of an undergraduate degree.

'Major programme' means the study requirements, including a capstone experience, for a single major area of disciplinary, interdisciplinary or multidisciplinary study, accumulating not fewer than 72 credits nor more than 96 credits, as prescribed in the syllabuses for a degree curriculum.

'Minor programme' means the study requirements for a single minor area of disciplinary, interdisciplinary or multidisciplinary study, accumulating not fewer than 36 credits nor more than 48 credits, as prescribed in the syllabuses for a degree curriculum.

'Professional core' refers to the study requirements, including a capstone experience, prescribed in the regulations and syllabuses for disciplinary studies in degree curricula which are not structured as major/minor programmes for reasons relating to professional qualification and/or accreditation.

'Course' means a course of study, with a credit value expressed as a number of credit-units as specified in the syllabuses for a degree curriculum.

'Disciplinary elective course' or 'Disciplinary Elective' means any course offered in the same major or minor programme or the professional core which can be taken by candidates to fulfill the curriculum requirements as specified in the syllabuses of the degree curriculum.

'Elective course' or 'Elective' means any course offered within the same or another curriculum, other than compulsory courses in the candidate's degree curriculum, that can be

<sup>&</sup>lt;sup>1</sup> These regulations are applicable to candidates admitted from 2019-20 onwards. Reference in these regulations to the powers of the Boards of Faculties shall be applicable to Senate Boards of Studies which administer first degree curricula.

taken by the candidate in order to complete the credit requirements of the degree curriculum.

'Capstone experience' refers to one or more courses within the major programme or professional core which are approved by the Board of the Faculty for the purpose of integrating knowledge and skills acquired, and which are prescribed in the syllabuses of the degree curriculum.

'Syllabus' means courses taught by departments, centres, and schools, offered under a degree curriculum.

'Prerequisite' means a course or a group of courses which candidates must have completed successfully or a requirement which candidates must have fulfilled before being permitted to take the course in question.

'Corequisite' means a course which candidates must take in conjunction with the course in question.

'Credits' or 'credit-units' means the value assigned to each course to indicate its study load relative to the total study load under a degree curriculum. The study load refers to the hours of student learning activities and experiences, both within and outside the classroom, and includes contact hours and time spent on assessment tasks and examinations. Candidates who satisfactorily complete courses with a credit value earn the credits assigned to these courses.

'Grade Points' are standardized measurements of candidates' academic achievement in courses taken to satisfy the requirements of the degree curriculum and are expressed as a scale prescribed in these regulations.

'Grade Point Average' is a numerical measure of a candidate's academic achievement over a specified period of time. Each course attempted (including each failed course) is assigned a numerical value, with all courses carrying equal weighting. This numerical value is the product of grade points earned for the course and the credit value of that course. The 'Grade Point Average' is the sum of these numerical values divided by the total number of credits attempted:

$$GPA = \frac{\sum\limits_{i}^{\Sigma} Course\ Grade\ Point \times Course\ Credit\ Value}{\sum\limits_{i}^{\Sigma} Course\ Credit\ Value}$$

(where 'i' stands for all passed and failed courses taken by the student over a specified period)

'Semester Grade Point Average' or 'Semester GPA' is the GPA in respect of courses attempted by a candidate (including failed courses) during a given semester.

'Year Grade Point Average' or 'Year GPA' is the GPA in respect of courses attempted by a candidate (including failed courses) during a given academic year.

'Cumulative Grade Point Average' or 'Cumulative GPA' is the GPA in respect of courses attempted by a candidate (including failed courses) at the time of calculation.

'Graduation Grade Point Average' or 'Graduation GPA' is the GPA in respect of courses attempted by a candidate (including failed courses) at the point of graduation. For students in the 2017-18 intake and thereafter who have successfully completed six Common Core courses, the calculation of Graduation GPA is subject to the proviso that either five Common Core courses with the highest grades (covering all four Areas of Inquiry), or all six courses will be counted towards Graduation GPA, depending on which generates the higher Graduation GPA.

'Assessment' refers to judgment about the quality and extent to which a student has achieved the stated learning objectives or learning outcomes. It includes all types of assessment activities which allow for such a judgment to be made. For the purpose of interpreting the relevant provisions of the Ordinance and the Statutes and where appropriate,

reference to 'examination' or 'examinations' in the Ordinance and the Statutes shall include and cover all forms of 'assessment' and its related processes.

A 'transcript' refers to a transcript of the record of study of a candidate, issued by the Registry of the University.

# UG 2 Advanced standing:

Advanced standing may be granted to candidates in recognition of studies completed successfully before admission to the curriculum. Candidates who are awarded Advanced Standing will not be granted any further credit transfer for those studies for which Advanced Standing has been granted. The amount of credits to be granted for advanced standing shall be determined by the Board of the Faculty, in accordance with the following principles:

- (a) at least half the number of credits of the degree curriculum normally required for award of the degree shall be accumulated through study at this University or from transfer of credits for courses completed at other institutions in accordance with Regulation UG 4(d); and
- (b) in accordance with Statute III.5 and notwithstanding the granting of advanced and/or transfer credits, a minimum of two semesters of study at this University shall be required before a candidate is considered for the award of a first degree, other than a degree in medicine or surgery, and a minimum of four semesters of study at this University shall be required before a candidate is considered for a first degree in medicine or surgery.

Credits granted for advanced standing shall not normally be included in the calculation of the GPA unless permitted by the Board of the Faculty but will be recorded on the transcript of the candidate.

# **UG 3** Period of study:

The period of study of the curriculum shall be specified in the regulations governing the degree. To be eligible for award of the degree, a candidate shall fulfill all curriculum requirements within the maximum period of registration, unless otherwise permitted or required by the Board of the Faculty.

# **UG 4** Progression in curriculum:

- (a) Candidates shall normally be required to take not fewer than 24 credits nor more than 30 credits in any one semester (except the summer semester) unless otherwise permitted or required by the Board of the Faculty, or except in the last semester of study when the number of outstanding credits required to complete the curriculum requirements is fewer than 24 credits.
- (b) Candidates may, of their own volition, take additional credits not exceeding 6 credits in each semester, and/or further credits during the summer semester, accumulating up to a maximum of 72 credits in one academic year. With the special permission of the Board of the Faculty, candidates may exceed the annual study load of 72 credits in a given academic year provided that the total number of credits taken does not exceed the maximum curriculum study load for the normative period of study specified in the curriculum regulations, save as provided for under UG4(c).
- (c) Where candidates are required to make up for failed credits, the Board of the Faculty may give permission for candidates to exceed the annual study load of 72 credits provided that the total number of credits taken does not exceed the maximum curriculum study load for the maximum period of registration specified in the curriculum regulations.
- (d) Candidates may, with the approval of the Board of the Faculty, transfer credits for courses completed at other institutions at any time during their candidature. The

number of transferred credits may be recorded in the transcript of the candidate, but the results of courses completed at other institutions shall not be included in the calculation of the GPA. The number of credits to be transferred shall not exceed half of the total credits normally required under the degree curricula of the candidates during their candidature at the University.

- (e) Unless otherwise permitted by the Board of the Faculty, candidates shall be recommended for discontinuation of their studies if they have:
  - (i) failed to complete successfully 36 or more credits in two consecutive semesters (not including the summer semester), except where they are not required to take such a number of credits in the two given semesters, or
  - (ii) failed to achieve an average Semester GPA of 1.0 or higher for two consecutive semesters (not including the summer semester), or
  - (iii) exceeded the maximum period of registration specified in the regulations of the degree.

# UG 5 Requirements for graduation:

To be eligible for admission to the degree, candidates shall fulfill the following requirements in addition to the requirements prescribed in the regulations and syllabuses governing the degree curriculum within the maximum period of registration:

- (a) successful completion of 12 credits in English language enhancement, including 6 credits in Core University English<sup>2</sup> and 6 credits in an English in the Discipline course<sup>3</sup>;
- (b) successful completion of 6 credits in Chinese language enhancement<sup>4</sup>;
- (c) unless otherwise prescribed in the curriculum regulations and syllabuses, successful completion of 36 credits of courses in the Common Core Curriculum, comprising at least one and not more than two courses from each Area of Inquiry<sup>5</sup> with not more than 24 credits of course being selected within one academic year except where candidates are required to make up for failed credits; and
- (d) successful completion of a capstone experience as specified in the syllabuses of the degree curriculum.

### **UG 6** Exemption:

Candidates may be exempted, with or without special conditions attached, from any of the requirements in UG 5 by the Senate in exceptional circumstances. Candidates who are so

<sup>&</sup>lt;sup>2</sup> Candidates who have achieved Level 5\*\* in English Language in the Hong Kong Diploma of Secondary Education Examination, or equivalent, may at the discretion of the Faculty be exempted from this requirement and should take an elective course in lieu, see *Regulation UG6*.

<sup>&</sup>lt;sup>3</sup> (a) To satisfy the English in the Discipline (ED) requirement, candidates who have passed the ED course for a Major but subsequently change that Major are required to pass the ED course for the new Major, or either of the double Majors finally declared upon graduation irrespective of whether the second Major is offered within or outside of the candidates' home Faculty.

<sup>(</sup>b) Candidates declaring double Majors can, if they fail in the ED course for one of the Majors, either (i) re-take and successfully complete that failed ED course, or (ii) successfully complete the ED course for the other Major, irrespective of whether the Major is offered within or outside of the candidates' home Faculty.

<sup>(</sup>c) Candidates who undertake studies in double Majors or double degrees are not required to take a second ED course but may be advised by the Faculty to do so.

<sup>&</sup>lt;sup>4</sup> Candidates who have not studied Chinese language during their secondary education may be exempted from this requirement and should take an elective course in lieu, see *Regulation UG6*.

