BSc

Syllabuses and Regulations

2019-2020

Faculty of ScienceThe 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 2019-2020 and thereafter are required to complete at least one Science major out of the 14 regular or 6 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 for students admitted under the 4-year 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) UG5:

- 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:

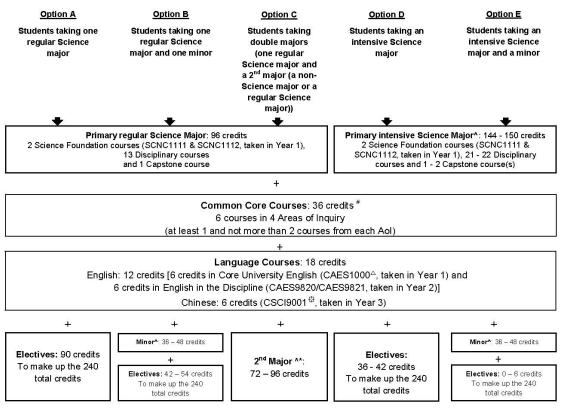
- 16 courses for the regular Science major including 2 Science Foundation courses, Disciplinary courses and capstone course (96 credits)
- A choice of 15 courses as elective courses, or to fulfill the requirements of a minor or a second major (90 credits)

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:

[#] 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 Literacy; (2) 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 vear 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 English¹ (i.e. CAES1000) and 6 credits in an English in the Discipline course² (i.e. CAES9820 Academic English for Science Students);
 - 6 credits in Chinese language enhancement³ (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 Inquiry⁴ 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 enhancement³ (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 Inquiry⁴ 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:

- 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 OR CAES9821 Professional and Technical Communication for Mathematical Sciences);
 - 6 credits in Chinese language enhancement³ (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 Inquiry⁴ 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

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:

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.

- holder of a Bachelor's degree from an English-medium university

¹ 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

⁻ 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
- ² (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.
- ³ 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:

BS	c - Major	Recognized Capstone Courses
1.	Biochemistry	1. BIOC3999 Directed studies in biochemistry (6) 2. BIOC4966 Biochemistry internship (6)
		3. BIOC4999 Biochemistry project (12)
2.	Biological Sciences	1. BIOL3994 Directed studies in biological sciences (6)
		 BIOL4964 Biological sciences internship (6) BIOL4994 Biological sciences project (12)
3.	Chemistry	CHEM3999 Directed studies in chemistry (6)
٠.	Chemistry (Intensive)	2. CHEM4910 Chemistry literacy and research (6)
		3. CHEM4911 Capstone experience for chemistry undergraduates: HKUtopia (6)
		4. CHEM4966 Chemistry internship (6)
		5. CHEM4999 Chemistry project (12)
	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)
7	Earth System Science	4. STAT4799 Statistics project (12) 1. EASC4911 Earth system: contemporary issues (6)
	<u> </u>	
	Ecology & Biodiversity	BIOL4991 Ecology & biodiversity project (12) BIOL3991 Directed studies in ecology & biodiversity (6)
80.	Ecology & Biodiversity	2. BIOL4911 Conservation science in practice (6)
		3. BIOL4991 Ecology & biodiversity project (12)
Q2	Environmental Science	ENVS3999 Directed studies in environmental science (6)
Ju.	Environmental science	2. ENVS4966 Environmental science internship (6)
		3. ENVS4999 Environmental science project (12)
9b.	Environmental Science (Intensive)	1. 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)
12	M-41	5. MATH4999 Mathematics project (12) 1. MATH3999 Directed studies in mathematics (6)
13.	Mathematics / Physics	MATH3999 Directed studies in mathematics (6) MATH4910 Senior mathematics seminar (6)
		3. MATH4910 Selifor mathematics scriminar (0)
		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)
		2. BIOL4963 Molecular biology & biotechnology internship (6)
		3. BIOL4993 Molecular biology & biotechnology project (12)
	Astronomy	1. PHYS3999 Directed studies in physics (6)
16.	Physics (Intensive)	 PHYS4966 Physics internship (6) PHYS4999 Physics project (12)
Щ	1 hysics (intensive)	3. 1111 57//7 1 Hysics project (12)

Credit Unit Statement of

BSc Degree Curriculum

SECTION III Credit Unit Statement of the BSc Degree Curriculum (4-year)

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)

description of individual courses.

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

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 (Major)	✓	✓	✓	✓		✓
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)	✓	✓	✓	√	✓	✓
Environmental Science (Major & Minor)	✓	✓	✓	√	✓	✓
Food & Nutritional Science (Major & Minor)	✓	✓	✓	✓		✓
Geology (Intensive Major & Major)	✓	✓	✓	✓	✓	✓
Marine Biology (Minor)	✓	✓	✓	✓	✓	✓
Mathematics (Intensive Major, Major & Minor)	✓	✓	✓	✓		✓
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 2019-2020 and 2020-2021

SECTION IV List of BSc Courses on offer in 2019/2020 and 2020/2021

Course Code	Title	Credit	Pre-requisite	Availa	able in	Semester offered in 2019 - 2020	Exam. held in 2019 - 2020	Quota	Course Coordinator		Major / (The Major/Minor that th		
				2019 - 2020	2020 - 2021	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 B	iomedical Sciences												
BIOC1600	Perspectives in biochemistry	6	Level 3 or above in HKDSE Biology, Chemistry, or Combined Science with Biology or Chemistry component, or equivalent	Y	Y	1	Dec		Dr J Tanner, Biomedical Sciences	Major in Biochemistry (2014,2013,2012)	Major in Biochemistry (2019,2018,2017,2016, 2015); Minor in Biochemistry (2019,2018,2017,2016, 2015,2014,2013,2012)		
BIOC2600	Basic biochemistry	6	Pass in BIOC1600 or BIOL1110 or ENGG1207; 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 (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Biological Sciences (2019,2018,2017,2016, 2015); Major in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2014,2013,2012); Major in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (Intensive) (2019,2018,2017,2016, 2015)	Minor in Biochemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012)		
BIOC3601	Basic metabolism	6	Pass in BIOC2600 or BIOL2220 or MEDE2301	Y	Y	1	Dec	80	Dr N S Wong, Biomedical Sciences	Major in Biochemistry (2019,2018,2017,2016, 2015,2014,2013,2012)	Minor in Biochemistry (2019,2018,2017,2016, 2015,2014,2013,2012)		
BIOC3604	Essential techniques in biochemistry and molecular biology	6	Pass in BIOC2600 or BIOL2220 or MEDE2301	Y	Y	2	May	70	Dr K M Yao, Biomedical Sciences	Major in Biochemistry (2019,2018,2017,2016, 2015,2014,2013,2012)	Minor in Biochemistry (2019,2018,2017,2016, 2015,2014,2013,2012)		
BIOC3605	Sequence bioinformatics	6	Pass in BIOC2600 or BIOL2220 or BBMS2003 or BBMS2007 or MEDE2301	Y	Y	2	May	50	Dr B C W Wong, Biomedical Sciences		Major in Biochemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Biochemistry (2019,2018,2017,2016, 2015,2014,2013,2012)		
BIOC3606	Molecular medicine	6	Pass in BIOC2600 or BIOL2220 or MEDE2301	Y	Y	2	May	50	Prof D Y Jin, Biomedical Sciences		Major in Biochemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Food & Nutritional Science (2019); Minor in Biochemistry (2019,2018,2017,2016, 2015,2014,2013,2012)		
BIOC3999	Directed studies in biochemistry	6	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in Biochemistry Major including BIOC2600 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.	Y	Y	1, 2, S	No exam	36	Prof J D Huang, Biomedical Sciences				Major in Biochemistry (2019,2018,2017,201 2015,2014,2013,2012

[^] Availability of courses in 2020-2021 is subject to change.