<sup>&</sup>lt;sup>5</sup> Candidates registered for dual degree studies are required to successfully complete 24 credits of courses in the Common Core Curriculum, selecting one course from each Area of Inquiry, within the curriculum of the first degree, as appropriate.

exempted must replace the number of exempted credits with courses of the same credit value.

# **UG7** Assessment:

(a) Candidates shall be assessed for each of the courses for which they have registered, and assessment may be conducted in any combination of continuous assessment of coursework, written examinations and/or any other assessable activities. Only passed courses will earn credits.

- (b) Candidates who are unable, because of illness, to be present at the written examination of any course may apply for permission to present themselves at a supplementary examination of the same course to be held before the beginning of the First Semester of the following academic year. Any such application shall be made on the form prescribed within two weeks of the first day of the candidate's absence from any examination. Any supplementary examination shall be part of that academic year's examinations, and the provisions made in the regulations for failure at the first attempt shall apply accordingly.
- (c) Candidates suspended under Statute XXXI shall not be allowed to take, present themselves for, and participate in any assessments during the period of suspension, unless otherwise permitted by the Senate.
- (d) Candidates shall not be permitted to repeat a course for which they have received a D grade or above for the purpose of upgrading.
- (e) Candidates are required to make up for failed courses in the following manner as prescribed in the curriculum regulations:
  - (i) undergoing re-assessment/re-examination in the failed course to be held no later than the end of the following semester (not including the summer semester); or
  - (ii) re-submitting failed coursework, without having to repeat the same course of instruction; or
  - (iii) repeating the failed course by undergoing instruction and satisfying the assessments; or
  - (iv) for elective courses, taking another course *in lieu* and satisfying the assessment requirements.
- (f) There shall be no appeal against the results of examinations and all other forms of assessment.

# UG 8 Grading system:

(a) The grades, their standards and the grade points for assessment shall be as follows<sup>6</sup>:

Grade		Standard	Grade Point
A+	1		4.3
A	}	Excellent	4.0
A-	J		3.7
B+	)		3.3
В	}	Good	3.0
B-	J		2.7
C+	1		2.3
C	}	Satisfactory	2.0
C-	J	•	1.7
D+	l	Pass	1.3
D	ſ	rass	1.0
F		Fail	0

<sup>6</sup> UG 8 is not applicable to the respective Professional Core of the BDS and MBBS curricula.

(b) Special permission may be given by Senate for courses in individual curricula to be graded as 'Pass', 'Fail' or 'Distinction'. Such courses will not be included in the calculation of the GPA.

# **UG9** Honours classifications:

(a) Honours classifications shall be awarded in five divisions<sup>7</sup>: First Class Honours, Second Class Honours Division One, Second Class Honours Division Two, Third Class Honours, and Pass. The classification of honours shall be determined by the Board of Examiners for the degree in accordance with the following Graduate GPA scores, with all courses taken (including failed courses) carrying equal weighting which are proportionate to their credit values<sup>8</sup>:

Class of honours	GGPA range
First Class Honours	3.60 - 4.30
Second Class Honours	(2.40 - 3.59)
Division One	3.00 - 3.59
Division Two	2.40 - 2.99
Third Class Honours	1.70 - 2.39
Pass	1.00 - 1.69

- (b) Honours classification may not be determined solely on the basis of a candidate's Graduation GPA and the Board of Examiners for the degree may, at its absolute discretion and with justification, award a higher class of honours to a candidate deemed to have demonstrated meritorious academic achievement but whose Graduation GPA falls below the range stipulated in UG9(a) of the higher classification by not more than 0.1 Grade Point.
- (c) A list of candidates who have successfully completed all degree requirements shall be posted on Faculty noticeboards.

<sup>&</sup>lt;sup>7</sup> UG 9 is not applicable to the BChinMed, BDS and MBBS curricula.

<sup>&</sup>lt;sup>8</sup> For students in the 2017-18 intake and thereafter who have successfully completed six Common Core courses, the calculation of Graduation GPA is subject to the proviso that either five Common Core course with the highest grades (covering all four Areas of Inquiry), or all six courses will be counted towards Graduation GPA, depending on which generates the higher Graduation GPA.

# REGULATIONS FOR FIRST DEGREE CURRICULA 1

Regulations for First Degree Curricula (for students admitted under the 4-year curriculum to the first year in the academic year 2018-19, students admitted directly to the second year in the academic year 2019-20, and students admitted directly to the third year in the academic year 2020-21)

(See also General Regulations)

#### **UG 1** Definitions:

For the purpose of regulations and syllabuses for all first degree curricula unless otherwise defined —

An 'academic year' comprises two semesters, the first semester to commence in September and end in December, and the second semester to commence in January and end in May/June, on dates as prescribed by the Senate. It includes, normally at the end of each semester, a period during which candidates are assessed. For some curricula, a 'summer semester' may be organized in addition to the normal two semesters. Clinical curricula have extended semesters.

A 'summer semester' normally comprises seven to eight weeks of intensive timetabled teaching and assessment to commence four weeks after the end of the second semester assessment period, and to conclude about one week before the start of the next academic year.

The 'maximum period of registration' is equivalent to a period which is 150% of the curriculum's normative period of study as specified in the degree regulations, provided that where this results in a residual fraction of an academic year, the fractional period shall be extended to one full academic year.

'Degree curriculum' means the entire study requirements for the award of an undergraduate degree.

'Major programme' means the study requirements, including a capstone experience, for a single major area of disciplinary, interdisciplinary or multidisciplinary study, accumulating not fewer than 72 credits nor more than 96 credits, as prescribed in the syllabuses for a degree curriculum.

'Minor programme' means the study requirements for a single minor area of disciplinary, interdisciplinary or multidisciplinary study, accumulating not fewer than 36 credits nor more than 48 credits, as prescribed in the syllabuses for a degree curriculum.

'Professional core' refers to the study requirements, including a capstone experience, prescribed in the regulations and syllabuses for disciplinary studies in degree curricula which are not structured as major/minor programmes for reasons relating to professional qualification and/or accreditation.

'Course' means a course of study, with a credit value expressed as a number of credit-units as specified in the syllabuses for a degree curriculum.

'Disciplinary elective course' or 'Disciplinary Elective' means any course offered in the same major or minor programme or the professional core which can be taken by candidates to fulfill the curriculum requirements as specified in the syllabuses of the degree curriculum.

'Elective course' or 'Elective' means any course offered within the same or another

<sup>&</sup>lt;sup>1</sup> These regulations are applicable to candidates admitted from 2018-19 onwards. Reference in these regulations to the powers of the Boards of Faculties shall be applicable to Senate Boards of Studies which administer first degree curricula.

curriculum, other than compulsory courses in the candidate's degree curriculum, that can be taken by the candidate in order to complete the credit requirements of the degree curriculum.

'Capstone experience' refers to one or more courses within the major programme or professional core which are approved by the Board of the Faculty for the purpose of integrating knowledge and skills acquired, and which are prescribed in the syllabuses of the degree curriculum.

'Syllabus' means courses taught by departments, centres, and schools, offered under a degree curriculum.

'Prerequisite' means a course or a group of courses which candidates must have completed successfully or a requirement which candidates must have fulfilled before being permitted to take the course in question.

'Corequisite' means a course which candidates must take in conjunction with the course in question.

'Credits' or 'credit-units' means the value assigned to each course to indicate its study load relative to the total study load under a degree curriculum. The study load refers to the hours of student learning activities and experiences, both within and outside the classroom, and includes contact hours and time spent on assessment tasks and examinations. Candidates who satisfactorily complete courses with a credit value earn the credits assigned to these courses.

'Grade Points' are standardized measurements of candidates' academic achievement in courses taken to satisfy the requirements of the degree curriculum and are expressed as a scale prescribed in these regulations.

'Grade Point Average' is a numerical measure of a candidate's academic achievement over a specified period of time. Each course attempted (including each failed course) is assigned a numerical value, with all courses carrying equal weighting. This numerical value is the product of grade points earned for the course and the credit value of that course. The 'Grade Point Average' is the sum of these numerical values divided by the total number of credits attempted:

$$GPA = \frac{\sum\limits_{i}^{\Sigma} Course \ Grade \ Point \times Course \ Credit \ Value}{\sum\limits_{i}^{\Sigma} Course \ Credit \ Value}$$

(where 'i' stands for all passed and failed courses taken by the student over a specified period)

'Semester Grade Point Average' or 'Semester GPA' is the GPA in respect of courses attempted by a candidate (including failed courses) during a given semester.

'Year Grade Point Average' or 'Year GPA' is the GPA in respect of courses attempted by a candidate (including failed courses) during a given academic year.

'Cumulative Grade Point Average' or 'Cumulative GPA' is the GPA in respect of courses attempted by a candidate (including failed courses) at the time of calculation.

'Graduation Grade Point Average' or 'Graduation GPA' is the GPA in respect of courses attempted by a candidate (including failed courses) at the point of graduation. For students in the 2017-18 intake and thereafter who have successfully completed six Common Core courses, the calculation of Graduation GPA is subject to the proviso that either five Common Core courses with the highest grades (covering all four Areas of Inquiry), or all six courses will be counted towards Graduation GPA, depending on which generates the higher Graduation GPA.

'Assessment' refers to judgment about the quality and extent to which a student has achieved the stated learning objectives or learning outcomes. It includes all types of assessment activities which allow for such a judgment to be made. For the purpose of

interpreting the relevant provisions of the Ordinance and the Statutes and where appropriate, reference to 'examination' or 'examinations' in the Ordinance and the Statutes shall include and cover all forms of 'assessment' and its related processes.

A 'transcript' refers to a transcript of the record of study of a candidate, issued by the Registry of the University.

# UG 2 Advanced standing:

Advanced standing may be granted to candidates in recognition of studies completed successfully before admission to the curriculum. Candidates who are awarded Advanced Standing will not be granted any further credit transfer for those studies for which Advanced Standing has been granted. The amount of credits to be granted for advanced standing shall be determined by the Board of the Faculty, in accordance with the following principles:

- (a) at least half the number of credits of the degree curriculum normally required for award of the degree shall be accumulated through study at this University or from transfer of credits for courses completed at other institutions in accordance with Regulation UG 4(d); and
- (b) in accordance with Statute III.5 and notwithstanding the granting of advanced and/or transfer credits, a minimum of two semesters of study at this University shall be required before a candidate is considered for the award of a first degree, other than a degree in medicine or surgery, and a minimum of four semesters of study at this University shall be required before a candidate is considered for a first degree in medicine or surgery.

Credits granted for advanced standing shall not normally be included in the calculation of the GPA unless permitted by the Board of the Faculty but will be recorded on the transcript of the candidate.

# **UG 3** Period of study:

The period of study of the curriculum shall be specified in the regulations governing the degree. To be eligible for award of the degree, a candidate shall fulfill all curriculum requirements within the maximum period of registration, unless otherwise permitted or required by the Board of the Faculty.

### **UG 4** Progression in curriculum:

- (a) Candidates shall normally be required to take not fewer than 24 credits nor more than 30 credits in any one semester (except the summer semester) unless otherwise permitted or required by the Board of the Faculty, or except in the last semester of study when the number of outstanding credits required to complete the curriculum requirements is fewer than 24 credits.
- (b) Candidates may, of their own volition, take additional credits not exceeding 6 credits in each semester, and/or further credits during the summer semester, accumulating up to a maximum of 72 credits in one academic year. With the special permission of the Board of the Faculty, candidates may exceed the annual study load of 72 credits in a given academic year provided that the total number of credits taken does not exceed the maximum curriculum study load for the normative period of study specified in the curriculum regulations, save as provided for under UG4(c).
- (c) Where candidates are required to make up for failed credits, the Board of the Faculty may give permission for candidates to exceed the annual study load of 72 credits provided that the total number of credits taken does not exceed the maximum curriculum study load for the maximum period of registration specified in the curriculum regulations.

- (d) Candidates may, with the approval of the Board of the Faculty, transfer credits for courses completed at other institutions at any time during their candidature. The number of transferred credits may be recorded in the transcript of the candidate, but the results of courses completed at other institutions shall not be included in the calculation of the GPA. The number of credits to be transferred shall not exceed half of the total credits normally required under the degree curricula of the candidates during their candidature at the University.
- (e) Unless otherwise permitted by the Board of the Faculty, candidates shall be recommended for discontinuation of their studies if they have:
  - (i) failed to complete successfully 36 or more credits in two consecutive semesters (not including the summer semester), except where they are not required to take such a number of credits in the two given semesters, or
  - (ii) failed to achieve an average Semester GPA of 1.0 or higher for two consecutive semesters (not including the summer semester), or
  - (iii) exceeded the maximum period of registration specified in the regulations of the degree.

# UG 5 Requirements for graduation:

To be eligible for admission to the degree, candidates shall fulfill the following requirements in addition to the requirements prescribed in the regulations and syllabuses governing the degree curriculum within the maximum period of registration:

- (a) successful completion of 12 credits in English language enhancement, including 6 credits in Core University English<sup>2</sup> and 6 credits in an English in the Discipline course<sup>3</sup>;
- (b) successful completion of 6 credits in Chinese language enhancement<sup>4</sup>;
- (c) successful completion of 36 credits of courses in the Common Core Curriculum, comprising at least one and not more than two courses from each Area of Inquiry<sup>5</sup> with not more than 24 credits of course being selected within one academic year except where candidates are required to make up for failed credits; and
- (d) successful completion of a capstone experience as specified in the syllabuses of the degree curriculum.

# **UG 6** Exemption:

Candidates may be exempted, with or without special conditions attached, from any of the

<sup>2</sup> Candidates who have achieved Level 5\*\* in English Language in the Hong Kong Diploma of Secondary Education Examination, or equivalent, may at the discretion of the Faculty be exempted from this requirement and should take an elective course in lieu, see *Regulation UG6*.

- (b) Candidates declaring double Majors can, if they fail in the ED course for one of the Majors, either (i) re-take and successfully complete that failed ED course, or (ii) successfully complete the ED course for the other Major, irrespective of whether the Major is offered within or outside of the candidates' home Faculty.
- (c) Candidates who undertake studies in double Majors or double degrees are not required to take a second ED course but may be advised by the Faculty to do so.

<sup>&</sup>lt;sup>3</sup> (a) To satisfy the English in the Discipline (ED) requirement, candidates who have passed the ED course for a Major but subsequently change that Major are required to pass the ED course for the new Major, or either of the double Majors finally declared upon graduation irrespective of whether the second Major is offered within or outside of the candidates' home Faculty.

<sup>&</sup>lt;sup>4</sup> Candidates who have not studied Chinese language during their secondary education may be exempted from this requirement and should take an elective course in lieu, see *Regulation UG6*.

<sup>&</sup>lt;sup>5</sup> Candidates registered for dual degree studies are required to successfully complete 24 credits of courses in the Common Core Curriculum, selecting one course from each Area of Inquiry, within the curriculum of the first degree, as appropriate.

requirements in UG 5 by the Senate in exceptional circumstances. Candidates who are so exempted must replace the number of exempted credits with courses of the same credit value.

#### **UG7** Assessment:

- (a) Candidates shall be assessed for each of the courses for which they have registered, and assessment may be conducted in any combination of continuous assessment of coursework, written examinations and/or any other assessable activities. Only passed courses will earn credits.
- (b) Candidates who are unable, because of illness, to be present at the written examination of any course may apply for permission to present themselves at a supplementary examination of the same course to be held before the beginning of the First Semester of the following academic year. Any such application shall be made on the form prescribed within two weeks of the first day of the candidate's absence from any examination. Any supplementary examination shall be part of that academic year's examinations, and the provisions made in the regulations for failure at the first attempt shall apply accordingly.
- (c) Candidates suspended under Statute XXXI shall not be allowed to take, present themselves for, and participate in any assessments during the period of suspension, unless otherwise permitted by the Senate.
- (d) Candidates shall not be permitted to repeat a course for which they have received a D grade or above for the purpose of upgrading.
- (e) Candidates are required to make up for failed courses in the following manner as prescribed in the curriculum regulations:
  - (i) undergoing re-assessment/re-examination in the failed course to be held no later than the end of the following semester (not including the summer semester); or
  - (ii) re-submitting failed coursework, without having to repeat the same course of instruction; or
  - (iii) repeating the failed course by undergoing instruction and satisfying the assessments; or
  - (iv) for elective courses, taking another course in lieu and satisfying the assessment requirements.
- (f) There shall be no appeal against the results of examinations and all other forms of assessment.

# **UG 8** Grading system:

(a) The grades, their standards and the grade points for assessment shall be as follows<sup>6</sup>:

Grade		Standard	Grade Point
A+	1		4.3
A	}	Excellent	4.0
A-	J		3.7
B+	1		3.3
В	}	Good	3.0
B-	J		2.7
C+	)		2.3
C	}	Satisfactory	2.0
C-	J	•	1.7
D+	l	Pass	1.3
D	ſ	T 488	1.0
F		Fail	0

<sup>6</sup> UG 8 is not applicable to the respective Professional Core of the BDS and MBBS curricula.

(b) Special permission may be given by Senate for courses in individual curricula to be graded as 'Pass', 'Fail' or 'Distinction'. Such courses will not be included in the calculation of the GPA.

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#### **UG9** Honours classifications:

(a) Honours classifications shall be awarded in five divisions<sup>7</sup>: First Class Honours, Second Class Honours Division One, Second Class Honours Division Two, Third Class Honours, and Pass. The classification of honours shall be determined by the Board of Examiners for the degree in accordance with the following Graduate GPA scores, with all courses taken (including failed courses) carrying equal weighting which are proportionate to their credit values<sup>8</sup>:

<u>Class of honours</u>	GGPA range
First Class Honours	3.60 - 4.30
Second Class Honours	(2.40 - 3.59)
Division One	3.00 - 3.59
Division Two	2.40 - 2.99
Third Class Honours	1.70 - 2.39
Pass	1.00 - 1.69

- (b) Honours classification may not be determined solely on the basis of a candidate's Graduation GPA and the Board of Examiners for the degree may, at its absolute discretion and with justification, award a higher class of honours to a candidate deemed to have demonstrated meritorious academic achievement but whose Graduation GPA falls below the range stipulated in UG9(a) of the higher classification by not more than 0.1 Grade Point.
- (c) A list of candidates who have successfully completed all degree requirements shall be posted on Faculty noticeboards.

<sup>&</sup>lt;sup>7</sup> UG 9 is not applicable to the BChinMed, BDS and MBBS curricula.

<sup>&</sup>lt;sup>8</sup> For students in the 2017-18 intake and thereafter who have successfully completed six Common Core courses, the calculation of Graduation GPA is subject to the proviso that either five Common Core course with the highest grades (covering all four Areas of Inquiry), or all six courses will be counted towards Graduation GPA, depending on which generates the higher Graduation GPA.

# REGULATIONS FOR FIRST DEGREE CURRICULA 1

Regulations for First Degree Curricula (for students admitted under the 4-year curriculum to the first year in the academic year 2017-18, students admitted directed to the second year in the academic year 2018-19 and students admitted directly to the third year in the academic year 2019-20)

(See also General Regulations)

#### **UG1** Definitions:

For the purpose of regulations and syllabuses for all first degree curricula unless otherwise defined —

An 'academic year' comprises two semesters, the first semester to commence in September and end in December, and the second semester to commence in January and end in May/June, on dates as prescribed by the Senate. It includes, normally at the end of each semester, a period during which candidates are assessed. For some curricula, a 'summer semester' may be organized in addition to the normal two semesters. Clinical curricula have extended semesters.