BIOC4610	Advanced biochemistry	6	Pass in BIOC3601 or BIOL3401 or BIOL3402 or BIOL3404	Y	Y	1	Dec	50	Dr K M Yao, Biomedical Sciences	Major in Biochemistry (2019,2018,2017,2016, 2015,2014,2013,2012)	Minor in Biochemistry (2019,2018,2017,2016, 2015,2014,2013,2012)	
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 (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Biochemistry (2019,2018,2017,2016, 2015,2014,2013,2012)	
BIOC4613	Advanced techniques in biochemistry & molecular biology	6	Pass in BIOC3604	Y	Y	1	Dec	70	Prof D Chan, Biomedical Sciences	Major in Biochemistry (2019,2018,2017,2016, 2015,2014,2013,2012)	Minor in Biochemistry (2019,2018,2017,2016, 2015,2014,2013,2012)	
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	Prof J D Huang, Biomedical Sciences			Major in Biochemistry (2019,2018,2017,2016, 2015,2014,2013,2012)
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 (2019,2018,2017,2016, 2015,2014,2013,2012)
School of Bi	ological Sciences					!			1	!	!	
BIOL1110	From molecules to cells	6	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) course.	Y	Y	1, 2	Dec, May	420	Prof B K C Chow, Biological Sciences	Major in Biochemistry (2014,2013,2012); Major in Biological Sciences (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Ecology & Biodiversity (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Ecology & Biodiversity (Intensive) (2019,2018,2017,2016, 2015); Major in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (Intensive) (2019,2018,2017,2016, 2019,2018,2018,2018,2018,2018,2018,2018,2018	Major in Biochemistry (2019,2018,2017,2016, 2015); Minor in Biochemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Plant Science (2019,2018,2017,2016, 2015,2014,2013,2012)	

		[2015)		
BIOL1111	Introductory microbiology	6	NIL	N	N			80	, Biological Sciences	Major in Biological Sciences (2014,2013,2012)		
BIOL1201	Introduction to food and nutrition	6	NIL	Υ	Y	1	Dec	150	Dr L Zhang, Biological Sciences	Major in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012)	Minor in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012)	
BIOL1309	Evolutionary diversity	6	NIL	Y	Y	2	May	250	Prof R M K Saunders, Biological Sciences	Major in Biological Sciences (2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012); Major in Earth System Science (2014, 2013, 2012); Major in Ecology & Biodiversity (2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012); Major in Ecology & Biodiversity (Intensive) (2019, 2018, 2017, 2016, 2015); Major in Food & Nutritional Science (2016, 2015, 2014); Minor in Ecology & Biodiversity (2019, 2018, 2017, 2016, 2015, 2014); Minor in Ecology & Biodiversity (2019, 2018, 2017, 2016, 2015, 2014, 2015, 2014, 2015, 2014, 2015, 2014, 2015, 2014, 2015, 2014, 2015, 2014, 2015, 2014);	Major in Earth System Science (2016,2015); Major in Food & Nutritional Science (2013); Major in Food & Nutritional Science (2013); Major in Molecular Biology & Biotechnology (2019,2018,2017,2016,2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (1019,2018,2017,2016,2015); Minor in Marine Biology (2019,2018,2017,2016,2015,2014,2013,2012); Minor in Molecular Biology & Biotechnology (2019,2018,2017,2016,2015,2014,2013,2012); Minor in Molecular Biology & Biotechnology (2019,2018,2017,2016,2015,2014,2013,2012); Minor in Plant Science (2019,2018,2017,2016,2015,2014,2013,2012)	
BIOL1501	Bioethics	6	NIL	N	N			40	, Biological Sciences			
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.	Υ	Y	1	Dec	70	Dr J C Y Lee, Biological Sciences	Major in Food & Nutritional Science (2019,2018,2017)	Minor in Food & Nutritional Science (2019,2018,2017)	
BIOL2102	Biostatistics	6	Pass in BIOC1600 or BIOL1110 or BIOL2306 or ENVS1301 or ENVS2002	Y	Y	2	May	169	Prof. K M Y Leung, Biological Sciences	Major in Biological Sciences (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Ecology & Biodiversity (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Ecology & Biodiversity (Intensive) (2019,2018,2017,2016, 2015); Major in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Molecular Biology & Biotechnology	Major in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Environmental Science (2012); Minor in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012)	

										(Intensive) (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 (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Ecology & Biodiversity (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Ecology & Biodiversity (Intensive) (2019,2018,2017,2016, 2015); Major in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (1019,2018,2017,2016, 2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (Intensive) (2019,2018,2017,2016, 2015,2014,2013,2017,2016, 2019,2018,2017,2016, 2015)	Minor in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Plant Science (2019,2018,2017,2016, 2015,2014,2013,2012)	
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 (2019,2018,2017,2016, 2015); Major in Biological Sciences (2019,2018,2017,2016, 2015); Major in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (1019,2018,2017,2016, 2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (Intensive) (2019,2018,2017,2016, 2015)	Minor in Biochemistry (2019,2018,2017,2016, 2015); Minor in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Plant Science (2019,2018,2017,2016, 2015,2014,2013,2012)	
BIOL2306	Ecology and evolution	6	Pass in BIOL1110 or BIOL1309 or ENVS1301 or ENVS1401	Y	Y	1	Dec	80	Prof D Dudgeon, Biological Sciences	Major in Biological Sciences (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Ecology & Biodiversity (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Ecology & Biodiversity (Intensive) (2019,2018,2017,2016, 2015); Major in Food & Nutritional Science (2012); Minor in Ecology & Biodiversity (2019,2018,2017,2016, 2015),2014,2013,2012)	Major in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Food & Nutritional Science (2013); Major in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (Intensive) (2019,2018,2017,2016, 2015); Minor in Marine Biology (2019,2018,2017,2016,	

											2015,2014,2013,2012); Minor in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012)	
BIOL2408	Green earth-plants and mankind	6	Pass in BIOL1110	N	Y			40	Prof. M L Chye, Biological Sciences		Major in Molecular Biology & Biotechnology (Intensive) (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) (2019,2018,2017,2016, 2015)		
BIOL3101	Animal behaviour	6	Pass in BIOL2306	Y	Y	1	Dec	30	Dr S Sin, Biological Sciences	Major in Ecology & Biodiversity (Intensive) (2019,2018,2017,2016, 2015)	Major in Ecology & Biodiversity (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Ecology & Biodiversity (2019,2018,2017,2016, 2015,2014,2013,2012)	
BIOL3105	Animal physiology and environmental adaptation	6	Pass in BIOL2103 or BIOL2220 or BIOC2600 or MEDE2301	N	Y			60	Prof A O L Wong, Biological Sciences		Major in Biological Sciences (2019,2018,2017,2016, 2015,2014,2013,2012)	
BIOL3107	Plant physiology	6	Pass in BIOL2103	N	N			30	TBC, Biological Sciences		Major in Biological Sciences (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (Intensive) (2019,2018,2017,2016, 2015); Minor in Plant Science (2019,2018,2017,2016, 2015,2014,2013,2012)	
BIOL3108	Microbial physiology	6	Pass in BIOC2600 or BIOL2103 or BIOC3604	N	N			50	Dr A Yan, Biological Sciences		Major in Biological Sciences (2015,2014,2013,2012)	
BIOL3109	Environmental microbiology	6	Pass in BIOL2103	Y	Y	2	May	40	Dr J D Gu, Biological Sciences		Major in Biological Sciences (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Ecology & Biodiversity (2016,2015,2014,2013, 2012)	
BIOL3110	Environmental toxicology	6	Pass in BIOL2103 or CHEM3141 or ENVS3042	Y	Y	2	May	60	Dr J D Gu, Biological Sciences		Major in Biological Sciences (2015,2014,2013,2012): Major in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012): Minor in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012)	