A 'summer semester' normally comprises seven to eight weeks of intensive timetabled teaching and assessment to commence four weeks after the end of the second semester assessment period, and to conclude about one week before the start of the next academic year.

The 'maximum period of registration' is equivalent to a period which is 150% of the curriculum's normative period of study as specified in the degree regulations, provided that where this results in a residual fraction of an academic year, the fractional period shall be extended to one full academic year.

'Degree curriculum' means the entire study requirements for the award of an undergraduate degree.

'Major programme' means the study requirements, including a capstone experience, for a single major area of disciplinary, interdisciplinary or multidisciplinary study, accumulating not fewer than 72 credits nor more than 96 credits, as prescribed in the syllabuses for a degree curriculum.

'Minor programme' means the study requirements for a single minor area of disciplinary, interdisciplinary or multidisciplinary study, accumulating not fewer than 36 credits nor more than 48 credits, as prescribed in the syllabuses for a degree curriculum.

'Professional core' refers to the study requirements, including a capstone experience, prescribed in the regulations and syllabuses for disciplinary studies in degree curricula which are not structured as major/minor programmes for reasons relating to professional qualification and/or accreditation.

'Course' means a course of study, with a credit value expressed as a number of credit-units as specified in the syllabuses for a degree curriculum.

'Disciplinary elective course' or 'Disciplinary Elective' means any course offered in the same major or minor programme or the professional core which can be taken by candidates to fulfill the curriculum requirements as specified in the syllabuses of the degree curriculum.

<sup>&</sup>lt;sup>1</sup> These regulations are applicable to candidates admitted from 2017-18 onwards. Reference in these regulations to the powers of the Boards of Faculties shall be applicable to Senate Boards of Studies which administer first degree curricula.

'Elective course' or 'Elective' means any course offered within the same or another curriculum, other than compulsory courses in the candidate's degree curriculum, that can be taken by the candidate in order to complete the credit requirements of the degree curriculum.

'Capstone experience' refers to one or more courses within the major programme or professional core which are approved by the Board of the Faculty for the purpose of integrating knowledge and skills acquired, and which are prescribed in the syllabuses of the degree curriculum.

'Syllabus' means courses taught by departments, centres, and schools, offered under a degree curriculum.

'Prerequisite' means a course or a group of courses which candidates must have completed successfully or a requirement which candidates must have fulfilled before being permitted to take the course in question.

'Corequisite' means a course which candidates must take in conjunction with the course in question.

'Credits' or 'credit-units' means the value assigned to each course to indicate its study load relative to the total study load under a degree curriculum. The study load refers to the hours of student learning activities and experiences, both within and outside the classroom, and includes contact hours and time spent on assessment tasks and examinations. Candidates who satisfactorily complete courses with a credit value earn the credits assigned to these courses.

'Grade Points' are standardized measurements of candidates' academic achievement in courses taken to satisfy the requirements of the degree curriculum and are expressed as a scale prescribed in these regulations.

'Grade Point Average' is a numerical measure of a candidate's academic achievement over a specified period of time. Each course attempted (including each failed course) is assigned a numerical value, with all courses carrying equal weighting. This numerical value is the product of grade points earned for the course and the credit value of that course. The 'Grade Point Average' is the sum of these numerical values divided by the total number of credits attempted:

$$GPA = \frac{\sum\limits_{i}^{\Sigma} Course\ Grade\ Point \times Course\ Credit\ Value}{\sum\limits_{i}^{\Sigma} Course\ Credit\ Value}$$

(where 'i' stands for all passed and failed courses taken by the student over a specified period)

'Semester Grade Point Average' or 'Semester GPA' is the GPA in respect of courses attempted by a candidate (including failed courses) during a given semester.

'Year Grade Point Average' or 'Year GPA' is the GPA in respect of courses attempted by a candidate (including failed courses) during a given academic year.

'Cumulative Grade Point Average' or 'Cumulative GPA' is the GPA in respect of courses attempted by a candidate (including failed courses) at the time of calculation.

'Graduation Grade Point Average' or 'Graduation GPA' is the GPA in respect of courses attempted by a candidate (including failed courses) at the point of graduation. For students in the 2017-18 intake and thereafter who have successfully completed six Common Core courses, the calculation of Graduation GPA is subject to the proviso that either five Common Core courses with the highest grades (covering all four Areas of Inquiry), or all six courses will be counted towards Graduation GPA, depending on which generates the higher Graduation GPA.

'Assessment' refers to judgment about the quality and extent to which a student has achieved the stated learning objectives or learning outcomes. It includes all types of

assessment activities which allow for such a judgment to be made. For the purpose of interpreting the relevant provisions of the Ordinance and the Statutes and where appropriate, reference to 'examination' or 'examinations' in the Ordinance and the Statutes shall include and cover all forms of 'assessment' and its related processes.

A 'transcript' refers to a transcript of the record of study of a candidate, issued by the Registry of the University.

# **UG 2** Advanced standing:

Advanced standing may be granted to candidates in recognition of studies completed successfully before admission to the curriculum. Candidates who are awarded Advanced Standing will not be granted any further credit transfer for those studies for which Advanced Standing has been granted. The amount of credits to be granted for advanced standing shall be determined by the Board of the Faculty, in accordance with the following principles:

- (a) at least half the number of credits of the degree curriculum normally required for award of the degree shall be accumulated through study at this University or from transfer of credits for courses completed at other institutions in accordance with Regulation UG 4(d); and
- (b) in accordance with Statute III.5 and notwithstanding the granting of advanced and/or transfer credits, a minimum of two semesters of study at this University shall be required before a candidate is considered for the award of a first degree, other than a degree in medicine or surgery, and a minimum of four semesters of study at this University shall be required before a candidate is considered for a first degree in medicine or surgery.

Credits granted for advanced standing shall not normally be included in the calculation of the GPA unless permitted by the Board of the Faculty but will be recorded on the transcript of the candidate.

# **UG 3** Period of study:

The period of study of the curriculum shall be specified in the regulations governing the degree. To be eligible for award of the degree, a candidate shall fulfill all curriculum requirements within the maximum period of registration, unless otherwise permitted or required by the Board of the Faculty.

# **UG 4** Progression in curriculum:

- (a) Candidates shall normally be required to take not fewer than 24 credits nor more than 30 credits in any one semester (except the summer semester) unless otherwise permitted or required by the Board of the Faculty, or except in the last semester of study when the number of outstanding credits required to complete the curriculum requirements is fewer than 24 credits.
- (b) Candidates may, of their own volition, take additional credits not exceeding 6 credits in each semester, and/or further credits during the summer semester, accumulating up to a maximum of 72 credits in one academic year. With the special permission of the Board of the Faculty, candidates may exceed the annual study load of 72 credits in a given academic year provided that the total number of credits taken does not exceed the maximum curriculum study load for the normative period of study specified in the curriculum regulations, save as provided for under UG4(c).
- (c) Where candidates are required to make up for failed credits, the Board of the Faculty may give permission for candidates to exceed the annual study load of 72 credits provided that the total number of credits taken does not exceed the maximum curriculum study load for the maximum period of registration specified in the curriculum regulations.

- (d) Candidates may, with the approval of the Board of the Faculty, transfer credits for courses completed at other institutions at any time during their candidature. The number of transferred credits may be recorded in the transcript of the candidate, but the results of courses completed at other institutions shall not be included in the calculation of the GPA. The number of credits to be transferred shall not exceed half of the total credits normally required under the degree curricula of the candidates during their candidature at the University.
- (e) Unless otherwise permitted by the Board of the Faculty, candidates shall be recommended for discontinuation of their studies if they have:
  - (i) failed to complete successfully 36 or more credits in two consecutive semesters (not including the summer semester), except where they are not required to take such a number of credits in the two given semesters, or
  - (ii) failed to achieve an average Semester GPA of 1.0 or higher for two consecutive semesters (not including the summer semester), or
  - (iii) exceeded the maximum period of registration specified in the regulations of the degree.

### **UG 5** Requirements for graduation:

To be eligible for admission to the degree, candidates shall fulfill the following requirements in addition to the requirements prescribed in the regulations and syllabuses governing the degree curriculum within the maximum period of registration:

- (a) successful completion of 12 credits in English language enhancement, including 6 credits in Core University English<sup>2</sup> and 6 credits in an English in the Discipline course<sup>3</sup>;
- (b) successful completion of 6 credits in Chinese language enhancement<sup>4</sup>;
- (c) successful completion of 36 credits of courses in the Common Core Curriculum, comprising at least one and not more than two courses from each Area of Inquiry<sup>5</sup> with not more than 24 credits of course being selected within one academic year except where candidates are required to make up for failed credits; and
- (d) successful completion of a capstone experience as specified in the syllabuses of the degree curriculum.

#### **UG 6** Exemption:

Candidates may be exempted, with or without special conditions attached, from any of the

<sup>2</sup> Candidates who have achieved Level 5\*\* in English Language in the Hong Kong Diploma of Secondary Education Examination, or equivalent, may at the discretion of the Faculty be exempted from this requirement and should take an elective course in lieu, see *Regulation UG6*.

<sup>&</sup>lt;sup>3</sup> (a) To satisfy the English in the Discipline (ED) requirement, candidates who have passed the ED course for a Major but subsequently change that Major are required to pass the ED course for the new Major, or either of the double Majors finally declared upon graduation irrespective of whether the second Major is offered within or outside of the candidates' home Faculty.

<sup>(</sup>b) Candidates declaring double Majors can, if they fail in the ED course for one of the Majors, either (i) re-take and successfully complete that failed ED course, or (ii) successfully complete the ED course for the other Major, irrespective of whether the Major is offered within or outside of the candidates' home Faculty.

<sup>(</sup>c) Candidates who undertake studies in double Majors or double degrees are not required to take a second ED course but may be advised by the Faculty to do so.