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.	Y	Y	1	Dec	30	Dr J C Y Lee, Biological Sciences	Major in Food & Nutritional Science (2016,2015,2014,2013, 2012)	Minor in Food & Nutritional Science (2016,2015,2014,2013, 2012)
BIOL3202	Nutritional biochemistry	6	Pass in BIOC2600 or BIOL2220 or MEDE2301	Y	Y	1	Dec	90	Dr C B Chan, Biological Sciences	Major in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012)	Major in Biochemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Biochemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012)
BIOL3203	Food microbiology	6	Pass in BIOC2600 or BIOL2220 or MEDE2301	Y	Y	2	May	80	Dr H S El-Nezami, Biological Sciences	Major in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012)	Major in Biological Sciences (2019,2018,2017,2016) ; Minor in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012)
BIOL3204	Nutrition and the life cycle	6	Pass in BIOL2220 or BIOC2600 or BIOL3202	Y	Y	2	May	70	Dr J C Y Lee, Biological Sciences		Major in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012)
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 (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (Intensive) (2019,2018,2017,2016, 2015); Minor in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012)
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, 2014,2013,2012); Minor in Food & Nutritional Science (2018,2017,2016,2015, 2014,2013,2012)
BIOL3207	Principles of toxicology	6	Pass in BIOC2600 or BIOL2220 or BIOL3205 or MEDE2301	Y	Y	2	May	80	Dr H S El-Nezami, Biological Sciences		Major in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012)
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 (2016,2015,2014,2013,

											2012); Minor in Food & Nutritional Science (2016,2015,2014,2013, 2012)	
BIOL3209	Food and nutrient analysis	6	Pass in BIOL2101 or BIOL3201	Y	Y	1	Dec	80	Dr J C Y Lee, Biological Sciences	Major in Food & Nutritional Science (2018,2017)	Major in Food & Nutritional Science (2019,2016,2015,2014, 2013,2012); Minor in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012)	
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 (2016,2015,2014,2013, 2012); Minor in Food & Nutritional Science (2016,2015,2014,2013, 2012); Minor in Plant Science (2019,2018,2017,2016, 2015,2014,2013,2012)	
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 (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012)	
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, 2014,2013,2012)	
BIOL3216	Food waste management	6	Pass in BIOL2101 or BIOL3201	Y	Y	2	May	30	Dr O Habimana, Biological Sciences		Major in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012)	
BIOL3217	Food, environment and health	6	Pass in BIOL 2101 or ENVS2001 or ENVS2002 or BIOL3201	Y	Y	2	No exam	50	Dr T. Sobko, Biological Sciences		Major in Environmental Science (2019,2018,2017,2016, 2015); Major in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012)	
BIOL3218	Food hygiene and quality control	6	Pass in BIOL2101 or BIOL3201 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 (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012)	
BIOL3301	Marine biology	6	Pass in BIOL2306 or ENVS2002	Y	Y	1	Dec	40	Dr M Yasuhara, Biological Sciences	Major in Ecology & Biodiversity (2019,2018,2017); Major in Ecology &	Major in Biological Sciences (2019,2018,2017,2016, 2015,2014,2013,2012);	

BIOL3302	Systematics and phylogenetics	6	Pass in BIOL1309; and	Y	Y	1	Dec	60	Prof R M K Saunders,	Biodiversity (Intensive) (2019,2018,2017,2016, 2015); Minor in Marine Biology (2019,2018,2017,2016, 2015,2014,2013,2012) Major in Ecology &	Major in Ecology & Biodiversity (2016,2015,2014,2013, 2012); Minor in Ecology & Biodiversity (2019,2018,2017,2016, 2015,2014,2013,2012) Major in Biological	
			Any level 2 BIOL course						Biological Sciences	Biodiversity (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Ecology & Biodiversity (Intensive) (2019,2018,2017,2016, 2015)	Sciences (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Ecology & Biodiversity (2019,2018,2017,2016, 2015,2014,2013,2012)	
BIOL3303	Conservation biology	6	Pass in BIOL2306	Y	Y	2	May		Dr T C Bonebrake, Biological Sciences	Major in Ecology & Biodiversity (2016, 2015, 2014, 2013, 2012); Major in Ecology & Biodiversity (Intensive) (2019, 2018, 2017, 2016, 2015)	Major in Biological Sciences (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Ecology & Biodiversity (2019,2018,2017); Major in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Ecology & Biodiversity (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Marine Biology (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Marine Biology (2019,2018,2017,2016, 2015,2014,2013,2012)	
BIOL3305	Tropical and temperate marine ecology field course	6	Pass in "C" or above in BIOL2306 or BIOL3301 or BIOL3303 or ENVS2001	N	Y	-		15	Dr B Russell, Biological Sciences		Major in Ecology & Biodiversity (2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012); Major in Ecology & Biodiversity (Intensive) (2019, 2018, 2017, 2016, 2015); Minor in Marine Biology (2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012)	
BIOL3313	Freshwater ecology	6	Pass in BIOL2102 and BIOL2306	N	Y	I		30	Prof D Dudgeon, Biological Sciences		Major in Ecology & Biodiversity (2019,2014,2017,2016, 2015,2014,2013,2012); Major in Ecology & Biodiversity (Intensive) (2019,2018,2017,2016, 2015); Minor in Ecology & Biodiversity (2019,2018,2017,2016, 2015,2014,2013,2012)	
BIOL3314	Plant structure and evolution	6	Pass in BIOL1309; and Any level 2 BIOL course	Y	Z	2	May	30	Prof R M K Saunders, Biological Sciences		Major in Biological Sciences (2019,2018,2017,2016) ; Major in Ecology & Biodiversity (2019,2018,2017,2016, 2015,2014,2013,2012);	

											Major in Ecology & Biodiversity (Intensive) (2019,2018,2017,2016, 2015); Minor in Ecology & Biodiversity (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Plant Science (2019,2018,2017,2016, 2015,2014,2013,2012)	
BIOL3318	Experimental intertidal ecology	6	Pass in BIOL2102 or BIOL3301	N	Y			20	Prof G A Williams, Biological Sciences		Major in Ecology & Biodiversity (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Ecology & Biodiversity (Intensive) (2019,2018,2017,2016, 2015); Minor in Ecology & Biodiversity (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Marine Biology (2019,2018,2017,2016, 2015,2014,2013,2012)	
BIOL3319	Tropical terrestrial ecology	6	Pass in BIOL1309 and BIOL2306	Y	Y	2	May	30	Dr B Guenard, Biological Sciences	Major in Ecology & Biodiversity (2019,2018,2017); Major in Ecology & Biodiversity (Intensive) (2019,2018,2017,2016, 2015)	Major in Biological Sciences (2019); Major in Ecology & Biodiversity (2016,2015,2014,2013, 2012); Minor in Ecology & Biodiversity (2019,2018,2017,2016, 2015,2014,2013,2012)	
BIOL3320	The biology of marine mammals	6	Pass in BIOL2306	N	N			30	, Biological Sciences		Major in Ecology & Biodiversity (2016, 2015, 2014, 2013, 2012); Minor in Ecology & Biodiversity (2016, 2015, 2014, 2013, 2012); Minor in Marine Biology (2016, 2015, 2014, 2013, 2012)	
BIOL3322	Marine invertebrate zoology	6	Pass in BIOL2306	Y	N	2	May	30	Dr S Cannicci, Biological Sciences		Major in Ecology & Biodiversity (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Ecology & Biodiversity (Intensive) (2019,2018,2017,2016, 2015); Minor in Marine Biology (2019,2018,2017,2016, 2015,2014,2013,2012)	
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 (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Ecology & Biodiversity (Intensive) (2019,2018,2017,2016, 2015); Minor in Marine Biology (2019,2018,2017,2016, 2015,2014,2013,2012)	
BIOL3401	Molecular biology	6	Pass in BIOC2600 or BIOL2103 or	Y	Υ	1	Dec	130	Dr K W Y Yuen,	Major in Biochemistry	Major in Biological	

			BIOL2220 or MEDE2301						Biological Sciences	(2019,2018,2017,2016, 2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (Intensive) (2019,2018,2017,2016, 2015); Minor in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015); Minor in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012)	Sciences (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Biochemistry (2019,2018,2017,2016, 2015,2014,2013,2012)	
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 (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (Intensive) (2019,2018,2017,2016, 2015)	Major in Biochemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Biological Sciences (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Biochemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012)	
BIOL3403	Immunology	6	Pass in BIOC2600 or BIOL2103 or BIOL2220 or MEDE2301	Y	Y	2	May	100	Dr W B L Lim, Biological Sciences		Major in Biochemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Biological Sciences (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (1019,2018,2017,2016, 2015); Milor in Molecular Biology & Biotechnology (1019,2018,2017,2016, 2015,2014,2013,2012); Milor in Molecular Biologhemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Milor in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012); Milor in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012)	
BIOL3404	Protein structure and function	6	Pass in BIOC2600 or BIOL2220 or MEDE2301	Y	Y	2	May	70	Dr Y L Zhai, Biological Sciences		Major in Biochemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Biological Sciences (2019,2018,2017,2016); Major in Molecular Biology & Biotechnology (2019,2018,2017,2016,	

BIOL3405	Molecular microbiology	6	Pass in BIOL2103	N	N			30	, Biological Sciences	2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (Intensive) (2019,2018,2017,2016, 2015); Minor in Biochemistry (2019,2018,2017,2016, 2015,2014,2013,2012) Major in Molecular
5.020.00									, Diological Colonico	Biology & Biotechnology (2015,2014,2013,2012)
BIOL3406	Reproduction and reproductive biotechnology	6	Pass in BIOL2103 or BIOL2220 or BIOC2600 or MEDE2301	N	Y			50	Prof A O L Wong, Biological Sciences	Major in Biological Sciences (2019,2018,2017,2016) ; Major in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (Intensive) (2019,2018,2017,2016, 2015)
BIOL3408	Genetics	6	Pass in BIOL1110 and BIOL2102	Y	Y	1	Dec	50	Dr G Y W Chan, Biological Sciences	Major in Biochemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Biological Sciences (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (1019,2018,2017,2016, 2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (Intensive) (2019,2018,2017,2016, 2015); Minor in Plant Science (2019,2018,2017,2016, 2015,2014,2013,2012)
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.	Y	N	2	No exam	40	Dr W B L Lim, Biological Sciences	Major in Biological Sciences (2015,2014,2013,2012) ; Major in Molecular Biology & Biotechnology (2017,2016,2015,2014, 2013,2012); Minor in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012)
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 (2019,2018,2017,2016,

											2015,2014,2013,2012); Major in Ecology & Biodiversity (Intensive) (2019,2018,2017,2016, 2015); Minor in Ecology & Biodiversity (2019,2018,2017,2016, 2015,2014,2013,2012)	
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	N	Y			60	Dr C B Chan, Biological Sciences		Major in Biological Sciences (2019,2018,2017,2016) ; Major in Food & Nutritional Science (2019)	
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 (2016,2015,2014,2013, 2012)	
BIOL3506	Evolutionary biology	6	Pass in BIOL2306 Not for students who have passed in BIOL3501	Y	Y	1	Dec	50	Dr C Schunter, Biological Sciences		Major in Biological Sciences (2019,2018,2017,2016); Major in Ecology & Biodiversity (2019,2018,2017,2016, 2015); Major in Ecology & Biodiversity (Intensive) (2019,2018,2017,2016, 2015); Minor in Ecology & Biodiversity (2019,2018,2017,2016, 2015); Minor in	
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, 2013,2012)	Major in Biological Sciences (2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012); Major in Molecular Biology & Biotechnology (2019, 2018); Major in Molecular Biology & Biotechnology (Intensive) (2019, 2018, 2017, 2016, 2015); Minor in Molecular Biology & Biotechnology (2019, 2018, 2017, 2016, 2015); Minor in Molecular Biology & Biotechnology (2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012)	
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	May	70	Dr J C Y Lee, Biological Sciences		Major in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012)	
BIOL3608	Food commodities	6	Pass in BIOL3201 or (BIOL2101 and any level 3 BIOL course); and Not for students who have passed in	Y	Y	2	May	30	Prof N P Shah, Biological Sciences		Major in Food & Nutritional Science (2019,2018,2017,2016,	

			BIOL3210; Not for students who have passed in BIOL4207; and Not for students who have passed in BIOL4208.							N N (2	015,2014,2013,2012); finor in Food & lutritional Science 2019,2018,2017,2016, 015,2014,2013,2012)	
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	Z	1		20	Dr L Karczmarski, Biological Sciences			Major in Ecology & Biodiversity (2015,2014,2013,2012)
BIOL3991	Directed studies in ecology & biodiversity	6	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 Major / Ecology & Biodiversity (Intensive) 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 M Yasuhara, Biological Sciences			Major in Ecology & Biodiversity (2018,2017,2016,2015, 2014,2013,2012); Major in Ecology & Biodiversity (Intensive) (2019,2018,2017,2016, 2015)
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 O Habimana, Biological Sciences			Major in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012)
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 (2019,2018,2017,2016, 2015,2014,2013,2012)
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 S Cannicci, Biological Sciences			Major in Biological Sciences (2019,2018,2017,2016, 2015,2014,2013,2012)
BIOL4201	Public health nutrition	6	Pass in BIOL3201 or BIOL3202	Y	Y	2	May	90	Dr J C Y Louie, Biological Sciences	N (2 2: N N (2	Tajor in Food & Lutritional Science 2019,2018,2017,2016, 015,2014,2013,2012); In Food & Lutritional Science 2019,2018,2017,2016, 015,2014,2013,2012)	
BIOL4202	Nutrition and sports performance	6	Pass in BIOL3202	N	Y			30	Dr T Sobko, Biological Sciences		lajor in Food & lutritional Science	

										(2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012)
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 (2016,2015,2014,2013, 2012); Minor in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012)
BIOL4205	Food technology	6	Pass in BIOL3201 or BIOL3209	Y	Y	2	May	30	Prof N P Shah, Biological Sciences	Major in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012)
BIOL4207	Meat and dairy sciences	6	Pass in BIOL3201	N	N			50	Prof N P Shah, Biological Sciences	Major in Food & Nutritional Science (2016,2015,2014,2013, 2012); Minor in Food & Nutritional Science (2016,2015,2014,2013, 2012)
BIOL4208	Meat, dairy and grain sciences	6	Pass in BIOL3201 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, 2014,2013,2012); Minor in Food & Nutritional Science (2018,2017,2016,2015, 2014,2013,2012)
BIOL4209	Functional foods	6	Pass in BIOL3201 or BIOL3202	Y	Y	1	Dec	40	Dr M F Wang, Biological Sciences	Major in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Plant Science (2019,2018,2017,2016, 2015,2014,2013,2012)
BIOL4210	Food product development	6	Pass in BIOL3203 or BIOL4205	N	N			40	Dr M F Wang, Biological Sciences	Major in Food & Nutritional Science (2015,2014,2013,2012) ; Minor in Food & Nutritional Science (2016,2015,2014,2013, 2012)
BIOL4301	Fish and fisheries	6	Pass in BIOL3301 or BIOL3303	N	N			40	TBC, Biological Sciences	Major in Biological Sciences (2015,2014,2013,2012) ; Major in Ecology & Biodiversity (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Ecology & Biodiversity (Intensive) (2019,2018,2017,2016, 2015); Minor in Ecology & Biodiversity