<sup>&</sup>lt;sup>4</sup> Candidates who have not studied Chinese language during their secondary education may be exempted from this requirement and should take an elective course in lieu, see *Regulation UG6*.

<sup>&</sup>lt;sup>5</sup> Candidates registered for dual degree studies are required to successfully complete 24 credits of courses in the Common Core Curriculum, selecting one course from each Area of Inquiry, within the curriculum of the first degree, as appropriate.

requirements in UG 5 by the Senate in exceptional circumstances. Candidates who are so exempted must replace the number of exempted credits with courses of the same credit value.

#### **UG7** Assessment:

- (a) Candidates shall be assessed for each of the courses for which they have registered, and assessment may be conducted in any combination of continuous assessment of coursework, written examinations and/or any other assessable activities. Only passed courses will earn credits.
- (b) Candidates who are unable, because of illness, to be present at the written examination of any course may apply for permission to present themselves at a supplementary examination of the same course to be held before the beginning of the First Semester of the following academic year. Any such application shall be made on the form prescribed within two weeks of the first day of the candidate's absence from any examination. Any supplementary examination shall be part of that academic year's examinations, and the provisions made in the regulations for failure at the first attempt shall apply accordingly.
- (c) Candidates suspended under Statute XXXI shall not be allowed to take, present themselves for, and participate in any assessments during the period of suspension, unless otherwise permitted by the Senate.
- (d) Candidates shall not be permitted to repeat a course for which they have received a D grade or above for the purpose of upgrading.
- (e) Candidates are required to make up for failed courses in the following manner as prescribed in the curriculum regulations:
  - (i) undergoing re-assessment/re-examination in the failed course to be held no later than the end of the following semester (not including the summer semester); or
  - (ii) re-submitting failed coursework, without having to repeat the same course of instruction; or
  - (iii) repeating the failed course by undergoing instruction and satisfying the assessments; or
  - (iv) for elective courses, taking another course in lieu and satisfying the assessment requirements.
- (f) There shall be no appeal against the results of examinations and all other forms of assessment.

# **UG 8** Grading system:

(a) The grades, their standards and the grade points for assessment shall be as follows<sup>6</sup>:

Grade		Standard	Grade Point
A+	1		4.3
A	}	Excellent	4.0
A-	J		3.7
B+	1		3.3
В	}	Good	3.0
B-	J		2.7
C+	1		2.3
C	}	Satisfactory	2.0
C-	J	·	1.7
D+	l	Pass	1.3
D	ſ	T 488	1.0
F		Fail	0

<sup>6</sup> UG 8 is not applicable to the respective Professional Core of the BDS and MBBS curricula.

(b) Special permission may be given by Senate for courses in individual curricula to be graded as 'Pass', 'Fail' or 'Distinction'. Such courses will not be included in the calculation of the GPA.

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#### **UG9** Honours classifications:

(a) Honours classifications shall be awarded in five divisions<sup>7</sup>: First Class Honours, Second Class Honours Division One, Second Class Honours Division Two, Third Class Honours, and Pass. The classification of honours shall be determined by the Board of Examiners for the degree in accordance with the following Graduate GPA scores, with all courses taken (including failed courses) carrying equal weighting which are proportionate to their credit values<sup>8</sup>:

Class of honours	GGPA range
First Class Honours	3.60 - 4.30
Second Class Honours	(2.40 - 3.59)
Division One	3.00 - 3.59
Division Two	2.40 - 2.99
Third Class Honours	1.70 - 2.39
Pass	1.00 - 1.69

- (b) Honours classification may not be determined solely on the basis of a candidate's Graduation GPA and the Board of Examiners for the degree may, at its absolute discretion and with justification, award a higher class of honours to a candidate deemed to have demonstrated meritorious academic achievement but whose Graduation GPA falls below the range stipulated in UG9(a) of the higher classification by not more than 0.1 Grade Point.
- (c) A list of candidates who have successfully completed all degree requirements shall be posted on Faculty noticeboards.

<sup>&</sup>lt;sup>7</sup> UG 9 is not applicable to the BChinMed, BDS and MBBS curricula.

<sup>&</sup>lt;sup>8</sup> For students in the 2017-18 intake and thereafter who have successfully completed six Common Core courses, the calculation of Graduation GPA is subject to the proviso that either five Common Core course with the highest grades (covering all four Areas of Inquiry), or all six courses will be counted towards Graduation GPA, depending on which generates the higher Graduation GPA.

# REGULATIONS FOR FIRST DEGREE CURRICULA<sup>1</sup>

Regulations for First Degree Curricula (for students admitted under the 4-year curriculum to the first year in the academic years in 2014-15, 2015-16 and 2016-17, students admitted directed to the second year in the academic year 2017-18, and students admitted directed to the third year in the academic years 2016-17, 2017-18 and 2018-19)

(See also General Regulations)

#### **UG 1** Definitions:

For the purpose of regulations and syllabuses for all first degree curricula unless otherwise defined —

An 'academic year' comprises two semesters, the first semester to commence in September and end in December, and the second semester to commence in January and end in May/June, on dates as prescribed by the Senate. It includes, normally at the end of each semester, a period during which candidates are assessed. For some curricula, a 'summer semester' may be organized in addition to the normal two semesters. Clinical curricula have extended semesters.

A 'summer semester' normally comprises seven to eight weeks of intensive timetabled teaching and assessment to commence four weeks after the end of the second semester assessment period, and to conclude about one week before the start of the next academic year.

The 'maximum period of registration' is equivalent to a period which is 150% of the curriculum's normative period of study as specified in the degree regulations, provided that where this results in a residual fraction of an academic year, the fractional period shall be extended to one full academic year.

'Degree curriculum' means the entire study requirements for the award of an undergraduate degree.

'Major programme' means the study requirements, including a capstone experience, for a single major area of disciplinary, interdisciplinary or multidisciplinary study, accumulating not fewer than 72 credits nor more than 96 credits, as prescribed in the syllabuses for a degree curriculum.

'Minor programme' means the study requirements for a single minor area of disciplinary, interdisciplinary or multidisciplinary study, accumulating not fewer than 36 credits nor more than 48 credits, as prescribed in the syllabuses for a degree curriculum.

'Professional core' refers to the study requirements, including a capstone experience, prescribed in the regulations and syllabuses for disciplinary studies in degree curricula which are not structured as major/minor programmes for reasons relating to professional qualification and/or accreditation.

<sup>1</sup> These regulations are applicable to candidates admitted from 2016-17 onwards to the first year of first degree curricula under the 4-year '2012 curriculum', the 2-year curriculum in respect of the BSc(IM), the 5-year curriculum in respect of the BA&BEd(LangEd), BEd&BSc, BEd&BSocSc, BSc(Sp&HearSc), and BNurs, and the 6-year curriculum in respect of the BChinMed, BDS and MBBS. Reference in these regulations to the powers of the Boards of Faculties shall be applicable to Senate Boards of Studies which administer first degree curricula.

(The Regulations for First Degree Curricula applicable to cohorts admitted in 2012-13 and 2013-14 under the 4-year '2012 curriculum' can be found in the Calendar for 2013-14, and in the Calendar for 2014-15 for the cohorts admitted in 2014-15 and 2015-16.)

'Course' means a course of study, with a credit value expressed as a number of credit-units as specified in the syllabuses for a degree curriculum.

'Disciplinary elective course' or 'Disciplinary Elective' means any course offered in the same major or minor programme or the professional core which can be taken by candidates to fulfill the curriculum requirements as specified in the syllabuses of the degree curriculum.

'Elective course' or 'Elective' means any course offered within the same or another curriculum, other than compulsory courses in the candidate's degree curriculum, that can be taken by the candidate in order to complete the credit requirements of the degree curriculum.

'Capstone experience' refers to one or more courses within the major programme or professional core which are approved by the Board of the Faculty for the purpose of integrating knowledge and skills acquired, and which are prescribed in the syllabuses of the degree curriculum.

'Syllabus' means courses taught by departments, centres, and schools, offered under a degree curriculum.

'Prerequisite' means a course or a group of courses which candidates must have completed successfully or a requirement which candidates must have fulfilled before being permitted to take the course in question.

'Corequisite' means a course which candidates must take in conjunction with the course in question.

'Credits' or 'credit-units' means the value assigned to each course to indicate its study load relative to the total study load under a degree curriculum. The study load refers to the hours of student learning activities and experiences, both within and outside the classroom, and includes contact hours and time spent on assessment tasks and examinations. Candidates who satisfactorily complete courses with a credit value earn the credits assigned to these courses.

'Grade Points' are standardized measurements of candidates' academic achievement in courses taken to satisfy the requirements of the degree curriculum and are expressed as a scale prescribed in these regulations.

'Grade Point Average' is a numerical measure of a candidate's academic achievement over a specified period of time. Each course attempted (including each failed course) is assigned a numerical value, with all courses carrying equal weighting. This numerical value is the product of grade points earned for the course and the credit value of that course. The 'Grade Point Average' is the sum of these numerical values divided by the total number of credits attempted:

$$GPA = \frac{\sum\limits_{i}^{\Sigma} Course\ Grade\ Point \times Course\ Credit\ Value}{\sum\limits_{i}^{\Sigma} Course\ Credit\ Value}$$

(where 'i' stands for all passed and failed courses taken by the student over a specified period)

'Semester Grade Point Average' or 'Semester GPA' is the GPA in respect of courses attempted by a candidate (including failed courses) during a given semester.

'Year Grade Point Average' or 'Year GPA' is the GPA in respect of courses attempted by a candidate (including failed courses) during a given academic year.

'Cumulative Grade Point Average' or 'Cumulative GPA' is the GPA in respect of courses attempted by a candidate (including failed courses) at the time of calculation.

'Assessment' refers to judgment about the quality and extent to which a student has achieved the stated learning objectives or learning outcomes. It includes all types of assessment activities which allow for such a judgment to be made. For the purpose of interpreting the relevant provisions of the Ordinance and the Statutes and where appropriate,

reference to 'examination' or 'examinations' in the Ordinance and the Statutes shall include and cover all forms of 'assessment' and its related processes.

A 'transcript' refers to a transcript of the record of study of a candidate, issued by the Registry of the University.

# UG 2 Advanced standing:

Advanced standing may be granted to candidates in recognition of studies completed successfully before admission to the curriculum. Candidates who are awarded Advanced Standing will not be granted any further credit transfer for those studies for which Advanced Standing has been granted. The amount of credits to be granted for advanced standing shall be determined by the Board of the Faculty, in accordance with the following principles:

- (a) at least half the number of credits of the degree curriculum normally required for award of the degree shall be accumulated through study at this University or from transfer of credits for courses completed at other institutions in accordance with Regulation UG 4(d); and
- (b) in accordance with Statute III.5 and notwithstanding the granting of advanced and/or transfer credits, a minimum of two semesters of study at this University shall be required before a candidate is considered for the award of a first degree, other than a degree in medicine or surgery, and a minimum of four semesters of study at this University shall be required before a candidate is considered for a first degree in medicine or surgery.

Credits granted for advanced standing shall not normally be included in the calculation of the GPA unless permitted by the Board of the Faculty but will be recorded on the transcript of the candidate.

# **UG 3** Period of study:

The period of study of the curriculum shall be specified in the regulations governing the degree. To be eligible for award of the degree, a candidate shall fulfill all curriculum requirements within the maximum period of registration, unless otherwise permitted or required by the Board of the Faculty.

#### **UG 4** Progression in curriculum:

- (a) Candidates shall normally be required to take not fewer than 24 credits nor more than 30 credits in any one semester (except the summer semester) unless otherwise permitted or required by the Board of the Faculty, or except in the last semester of study when the number of outstanding credits required to complete the curriculum requirements is fewer than 24 credits.
- (b) Candidates may, of their own volition, take additional credits not exceeding 6 credits in each semester, and/or further credits during the summer semester, accumulating up to a maximum of 72 credits in one academic year. With the special permission of the Board of the Faculty, candidates may exceed the annual study load of 72 credits in a given academic year provided that the total number of credits taken does not exceed the maximum curriculum study load for the normative period of study specified in the curriculum regulations, save as provided for under UG4(c).
- (c) Where candidates are required to make up for failed credits, the Board of the Faculty may give permission for candidates to exceed the annual study load of 72 credits provided that the total number of credits taken does not exceed the maximum curriculum study load for the maximum period of registration specified in the curriculum regulations.
- (d) Candidates may, with the approval of the Board of the Faculty, transfer credits for courses completed at other institutions at any time during their candidature. The

number of transferred credits may be recorded in the transcript of the candidate, but the results of courses completed at other institutions shall not be included in the calculation of the GPA. The number of credits to be transferred shall not exceed half of the total credits normally required under the degree curricula of the candidates during their candidature at the University.

- (e) Unless otherwise permitted by the Board of the Faculty, candidates shall be recommended for discontinuation of their studies if they have:
  - (i) failed to complete successfully 36 or more credits in two consecutive semesters (not including the summer semester), except where they are not required to take such a number of credits in the two given semesters, or
  - (ii) failed to achieve an average Semester GPA of 1.0 or higher for two consecutive semesters (not including the summer semester), or
  - (iii) exceeded the maximum period of registration specified in the regulations of the degree.

### UG 5 Requirements for graduation:

To be eligible for admission to the degree, candidates shall fulfill the following requirements in addition to the requirements prescribed in the regulations and syllabuses governing the degree curriculum within the maximum period of registration:

- (a) successful completion of 12 credits in English language enhancement, including 6 credits in Core University English<sup>2</sup> and 6 credits in an English in the Discipline course<sup>3</sup>;
- (b) successful completion of 6 credits in Chinese language enhancement<sup>4</sup>;
- (c) successful completion of 36 credits of courses in the Common Core Curriculum, comprising at least one and not more than two courses from each Area of Inquiry<sup>5</sup> with not more than 24 credits of course being selected within one academic year except where candidates are required to make up for failed credits; and
- (d) successful completion of a capstone experience as specified in the syllabuses of the degree curriculum.

#### **UG 6** Exemption:

Candidates may be exempted, with or without special conditions attached, from any of the

<sup>2</sup> Candidates who have achieved Level 5\*\* in English Language in the Hong Kong Diploma of Secondary Education Examination, or equivalent, may at the discretion of the Faculty be exempted from this requirement and should take an elective course in lieu, see *Regulation UG6*.

- 3 (a) To satisfy the English in the Discipline (ED) requirement, candidates who have passed the ED course for a Major but subsequently change that Major are required to pass the ED course for the new Major, or either of the double Majors finally declared upon graduation irrespective of whether the second Major is offered within or outside of the candidates' home Faculty.
  - (b) Candidates declaring double Majors can, if they fail in the ED course for one of the Majors, either (i) re-take and successfully complete that failed ED course, or (ii) successfully complete the ED course for the other Major, irrespective of whether the Major is offered within or outside of the candidates' home Faculty.
- (c) Candidates who undertake studies in double Majors or double degrees are not required to take a second ED course but may be advised by the Faculty to do so.

<sup>&</sup>lt;sup>4</sup> Candidates who have not studied Chinese language during their secondary education may be exempted from this requirement and should take an elective course in lieu, see *Regulation UG6*.

<sup>&</sup>lt;sup>5</sup> Candidates registered for double degree studies are required to successfully complete 24 credits of courses in the Common Core Curriculum, selecting one course from each Area of Inquiry, within the curriculum of the first degree, as appropriate.

requirements in UG 5 by the Senate in exceptional circumstances. Candidates who are so exempted must replace the number of exempted credits with courses of the same credit value.

#### **UG7** Assessment:

- (a) Candidates shall be assessed for each of the courses for which they have registered, and assessment may be conducted in any combination of continuous assessment of coursework, written examinations and/or any other assessable activities. Only passed courses will earn credits.
- (b) Candidates who are unable, because of illness, to be present at the written examination of any course may apply for permission to present themselves at a supplementary examination of the same course to be held before the beginning of the First Semester of the following academic year. Any such application shall be made on the form prescribed within two weeks of the first day of the candidate's absence from any examination. Any supplementary examination shall be part of that academic year's examinations, and the provisions made in the regulations for failure at the first attempt shall apply accordingly.
- (c) Candidates suspended under Statute XXXI shall not be allowed to take, present themselves for, and participate in any assessments during the period of suspension, unless otherwise permitted by the Senate.
- (d) Candidates shall not be permitted to repeat a course for which they have received a D grade or above for the purpose of upgrading.
- (e) Candidates are required to make up for failed courses in the following manner as prescribed in the curriculum regulations:
  - (i) undergoing re-assessment/re-examination in the failed course to be held no later than the end of the following semester (not including the summer semester); or
  - (ii) re-submitting failed coursework, without having to repeat the same course of instruction; or
  - (iii) repeating the failed course by undergoing instruction and satisfying the assessments; or
  - (iv) for elective courses, taking another course in lieu and satisfying the assessment requirements.
- (f) There shall be no appeal against the results of examinations and all other forms of assessment.

# **UG 8** Grading system:

(a) The grades, their standards and the grade points for assessment shall be as follows<sup>6</sup>:

Grade		Standard	Grade Point
A+	1		4.3
A	}	Excellent	4.0
A-	J		3.7
B+	1		3.3
В	}	Good	3.0
В-	J		2.7
C+	1		2.3
C	}	Satisfactory	2.0
C-	J	•	1.7
D+	l	Pass	1.3
D	ſ	rass	1.0
F		Fail	0

<sup>6</sup> UG 8 is not applicable to the respective Professional Core of the BDS and MBBS curricula.

(b) Special permission may be given by Senate for courses in individual curricula to be graded as 'Pass', 'Fail' or 'Distinction'. Such courses will not be included in the calculation of the GPA.

#### **UG9** Honours classifications:

(a) Honours classifications shall be awarded in five divisions<sup>7</sup>: First Class Honours, Second Class Honours Division One, Second Class Honours Division Two, Third Class Honours, and Pass. The classification of honours shall be determined by the Board of Examiners for the degree in accordance with the following Cumulative GPA scores, with all courses taken (including failed courses) carrying equal weighting:

Class of honours	CGPA range
First Class Honours	3.60 - 4.30
Second Class Honours	(2.40 - 3.59)
Division One	3.00 - 3.59
Division Two	2.40 - 2.99
Third Class Honours	1.70 - 2.39
Pass	1.00 - 1.69

- (b) Honours classification may not be determined solely on the basis of a candidate's Cumulative GPA and the Board of Examiners for the degree may, at its absolute discretion and with justification, award a higher class of honours to a candidate deemed to have demonstrated meritorious academic achievement but whose Cumulative GPA falls below the range stipulated in UG9(a) of the higher classification by not more than 0.1 Grade Point.
- (c) A list of candidates who have successfully completed all degree requirements shall be posted on Faculty noticeboards.

<sup>&</sup>lt;sup>7</sup> UG 9 is not applicable to the BChinMed, BDS and MBBS curricula.

# REGULATIONS FOR FIRST DEGREE CURRICULA

Regulations for First Degree Curricula (for students admitted under the 4-year curriculum to the first year in the academic year 2013-14, and students admitted directly to the third year in 2015-16)

(See also General Regulations)

#### **UG 1 Definitions:**

For the purpose of regulations and syllabuses for all first degree curricula unless otherwise defined —

An 'academic year' comprises two semesters, the first semester to commence in September and end in December, and the second semester to commence in January and end in May/June, on dates as prescribed by the Senate. It includes, normally at the end of each semester, a period during which candidates are assessed. For some curricula, a 'summer semester' may be organized in addition to the normal two semesters. Clinical curricula have extended semesters.