BIOL4302	Environmental impact assessment	6	Pass in (BIOL2103 or BIOL2306); and (ENVS3004 or any BIOL3XXX course)	Y	Y	2	May	30	Dr J Wu, Biological Sciences		(2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Marine Biology (2019,2018,2017,2016, 2015,2014,2013,2012) Major in Ecology & Biodiversity	
			(ENVSSU04 of any BIOLSXXX course)						Sciences		Biodiversity (2019, 2017, 2016, 2015, 2014, 2013, 2012); Major in Ecology & Biodiversity (Intensive) (2019, 2018, 2017, 2016, 2015); Major in Environmental Science (2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012); Minor in Ecology & Biodiversity (2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012); Minor in Environmental Science (2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012); Minor in Environmental Science (2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012)	
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	Z			30	Dr L Karczmarski, Biological Sciences		Major in Ecology & Biodiversity (2015,2014,2013,2012) ; Minor in Ecology & Biodiversity (2015,2014,2013,2012)	
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 D Russell, Biological Sciences		Major in Ecology & Biodiversity (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Ecology & Biodiversity (Intensive) (2019,2018,2017,2016, 2015)	
BIOL4401	Medical microbiology and applied immunology	6	Pass in BIOL3401 or BIOL3403	N	Y			40	Dr W Y Lui, Biological Sciences		Major in Biological Sciences (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (1019,2018,2017,2016, 2015); Minor in Molecular Biology & Biotechnology (1019,2018,2017,2016, 2015); Minor in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015); Minor in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012)	
BIOL4402	Microbial biotechnology	6	Pass in BIOL3401	N	Z			30	, Biological Sciences	Major in Molecular Biology & Biotechnology (2015,2014,2013,2012)	Minor in Molecular Biology & Biotechnology (2015,2014,2013,2012)	
BIOL4409	General virology	6	Pass in BIOL3401 or BIOL3403	N	Y			30	Dr W B L Lim, Biological Sciences		Major in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012);	

											Major in Molecular Biology & Biotechnology (Intensive) (2019,2018,2017,2016, 2015)	
BIOL4411	Plant and food biotechnology	6	Pass in BIOL3211 or BIOL3401	Y	Y	1	Dec	80	Dr Juliana Xu, Biological Sciences	Major in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (Intensive) (2019,2018,2017,2016, 2015)	Major in Biological Sciences (2019,2018,2017,2016); Major in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Plant Science (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Plant Science (2019,2018,2017,2016, 2015,2014,2013,2012)	
BIOL4415	Healthcare biotechnology	6	Pass in BIOL3401	Y	*	2	May	70	Prof A S T Wong, Biological Sciences	Major in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (Intensive) (2019,2018,2017,2016, 2015)	Minor in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012)	
BIOL4416	Stem cells and regenerative biology	6	Pass in BIOC3601 or BIOC3604 or BIOL3211 or BIOL3401 or BIOL3402 or BIOL3403 or BIOL3404 or BIOL3408	Z	Y			40	Dr K W Y Yuen, Biological Sciences		Major in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (Intensive) (2019,2018,2017,2016, 2015); Minor in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012)	
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) (2019,2018,2017,2016, 2015)	Major in Biochemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Biochemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2017,2016, 2015,2014,2013,2012)	

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 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.	N	N			12	, Biological Sciences	Major in Ecology & Biodiversity (2016,2015,2014,2013, 2012)	
BIOL4501	Molecular phylogenetics and evolution	6	Pass in BIOL3401 or BIOL3408	N	N			25	TBC, Biological Sciences		
BIOL4505	Oyster aquaculture	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 (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Ecology & Biodiversity (Intensive) (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 (2019,2018,2017,2016, 2015,2014,2013,2012)	
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 (Intensive) Major including BIOL3303. This capstone course is for Ecology & Biodiversity Major / Ecology & Biodiversity Major / Ecology & Biodiversity 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 (2018,2017,2016,2015, 2014,2013,2012); Major in Ecology & Biodiversity (Intensive) (2019,2018,2017,2016, 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 (2016,2015,2014,2013, 2012)
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 (2018,2017,2016,2015, 2014,2013,2012)

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 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.	N	N			15	, Biological Sciences		Major in Ecology & Biodiversity (2016,2015,2014,2013, 2012)
BIOL4922	Food product development and evaluation	6	Pass in at least 24 credits of advanced level disciplinary core/elective biological sciences courses (BIOL3XXX or BIOL4XXX) 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.	Y	Y	1	Dec	20	Dr M F Wang, Biological Sciences		Major in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012)
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 (2019,2018,2017,2016, 2015,2014,2013,2012)
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, Biological Sciences		Major in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012)
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 S Cannicci, Biological Sciences		Major in Biological Sciences (2019,2018,2017,2016, 2015,2014,2013,2012)
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 / 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.	Y	Y	0	No exam		Dr M Yasuhara, Biological Sciences	Major in Ecolo Biodiversity (2t Major in Ecolo Biodiversity (In (2019,2018,20 2015)	019); Biodiversity gy & (2018,2017,2016,2015, tensive) 2014,2013,2012)
BIOL4992	Food & nutritional science project	12	Pass in at least 24 credits of advanced	Υ	Υ	0	No exam		Dr J C Lee, Biological		Major in Food &

			level disciplinary core/elective biological sciences courses (BIOL3XXX or 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.						Sciences				Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012)
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) (2019,2018,2017,2016, 2015)	Major in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012)
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 S Cannicci, Biological Sciences				Major in Biological Sciences (2019,2018,2017,2016, 2015,2014,2013,2012)
ENVS1301	Environmental life science	6	NIL	Y	Y	2	May	60	Dr T Vengatesen, Biological Sciences		Major in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Marine Biology (2019,2018,2017,2016, 2015,2014,2013,2012)		
ENVS2001	Methods in environmental science	6	Pass in BIOL1309 or EASC1401 or ENVS1301 or ENVS1401	Y	Y	1	No exam	42	Dr D M Baker, Biological Sciences	Major in Environmental Science (2019,2018,2017,2016, 2015,2014,2013)	Major in Environmental Science (2012); Minor in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012)		
ENVS2002	Environmental data analysis	6	Pass in BIOL1309 or EASC1401 or ENVS1301 or ENVS1401	Y	>	2	May	65	Dr T C Bonebrake, Biological Sciences	Major in Ecology & Biodiversity (2019,2018,2017,2016, 2015,2014,2013); Major in Ecology & Biodiversity (Intensive) (2019,2018,2017,2016, 2015); Major in Environmental Science (2019,2018,2017,2016, 2015,2014,2013)	Major in Environmental Science (2012); Minor in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012)		
ENVS3019	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 (2019,2018,2017,2016, 2015,2014,2013,2012);		

										Major in Ecology & Biodiversity (Intensive) (2019,2018,2017,2016, 2015); Major in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Environmental Science (2019,2018,2017,2016, 2019,2018,2017,2016, 2019,2014,2013,2012)
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 (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Ecology & Biodiversity (Intensive) (2019,2018,2017,2016, 2015); Major in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012);
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 (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	~			8	Dr T Vengatesen, Biological Sciences	Major in Environmental Science (2019,2018,2017,2016, 2015)
ENVS3402	Qualitative data, social science methods and decision-making in environmental science	6	ENVS2002	N	Y			30	Dr Hannah Mumby, Biological Sciences	
ENVS4110	Environmental remediation	6	Pass in BIOL3109 or BIOL3110 or BIOL3401 or ENVS3042	Y	Z	2	May	30	Dr J D Gu, Biological Sciences	Major in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (Intensive) (2019,2018,2017,2016, 2015); Minor in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Molecular Biology & Biotechnology (Intensive) (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012)
	oplied English Studies	6	NIL	Y	Υ	1.0	Dog May		Dr. D. Wong, Frailish	
CAES1000 CAES9820	Core University English Academic English for science	6	NIL	Y	Y	1, 2 1, 2	Dec, May No exam		Dr P Wong, English Dr E Law, English	
	students									
CAES9821	Professional and technical	6	NIL	Y	Y	1, 2	No exam		Dr E Law, English	

	communication for mathematical sciences											
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	156	Dr A P L Tong, Chemistry		Major in Ecology & Biodiversity (Intensive) (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	375	Dr A P L Tong, Chemistry	Major in Biochemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015); Major in Environmental Science (2019,2018); Major in Molecular Biology & Biotechnology (Intensive) (2019,2018,2017,2016, 2015); Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)	Major in Ecology & Biodiversity (Intensive) (2019,2018,2017,2016, 2015); Major in Environmental Science (2017,2016,2015,2014, 2013,2012); Major in Food & Nutritional Science (2019); Minor in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012)	
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	290	Dr A P L Tong, Chemistry	Major in Biochemistry (2019,2018,2017,2016, 2015); Major in Chemistry (2019,2018,2017,2016, 2015); Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015); Major in Molecular Biology & Biotechnology (Intensive) (2019,2018,2017,2016, 2015); Minor in Chemistry (2019,2018,2017,2016, 2015); Minor in Chemistry (2019,2018,2017,2016, 2015)	Major in Biochemistry (2014,2013,2012)	
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	Y	Y	2	May	80	Prof C M Che, Chemistry		Major in Chemistry (Intensive) (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 CHEM24541, or have already enrolled in this course; and Not for students who have passed in CHEM2541, or have already enrolled in this course; and	N	N			140	Dr I K Chu, Chemistry		Major in Environmental Science (2017,2016,2015,2014, 2013,2012); Minor in Chemistry (2016,2015,2014,2013, 2012); Minor in Environmental Science (2017,2016,2015,2014, 2013,2012)	