A 'summer semester' normally comprises seven to eight weeks of intensive timetabled teaching and assessment to commence four weeks after the end of the second semester assessment period, and to conclude about one week before the start of the next academic year.

The 'maximum period of registration' is equivalent to a period which is 150% of the curriculum's normative period of study as specified in the degree regulations, provided that where this results in a residual fraction of an academic year, the fractional period shall be extended to one full academic year.

'Degree curriculum' means the entire study requirements for the award of an undergraduate degree.

'Major programme' means the study requirements, including a capstone experience, for a single major area of disciplinary, interdisciplinary or multidisciplinary study, accumulating not fewer than 72 credits nor more than 96 credits, as prescribed in the syllabuses for a degree curriculum.

'Minor programme' means the study requirements for a single minor area of disciplinary, interdisciplinary or multidisciplinary study, accumulating not fewer than 36 credits nor more than 48 credits, as prescribed in the syllabuses for a degree curriculum.

'Professional core' refers to the study requirements, including a capstone experience, prescribed in the regulations and syllabuses for disciplinary studies in degree curricula which are not structured as major/minor programmes for reasons relating to professional qualification and/or accreditation.

'Course' means a course of study, with a credit value expressed as a number of credit-units

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<sup>&</sup>lt;sup>1</sup> These regulations are applicable to candidates admitted from 2016-17 onwards to the first year of first degree curricula under the 4-year '2012 curriculum', the 2-year curriculum in respect of the BSc(IM), the 5-year curriculum in respect of the BA&BEd(LangEd), BEd&BSc, BEd&BSocSc, BSc(Sp&HearSc), and BNurs, and the 6-year curriculum in respect of the BChinMed, BDS and MBBS. Reference in these regulations to the powers of the Boards of Faculties shall be applicable to Senate Boards of Studies which administer first degree curricula.

<sup>(</sup>The Regulations for First Degree Curricula applicable to cohorts admitted in 2012-13 and 2013-14 under the 4-year '2012 curriculum' can be found in the Calendar for 2013-14, and in the Calendar for 2014-15 for the cohorts admitted in 2014-15 and 2015-16.)

as specified in the syllabuses for a degree curriculum.

'Disciplinary elective course' or 'Disciplinary Elective' means any course offered in the same major or minor programme or the professional core which can be taken by candidates to fulfill the curriculum requirements as specified in the syllabuses of the degree curriculum.

'Elective course' or 'Elective' means any course offered within the same or another curriculum, other than compulsory courses in the candidate's degree curriculum, that can be taken by the candidate in order to complete the credit requirements of the degree curriculum.

'Capstone experience' refers to one or more courses within the major programme or professional core which are approved by the Board of the Faculty for the purpose of integrating knowledge and skills acquired, and which are prescribed in the syllabuses of the degree curriculum.

'Syllabus' means courses taught by departments, centres, and schools, offered under a degree curriculum.

'Prerequisite' means a course or a group of courses which candidates must have completed successfully or a requirement which candidates must have fulfilled before being permitted to take the course in question.

'Corequisite' means a course which candidates must take in conjunction with the course in question.

'Credits' or 'credit-units' means the value assigned to each course to indicate its study load relative to the total study load under a degree curriculum. The study load refers to the hours of student learning activities and experiences, both within and outside the classroom, and includes contact hours and time spent on assessment tasks and examinations. Candidates who satisfactorily complete courses with a credit value earn the credits assigned to these courses.

'Grade Points' are standardized measurements of candidates' academic achievement in courses taken to satisfy the requirements of the degree curriculum and are expressed as a scale prescribed in these regulations.

'Grade Point Average' is a numerical measure of a candidate's academic achievement over a specified period of time. Each course attempted (including each failed course) is assigned a numerical value, with all courses carrying equal weighting. This numerical value is the product of grade points earned for the course and the credit value of that course. The 'Grade Point Average' is the sum of these numerical values divided by the total number of credits attempted:

$$GPA = \frac{\sum\limits_{i}^{\Sigma} Course\ Grade\ Point \times Course\ Credit\ Value}{\sum\limits_{i}^{\Sigma} Course\ Credit\ Value}$$

(where 'i' stands for all passed and failed courses taken by the student over a specified period)

'Semester Grade Point Average' or 'Semester GPA' is the GPA in respect of courses attempted by a candidate (including failed courses) during a given semester.

'Year Grade Point Average' or 'Year GPA' is the GPA in respect of courses attempted by a candidate (including failed courses) during a given academic year.

'Cumulative Grade Point Average' or 'Cumulative GPA' is the GPA in respect of courses attempted by a candidate (including failed courses) at the time of calculation.

'Assessment' refers to judgment about the quality and extent to which a student has achieved the stated learning objectives or learning outcomes. It includes all types of assessment activities which allow for such a judgment to be made. For the purpose of interpreting the relevant provisions of the Ordinance and the Statutes and where appropriate, reference to 'examination' or 'examinations' in the Ordinance and the Statutes shall include

and cover all forms of 'assessment' and its related processes.

A 'transcript' refers to a transcript of the record of study of a candidate, issued by the Registry of the University.

### **UG 2** Advanced standing:

Advanced standing may be granted to candidates in recognition of studies completed successfully in an approved institution of higher education elsewhere. Candidates who are awarded Advanced Standing will not be granted any further credit transfer for those studies for which Advanced Standing has been granted. The amount of credits to be granted for advanced standing shall be determined by the Board of the Faculty, in accordance with the following principles:

- (a) at least half the number of credits of the degree curriculum normally required for award of the degree shall be accumulated through study at this University or from transfer of credits for courses completed at other institutions in accordance with Regulation UG 4(d); and
- (b) in accordance with Statute III.5 and notwithstanding the granting of advanced and/or transfer credits, a minimum of two semesters of study at this University shall be required before a candidate is considered for the award of a first degree, other than a degree in medicine or surgery, and a minimum of four semesters of study at this University shall be required before a candidate is considered for a first degree in medicine or surgery.

Credits granted for advanced standing shall not normally be included in the calculation of the GPA unless permitted by the Board of the Faculty but will be recorded on the transcript of the candidate.

# **UG 3** Period of study:

The period of study of the curriculum shall be specified in the regulations governing the degree. To be eligible for award of the degree, a candidate shall fulfill all curriculum requirements within the maximum period of registration, unless otherwise permitted or required by the Board of the Faculty.

# **UG 4** Progression in curriculum:

- (a) Candidates shall normally be required to take not fewer than 24 credits nor more than 30 credits in any one semester (except the summer semester) unless otherwise permitted or required by the Board of the Faculty, or except in the last semester of study when the number of outstanding credits required to complete the curriculum requirements is fewer than 24 credits.
- (b) Candidates may, of their own volition, take additional credits not exceeding 6 credits in each semester, and/or further credits during the summer semester, accumulating up to a maximum of 72 credits in one academic year. With the special permission of the Board of the Faculty, candidates may exceed the annual study load of 72 credits in a given academic year provided that the total number of credits taken does not exceed the maximum curriculum study load for the normative period of study specified in the curriculum regulations, save as provided for under UG4(c).
- (c) Where candidates are required to make up for failed credits, the Board of the Faculty may give permission for candidates to exceed the annual study load of 72 credits provided that the total number of credits taken does not exceed the maximum curriculum study load for the maximum period of registration specified in the curriculum regulations.
- (d) Candidates may, with the approval of the Board of the Faculty, transfer credits for courses completed at other institutions at any time during their candidature. The

number of transferred credits may be recorded in the transcript of the candidate, but the results of courses completed at other institutions shall not be included in the calculation of the GPA. The number of credits to be transferred shall not exceed half of the total credits normally required under the degree curricula of the candidates during their candidature at the University.

- (e) Unless otherwise permitted by the Board of the Faculty, candidates shall be recommended for discontinuation of their studies if they have:
  - (i) failed to complete successfully 36 or more credits in two consecutive semesters (not including the summer semester), except where they are not required to take such a number of credits in the two given semesters, or
  - (ii) failed to achieve an average Semester GPA of 1.0 or higher for two consecutive semesters (not including the summer semester), or
  - (iii) exceeded the maximum period of registration specified in the regulations of the degree.

# UG 5 Requirements for graduation:

To be eligible for admission to the degree, candidates shall fulfill the following requirements in addition to the requirements prescribed in the regulations and syllabuses governing the degree curriculum within the maximum period of registration:

- (a) successful completion of 12 credits in English language enhancement, including 6 credits in Core University English<sup>2</sup> and 6 credits in an English in the Discipline course<sup>3</sup>;
- (b) successful completion of 6 credits in Chinese language enhancement<sup>4</sup>;
- (c) successful completion of 36 credits of courses in the Common Core Curriculum, comprising at least one and not more than two courses from each Area of Inquiry<sup>5</sup> with not more than 24 credits of courses being selected within one academic year except where candidates are required to make up for failed credits; and
- (d) successful completion of a capstone experience as specified in the syllabuses of the degree curriculum.

#### **UG 6** Exemption:

- (b) Candidates declaring double Majors can, if they fail in the ED course for one of the Majors, either (i) re-take and successfully complete that failed ED course, or (ii) successfully complete the ED course for the other Major, irrespective of whether the Major is offered within or outside of the candidates' home Faculty.
- (c) Candidates who undertake studies in double Majors or double degrees are not required to take a second ED course but may be advised by the Faculty to do so.

<sup>&</sup>lt;sup>2</sup> Candidates who have achieved Level 5\*\* in English Language in the Hong Kong Diploma of Secondary Education Examination, or equivalent, may at the discretion of the Faculty be exempted from this requirement and should take an elective course in lieu, see *Regulation UG6*.

<sup>3 (</sup>a) To satisfy the English in the Discipline (ED) requirement, candidates who have passed the ED course for a Major but subsequently change that Major are required to pass the ED course for the new Major, or either of the double Majors finally declared upon graduation irrespective of whether the second Major is offered within or outside of the candidates' home Faculty.