			Not for Chemistry major students.										
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 E C M Tse (1st sem); Dr I K Chu (2nd sem), Chemistry	Major in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015)	Major in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Environmental Science (2017,2016,2015,2014, 2013,2012)		
CHEM2341	Inorganic 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 in CHEM2041, or already enrolled in this course (for students admitted in 2015-16 or thereafter)	Y	Y	1, 2	Dec, May	120	Prof V W W Yam (1st sem); Dr H Y Au Yeung (2nd sem), Chemistry	Major in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015)	Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)		
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	Dr X Y Li (1st sem); Prof P Chiu (2nd sem), Chemistry	Major in Biochemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015)	Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)		
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	130	Dr P H Toy, Chemistry		Major in Environmental Science (2017,2016,2015,2014, 2013,2012); Major in Food & Nutritional Science (2019); Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Environmental Science (2017,2016,2015,2014, 2013,2012)		
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 (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015)	Major in Biochemistry (2014,2013,2012); Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)		
CHEM3141	Environmental chemistry	6	Pass in CHEM2041 or CHEM2341 or CHEM2441 or CHEM2442 or CHEM2541	Y	Y	2	May	100	Dr W T Chan, Chemistry		Major in Chemistry (2014,2013,2012); Major in Environmental Science		

											(2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012)	
CHEM3142	Chemical process industries and analysis	6	Pass in CHEM2241 or CHEM2341 or CHEM2441 or CHEM2442 or CHEM2541	Y	Y	2	May	60	Prof G K Y Chan, Chemistry		Major in Chemistry (2014,2013,2012); Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)	
CHEM3143	Introduction to materials chemistry	6	Pass in CHEM2441; and Pass in CHEM2541 or CHEM2341	Y	Y	1	Dec	100	Dr Y F Wang, Chemistry	Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015)	Major in Chemistry (2014,2013,2012); Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)	
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 (2014,2013,2012)	Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)	
CHEM3241	Analytical chemistry II: chemical instrumentation	6	Pass in CHEM2241	Y	Y	1	Dec	80	Dr W T Chan, Chemistry	Major in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015)	Major in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012)	
CHEM3242	Food and water analysis	6	Pass in CHEM2041 or CHEM2241 or CHEM2341 or CHEM2441 or CHEM2541.	Y	Y	2	May	50	Dr W T Chan, Chemistry		Major in Chemistry (2014, 2013, 2012); Major in Environmental Science (2017, 2016, 2015, 2014, 2013, 2012); Minor in Chemistry (2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012); Minor in Environmental Science (2017, 2016, 2015, 2014, 2013, 2012)	
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.	Y	Υ	2	May	65	Dr X Li, Chemistry		Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)	
CHEM3244	Analytical techniques for pharmacy students	6	Pass in BPHM2136 (This course is for BPharm students only)	Y	Y	2	May	35	Dr X Li, Chemistry		Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)	
CHEM3341	Inorganic chemistry II	6	Pass in CHEM2341	Y	Y	1	Dec	90	Prof V W W Yam, Chemistry	Major in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015)	Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)	
CHEM3342	Bioinorganic chemistry	6	Pass in CHEM2341	Y	Y	2	Мау	50	Prof H Z Sun, Chemistry		Major in Chemistry (2014,2013,2012); Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)	

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 X Y Li (1st sem); Prof D Yang (2nd sem), Chemistry	Major in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015)	Major in Biochemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)	
CHEM3442	Organic chemistry of biomolecules	6	Pass in CHEM2442 or CHEM3441	Y	Y	1	Dec	50	Dr P H Toy, Chemistry		Major in Chemistry (2014,2013,2012); Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)	
CHEM3443	Organic chemistry laboratory	6	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)	Y	Y	1, 2	Dec, May	80	Dr A M Y Yuen, Chemistry	Major in Chemistry (2019,2018,2017,2016, 2015); Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015)	Major in Chemistry (2014,2013,2012); Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)	
CHEM3445	Integrated laboratory	6	Pass in CHEM3443 or already enrolled in this course	Y	Y	S	No exam	20	Dr A M Y Yuen, Chemistry	Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015)	Major in Chemistry (2014,2013,2012); Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)	
CHEM3541	Physical chemistry: Introduction to quantum chemistry	6	Pass in CHEM2541	Y	Y	1	Dec	100	Prof G H Chen, Chemistry	Major in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015)	Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)	
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) (2019,2018,2017,2016, 2015)	Major in Chemistry (2014,2013,2012); Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)	
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 CHEM2441 or CHEM2441 or CHEM3416. This capstone course is for Chemistry Major/ 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 (2019,2018,2017,2016, 2015,2014,2013,2012)	Major in Chemistry (2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012); Major in Chemistry (Intensive) (2019, 2018, 2017, 2016, 2015)
CHEM4142	Symmetry, group theory and applications	6	Pass in CHEM3341	Y	Y	1	Dec	60	Prof V W W Yam, Chemistry	Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015)	Major in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)	

CHEM4143	Interfacial science and technology	6	Pass in CHEM3143 or CHEM3541 or CHEM3542	N	Y			50	Prof G K Y Chan, Chemistry		Major in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015); Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)
CHEM4144	Advanced materials	6	Pass in CHEM3143	Y	Y	2	May	50	Dr J Y Tang, Chemistry	Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015)	Major in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)
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	70	Prof H Z Sun, Chemistry		Major in Biochemistry (2019,2018,2017,2016, 2015,2014,2017,2016, 2015,2014,2013,2012); Major in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015); Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)
CHEM4147	Supramolecular chemistry	6	Pass in CHEM3341 and CHEM3441	Y	*	2	May	40	Dr H Y Au-Yeung, Chemistry		Major in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015); Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)
CHEM4148	Frontiers in Modern Chemical Science	6	Pass in CHEM3341 and CHEM3441.	Z	Y			60	Dr X Li, Chemistry		Major in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015); Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)
CHEM4241	Modern chemical instrumentation and applications	6	Pass in CHEM3241	Y	Y	1	Dec	50	Dr I K Chu, Chemistry	Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015)	Major in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)
CHEM4242	Analytical chemistry	6	Pass in CHEM3241 or CHEM3242	Y	Y	2	May	50	Dr W T Chan, Chemistry		Major in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015); Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)
CHEM4341	Advanced inorganic chemistry	6	Pass in CHEM3341	Υ	Υ	1	Dec	80	Prof C M Che,		Major in Chemistry

									Chemistry	(2019,2018,2017,2016, 2015,2014,2013,2012); Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015); Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)
CHEM4342	Organometallic chemistry	6	Pass in CHEM3341	Y	Y	1	Dec	40	Prof V W W Yam, Chemistry	Major in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015); Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)
CHEM4441	Advanced organic chemistry	6	Pass in CHEM3441	Y	Y	1	Dec	80	Prof D Yang, Chemistry	Major in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015); Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)
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 (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015); Minor in Chemistry (2019,2018,2017,2016, 2015,2018,2017,2016, 2015,2014,2013,2012)
CHEM4444	Chemical biology	6	Pass in BIOC3601 or CHEM3441	Y	Y	2	May	50	Prof X C Li, Chemistry	Major in Biochemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015); Minor in Biochemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)
CHEM4541	Physical chemistry III: statistical thermodynamics and kinetics theory	6	Pass in CHEM3541	N	N			40	, Chemistry	Major in Chemistry (2013,2012); Minor in Chemistry (2013,2012)
CHEM4542	Computational chemistry	6	Pass in CHEM3541 or PHYS3351	N	Y			60	Prof G H Chen, Chemistry	Major in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015); Minor in Chemistry (2019,2018,2017,2016,