<sup>&</sup>lt;sup>4</sup> Candidates who have not studied Chinese language during their secondary education may be exempted from this requirement and should take an elective course in lieu, see *Regulation UG6*.

<sup>&</sup>lt;sup>5</sup> Candidates registered for double degree studies are required to successfully complete 24 credits of courses in the Common Core Curriculum, selecting one course from each Area of Inquiry, within the curriculum of the first degree, as appropriate.

Candidates may be exempted, with or without special conditions attached, from any of the requirements in UG 5 by the Senate in exceptional circumstances. Candidates who are so exempted must replace the number of exempted credits with courses of the same credit value.

#### UG 7 Assessment:

- (a) Candidates shall be assessed for each of the courses for which they have registered, and assessment may be conducted in any combination of continuous assessment of coursework, written examinations and/or any other assessable activities. Only passed courses will earn credits.
- (b) Candidates who are unable, because of illness, to be present at the written examination of any course may apply for permission to present themselves at a supplementary examination of the same course to be held before the beginning of the First Semester of the following academic year. Any such application shall be made on the form prescribed within two weeks of the first day of the candidate's absence from any examination. Any supplementary examination shall be part of that academic year's examinations, and the provisions made in the regulations for failure at the first attempt shall apply accordingly.
- (c) Candidates shall not be permitted to repeat a course for which they have received a D grade or above for the purpose of upgrading.
- (d) Candidates are required to make up for failed courses in the following manner as prescribed in the curriculum regulations:
  - (i) undergoing re-assessment/re-examination in the failed course to be held no later than the end of the following semester (not including the summer semester); or
  - (ii) re-submitting failed coursework, without having to repeat the same course of instruction; or
  - (iii) repeating the failed course by undergoing instruction and satisfying the assessments; or
  - (iv) for elective courses, taking another course *in lieu* and satisfying the assessment requirements.
- (e) There shall be no appeal against the results of examinations and all other forms of assessment.

#### **UG 8** Grading system:

(a) The grades, their standards and the grade points for assessment shall be as follows<sup>6</sup>:

Grade		Standard	Grade Point
A+	1		4.3
A	}	Excellent	4.0
A-	J		3.7
B+	1		3.3
В	}	Good	3.0
B-	J		2.7
C+	1		2.3
C	}	Satisfactory	2.0
C-	J	•	1.7
D+	1	D	1.3
D	}	Pass	1.0
F		Fail	0
			-

(b) Special permission may be given by Senate for courses in individual curricula to be

<sup>&</sup>lt;sup>6</sup> UG 8 is not applicable to the respective Professional Core of the BDS and MBBS curricula.

graded as 'Pass', 'Fail' or 'Distinction'. Such courses will not be included in the calculation of the GPA.

#### **UG 9** Honours classifications:

(a) Honours classifications shall be awarded in five divisions<sup>7</sup>: First Class Honours, Second Class Honours Division One, Second Class Honours Division Two, Third Class Honours, and Pass. The classification of honours shall be determined by the Board of Examiners for the degree in accordance with the following Cumulative GPA scores, with all courses taken (including failed courses) carrying equal weighting:

<u>Class of honours</u>	<u>CGPA range</u>
First Class Honours	3.60 - 4.30
Second Class Honours	(2.40 - 3.59)
Division One	3.00 - 3.59
Division Two	2.40 - 2.99
Third Class Honours	1.70 - 2.39
Pass	1.00 - 1.69

- (b) Honours classification may not be determined solely on the basis of a candidate's Cumulative GPA and the Board of Examiners for the degree may, at its absolute discretion and with justification, award a higher class of honours to a candidate deemed to have demonstrated meritorious academic achievement but whose Cumulative GPA falls below the range stipulated in UG9(a) of the higher classification by not more than 0.1 Grade Point.
- (c) A list of candidates who have successfully completed all degree requirements shall be posted on Faculty noticeboards.

<sup>7</sup> UG 9 is not applicable to the BChinMed, BDS and MBBS curricula.

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**Teaching Weeks** 

# SCIENCE

# SECTION XI Teaching Weeks

 $Teaching\ Weeks\ 2021-22\ for\ Undergraduate\ and\ Taught\ Postgraduate\ Students$ 

	SUN	MON	TUE	WED	THUR	FRI	SAT	FIRST SEMESTER: SEP 1 - DEC 23, 2021	Week
SEP-21	5 12 19 26	6 13 20 27	7 14 21 28	1 8 15 [22] 29	2 9 16 23 30	3 10 17 24	4 11 18 25	First Day of Teaching: Sep 1, 2021	1 2 3 4 5
OCT-21	3 10 17 24 31	4 11 18 25	5 12 19 26	6 13 20 27	7 [14] 21 28	[1] 8 15 22 29	2 9 16 23 30	Reading/ Field Trip Week: Oct 11 - 16, 2021	6 7(Reading) 8 9
NOV-21	7 14 21 28	1 8 15 22 29	2 9 16 23 30	3 10 17 24	4 11 18 25	5 12 19 26	6 13 20 27	Last Day of Teaching: Nov 30, 2021	10 11 12 13
DEC-21	5 12 19 26	6 13 20 [27]	7 14 21 28	1 8 15 22 29	2 9 16 23 30	3 10 17 (24) <31>	4 11 18 [25]	Revision Period: Dec 1 - 7, 2021 Assessment Period: Dec 8 - 23, 2021	14(Revision) 1 2 3 Break
JAN-22	2 9 16	3 10 17 24	4 11 18 25	5 12 19 26	6 13 20 27	7 14 21 28	[1] 8 15 22 29	SECOND SEMESTER: JAN 17 - MAY 28, 2022 First Day of Teaching: Jan 17, 2022	Break Break 1 2
FEB-22	6 13 20 27	<31> 7 14 21 28	[1] 8 15 22	9 16 23	[3] 10 17 24	11 18 25	5 12 19 26	Class Suspension Period for the Lunar New Year: Feb 1 - 7, 2022	3 4 5
MAR-22	6 13 20 27	7 14 21 28	1 8 15 22 29	2 9 (16) 23 30	3 10 17 24 31	4 11 18 25	5 12 19 26	Reading/ Field Trip Week: Mar 7 - 12, 2022	6 7(Reading) 8 9 10
APR-22	3 10 17 24	4 11 [18] 25	[5] 12 19 26	6 13 20 27	7 14 21 28	1 8 [15] 22 29	2 9 [16] 23 30	Last Day of Teaching: Apr 30, 2022	11 12 13 14
MAY-22	1 8 15 22 29	[2] [9] 16 23 30	3 10 17 24 31	4 11 18 25	5 12 19 26	6 13 20 27	7 14 21 28	Revision Period: May 2 - 7, 2022 Assessment Period: May 9 - 28, 2022	15(Revision) 1 2 3
JUN-22	5 12 19 26	6 13 20 27	7 14 21 28	1 8 15 22 29	2 9 16 23 30	[3] 10 17 24	4 11 18 25	OPTIONAL SUMMER SEMESTER JUN 27 - AUG 20, 2022	Break Break Break Break 1
JUL-22	3 10 17 24 31	4 11 18 25	5 12 19 26	6 13 20 27	7 14 21 28	[1] 8 15 22 29	2 9 16 23 30		2 3 4 5
AUG-22	7 14 21 28	1 8 15 22 29	2 9 16 23 30	3 10 17 24 31	4 11 18 25	5 12 19 26	6 13 20 27		6 7 8
[] General Holic () University Ho	oliday (Full Da				Reading/ Fiel Revision Per Class Suspen	iod	for the Lunar N	Jew Year	

#### Notes:

First Semester: 12 Mondays and Tuesdays, 11 Wednesdays, 12 Thursdays, 11 Fridays, 12 Saturdays Second Semester: 11.5 Mondays, 12 Tuesdays and Wednesdays, 13 Thursdays, 12 Fridays and Saturdays

Assessment Period

# **Useful contacts and websites**

# SCIENCE

# Useful contacts and websites

Faculty of Science Office Location: Ground Floor,

Chong Yuet Ming Physics Building

Tel : 3917 2683 Fax : 2858 4620

Email : science@hku.hk (General Enquiries)

sci.ug.enquiry@hku.hk (Academic Matters) sci.ug.el@hku.hk (Experiential Learning &

**Enrichment Opportunities**)

Website : https://www.scifac.hku.hk/

(Please visit <a href="https://www.scifac.hku.hk/">https://www.scifac.hku.hk/</a> for the latest updates of BSc courses, timetables, notices and forms)

Departments/Schools

Biological Sciences Website : https://www.biosch.hku.hk/
Biomedical Sciences Website : http://www.sbms.hku.hk/

Chemistry Website : https://www.chemistry.hku.hk/
Earth Sciences Website : https://www.earthsciences.hku.hk/
Mathematics Website : https://hkumath.hku.hk/web/index.php

Physics Website : https://www.physics.hku.hk/
Statistics and Actuarial Science Website : https://saasweb.hku.hk/

Academic Advising Office Tel : 3917 0128

Website : http://aao.hku.hk

Academic Services Office Office Location: G04, Run Run Shaw Building

Tel : 2859 2433 Fax : 2540 1405 Email : asoffice@hku.hk

Website : http://www.ase.hku.hk

Common Core courses Website : https://commoncore.hku.hk/

HKU Worldwide Undergraduate

Exchange Programme

Website : https://aal.hku.hk/studyabroad/

Centre of Development and Tel : 3917 2305

Resources for Students (CEDARS) Website : https://www.cedars.hku.hk/

University Health Service Tel : 3917 2501 (General enquiries)

2549 4686 (Medical appointments only)

Website : http://www.uhs.hku.hk

Plagiarism Website : https://tl.hku.hk/plagiarism/