							[2015,2014,2013,2012)	
CHEM4543	Advanced physical chemistry	6	Pass in CHEM3541	Y	Y	2	May	40	Prof G H Chen, Chemistry	Major in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015); Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)	
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 (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015); Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)	
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. 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		Dr X Li, Chemistry	Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)	Major in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)
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 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.	Y	Y	S	No exam		Dr A P L Tong, Chemistry	Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)	Major in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)
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/ Chemistry Major (Intensive) 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 H Y Au-Yeung, Chemistry	Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)	Major in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Chemistry (Intensive) (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/ Chemistry Major (Intensive) students only.	Y	Y	0	No exam		Dr J Y Tang, Chemistry	Minor in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012)	Major in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015)

			The earliest that a student is allowed to take this capstone course is their year 3 study.									
School of Cl	ninese		1	1	1		-			1	1	
CSCI9001	Practical Chinese for science students	6	NIL	Y	Y	1, 2	Dec, May		Mr K W Wong, Chinese			
Department	of Earth Sciences											
EASC1020	Introduction to climate science	6	NIL	Y	Y	2	No exam		Dr Z H Liu, Earth Sciences		Major in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Environmental Science (2019,2018,2017,2016, 2015,2014,2013)	
EASC1401	Blue Planet	6	NIL	Y	Y	1, 2	Dec, May		Dr P Bach, Earth Sciences	Major in Earth System Science (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Ecology & Biodiversity (Intensive) (2019,2018,2017,2016, 2015); Major in Geology (Intensive) (2019,2018,2017,2016, 2015)	Major in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Earth Sciences (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012)	
EASC1402	Principles of geology	6	NIL	Y	Y	1	Dec		Prof M Sun, Earth Sciences	Major in Earth System Science (2016,2015,2014,2013, 2012); Major in Geology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (Intensive) (2019,2018,2017,2016, 2015)	Minor in Earth Sciences (2019,2018,2017,2016, 2015,2014,2013,2012)	
EASC1403	Geological heritage of Hong Kong	6	NIL	Y	Y	2	May	35	Prof M F Zhou, Earth Sciences			
EASC1404	Early life on earth	6	NIL	N	N			50	TBC, Earth Sciences			
EASC1405	Peaceful use of nuclear technologies	6	NIL	N	Y				Dr S H Li, Earth Sciences			
EASC1406	Introduction to the earth-life system	6	Pass in EASC1401	Y	Y	2	No exam		Dr S Crowe, Earth Sciences	Major in Earth System Science (2019,2018,2017)	Major in Earth System Science (2016,2015)	
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 (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (Intensive) (2019,2018,2017,2016, 2015)	Minor in Earth Sciences (2019,2018,2017,2016, 2015,2014,2013,2012)	
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 (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (2019,2018,2017,2016,		

										2015,2014,2013,2012); Major in Geology (Intensive) (2019,2018,2017,2016, 2015)		
EASC2404	Introduction to atmosphere and hydrosphere	6	Pass in EASC1401 or EASC1402	Y	Y	1	Dec	50	Dr J R Ali, Earth Sciences	Major in Earth System Science (2019,2018,2017,2016, 2015,2014,2013,2012)	Major in Environmental Science (2012); Major in Geology (Intensive) (2019,2018,2017,2016, 2015); Minor in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012)	
EASC2406	Geochemistry	6	Pass in EASC1402	Y	Y	1	Dec		Dr S H Li, Earth Sciences	Major in Geology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (Intensive) (2019,2018,2017,2016, 2015)		
EASC2407	Mineralogy	6	Pass in EASC1402	Y	Y	1	Dec	30	Prof M Sun, Earth Sciences	Major in Geology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (Intensive) (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, 2013,2012)	Major in Geology (Intensive) (2019,2018,2017,2016, 2015); Minor in Astronomy (2019,2018)	
EASC2409	Regional field studies	6	Pass in EASC1401 or EASC1402; and consent of course coordinator	Y	Y	2	No exam	10	Dr J R Ali, Earth Sciences	Major in Geology (Intensive) (2019,2018,2017,2016, 2015)		
EASC2410	Data analysis and modeling in earth sciences	6	Pass in EASC1401	Y	Y	2	No exam		Dr B Zhang, Earth Sciences	Major in Earth System Science (2019,2018,2017)		
EASC3020	Global change: anthropogenic impacts	6	Pass in EASC2404 or ENVS2001	N	Y				Dr Z H Liu, Earth Sciences		Major in Earth System Science (2019,2018,2017); Major in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (Intensive) (2019,2018,2017,2016, 2015); Minor in Earth Sciences (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2017,2016, 2015,2014,2013,2012)	
EASC3402	Petrology	6	Pass in EASC2407	Y	Y	2	May		Prof G Zhao, Earth Sciences	Major in Geology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (Intensive) (2019,2018,2017,2016, 2015)	Minor in Earth Sciences (2019,2018,2017,2016, 2015,2014,2013,2012)	

EASC3403	Sedimentary environments	6	Pass in EASC2402 or EASC3402	Y	Y	2	May		Dr N R McKenzie, Earth Sciences	Major in Geology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (Intensive) (2019,2018,2017,2016, 2015)	Major in Earth System Science (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Earth Sciences (2019,2018,2017,2016, 2015,2014,2013,2012)
EASC3404	Structural geology	6	Pass in EASC2402 and EASC3402	Y	Y	1	Dec	40	Dr J R Ali, Earth Sciences	Major in Geology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (Intensive) (2019,2018,2017,2016, 2015)	Minor in Earth Sciences (2019,2018,2017,2016, 2015,2014,2013,2012)
EASC3405	Environmental remote sensing	6	Pass in EASC2404 or EASC2406 or EASC2407 or ENVS2002	Y	Y	2	No exam	54	Dr J Michalski, Earth Sciences		Major in Earth System Science (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (Intensive) (2019,2018,2017,2016, 2015); Minor in Earth Sciences (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012)
EASC3406	Reconstruction of past climate	6	Pass in EASC2401	Y	Z	2	No exam	-	Dr S H Li, Earth Sciences		Major in Earth System Science (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (Intensive) (2019,2018,2017,2016, 2015); Minor in Earth Sciences (2019,2018,2017,2016, 2015,2014,2013,2012)
EASC3408	Geophysics	6	Pass in EASC2401 or EASC2402 or PHYS2250	Y	Y	2	No exam	I	Dr T Nakagawa, Earth Sciences	Major in Geology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (Intensive) (2019,2018,2017,2016, 2015)	Major in Earth System Science (2016,2015,2014,2013, 2012); Minor in Earth Sciences (2019,2018,2017,2016, 2015,2014,2013,2012)
EASC3409	Igneous and metamorphic petrogenesis	6	Pass in EASC3402	Y	Y	2	May	30	Prof M Sun, Earth Sciences	Major in Geology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (Intensive) (2019,2018,2017,2016, 2015)	Minor in Earth Sciences (2019,2018,2017,2016, 2015,2014,2013,2012)
EASC3410	Hydrogeology	6	Pass in EASC2402	Y	Y	1	Dec	40	Prof J J Jiao, Earth Sciences		Major in Earth System Science (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology

										(2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (Intensive) (2019,2018,2017,2016, 2015); Minor in Earth Sciences (2019,2018,2017,2016, 2015,2014,2013,2012)
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 (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (Intensive) (2019,2018,2017,2016, 2015); Minor in Earth Sciences (2019,2018,2017,2016, 2015,2014,2013,2012)
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 (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (Intensive) (2019,2018,2017,2016, 2015); Minor in Earth Sciences (2019,2018,2017,2016, 2015,2014,2013,2012)
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 (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (Intensive) (2019,2018,2017,2016, 2015); Minor in Earth Sciences (2019,2018,2017,2016, 2015,2014,2013,2012)
EASC3415	Meteorology	6	Pass in EASC2404	Y	Y	1	Dec		Dr Jed Kaplan, Earth Sciences	Major in Earth System Science (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Earth Sciences (2019,2018,2017,2016, 2015,2014,2013,2012)
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 (2016,2015,2014,2013, 2012); Major in Geology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (Intensive) (2019,2018,2017,2016, 2015); Minor in Earth Sciences (2019,2018,2017,2016, 2015,2014,2013,2012)
EASC3417	Earth through time	6	Pass in EASC3403	Y	Y	1	Dec		Dr S C Chang, Earth Sciences	Major in Geology (Intensive) Major in Earth System Science

										(2019,2018,2017,2016, 2015)	(2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Earth Sciences (2019,2018,2017,2016, 2015,2014,2013,2012)	
EASC3418	Coasts and coastal change	6	Pass in EASC2401 and EASC2402 OR Pass in ENVS2001	N	Y				Prof YQ Zong, Earth Sciences		Major in Earth System Science (2019,2018,2017)	
EASC3419	Earth System Science Field Studies	6	Pass in one of the following 2000-level courses: EASC2402 or ENVS2001 or GEOG2137 Or upon special arrangement with the course coordinator	Z	~			15	Dr Jed O. Kaplan, Earth Sciences		Major in Earth System Science (2019,2018,2017)	
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		Prof M Sun, Earth Sciences		Major in Earth System Science (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (Intensive) (2019,2018,2017,2016, 2015); Minor in Earth Sciences (2019,2018,2017,2016, 2015,2014,2013,2012)	
EASC4403	Biogeochemical cycles	6	Pass in EASC3403 or EASC3416 or ENVS3313	Y	Y	1	Dec		Dr Y Li, Earth Sciences	Major in Earth System Science (2019,2018,2017,2016, 2015,2014,2013,2012)	Major in Geology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (Intensive) (2019,2018,2017,2016, 2015); Minor in Earth Sciences (2019,2018,2017,2016, 2015,2014,2013,2012)	
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 (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (Intensive) (2019,2018,2017,2016, 2015)	Minor in Earth Sciences (2019,2018,2017,2016, 2015,2014,2013,2012)	
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) (2019,2018,2017,2016, 2015)	Major in Geology (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Earth Sciences (2019,2018,2017,2016, 2015,2014,2013,2012)	
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 (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (Intensive) (2019,2018,2017,2016, 2015); Minor in Earth	

											Sciences (2019,2018,2017,2016, 2015,2014,2013,2012)		
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) (2019,2018,2017,2016, 2015): Minor in Earth Sciences (2019,2018,2017,2016, 2015,2014,2013,2012)	Major in Earth System Science (2019,2018,2017,2016, 2015,2014,2013,2012)	
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 or 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 (2019,2018,2017,2016, 2015,2014,2013,2012)	Major in Geology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (Intensive) (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) (2019,2018,2017,2016, 2015); Minor in Earth Sciences (2019,2018,2017,2016, 2015,2014,2013,2012)		
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 M Sun, Earth Sciences	Major in Geology (Intensive) (2019,2018,2017,2016, 2015)	Major in Earth System Science (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Earth Sciences (2019,2018,2017,2016, 2015,2014,2013,2012)		
ENVS1401	Introduction to environmental science	6	NIL	Y	Y	1	Dec		Dr C Dingle, Biological Sciences	Major in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012)			
ENVS2020	Biogeochemistry of the environment	6		N	N								
ENVS3004	Environment, society and economics	6	Pass in one of the following courses: CHEM2041, EASC2404, ENVS2001 or ENVS2002	Y	Y	1	Dec		Prof Y Q Zong, Earth Sciences	Major in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Environmental Science (2019,2018,2017,2016,			

		1		1	1					2015,2014,2013,2012)		
ENVS3007	Natural hazards and mitigation	6	Pass in EASC2404 or ENVS2001 or ENVS2002	Y	Y	1	No exam		Dr N S KHAN, Earth Sciences		Major in Earth System Science (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (Intensive) (2019,2018,2017,2016, 2015); Minor in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012)	
ENVS3042	Pollution	6	Pass in EASC2401 or CHEM2241 or BIOL2103 or ENVS2001	Y	Y	1	Dec	50	Dr B Thibodeau, Earth Sciences		Major in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012)	
ENVS3202	Modelling the environment	6		N	N							
ENVS3313	Environmental oceanography	6	Pass in BIOL2306 or EASC2404 or ENVS2001 or ENVS2002	Y	Y	2	No exam		Dr C A Not, Earth Sciences	Minor in Marine Biology (2019,2018,2017,2016, 2015,2014,2013,2012)	Major in Earth System Science (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (Intensive) (2019,2018,2017,2016, 2015); Minor in Environmental Science (2019,2018,2017,2016, 2015); Mior in Control (2019,2018,2017,2016, 2015,2014,2013,2012)	
ENVS3401	Human dimensions of environmental science	6		N	N							
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. Cumulative GPA of 2.5 or above 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 (2019,2018,2017,2016, 2015,2014,2013,2012)
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 (2014,2013,2012)
ENVS4966	Environmental science internship	6	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in Environmental Science Major.	Y	Y	1, 2, S	No exam		Dr C Dingle, Biological Sciences			Major in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012)

			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.									
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 Students must have a cumulative GPA of 3.0 or above 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	0	No exam		Dr C Dingle, Biological Sciences			Major in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012)
Department of	of Mathematics											
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	440	Dr Y M Chan (1st sem); Dr K H Law (2nd sem), Mathematics			
MATH1011	University mathematics I	6	NIL The course has no pre-requisite, but students are expected to have achieved Level 2 or above in HKDSE Mathematics or equivalent before enrolling the course; and Not for students with Level 2 or above in Module 1 or Module 2 of HKDSE Mathematics or equivalent.	Y	Y	1, 2	Dec, May		Dr H Y Zhang, Mathematics		Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015); Major in Molecular Biology & Biotechnology (Intensive) (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 (2019); Major in Decision Analytics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (Intensive) (2019,2018,2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014,2013,2012); Major in Risk Management (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012); Mijor in Computational & Financial Mathematics	Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015); Major in Molecular Biology & Biotechnology (Intensive) (2019,2018,2017,2016, 2015); Major in Physics (Intensive) (2019,2018,2017,2016); Minor in Actuarial Studies (2019,2018,2017,2016, 2015,2014,2013,2012)	

										(2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Operations Research & Mathematical Programming (2019,2018,2017,2016, 2015,2014,2013)		
MATH1641	Mathematical laboratory and modeling	6	NIL	N	N			30	TBC, 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	Y	1	Dec		Dr J T Chan, Mathematics	BSc in Actuarial Science (2019,2018,2017,2016, 2015,2014,2013,2012)		
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	Dr Y K Lau, 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. (This course is exclusively for Engineering students.)	Y	Y	1, 2	Dec, May	700	Dr 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 (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (Intensive) (2019,2018,2017,2016)	Minor in Computational & Financial Mathematics (2019,2018,2017,2016, 2015); Minor in Mathematics (2019,2018,2017,2016, 2015); Minor in Operations Research & Mathematical Programming (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	Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019); Major in Decision Analytics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Risk Management (2019,2018,2017,2016, 2015,2014); Major in Statistics (2019,2018,2017,2016, 2015,2014)	Minor in Computational & Financial Mathematics (2019,2018,2017,2016, 2015); Minor in Mathematics (2019,2018,2017,2016, 2015); Minor in Operations Research & Mathematical Programming (2019,2018,2017,2016, 2015)	
MATH2101	Linear algebra I	6	Pass in MATH1013 or MATH1821 or (MATH1851 and MATH1853)	Y	Y	1, 2	Dec, May		Dr K H Law, Mathematics	Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (Intensive)	Minor in Computational & Financial Mathematics (2019,2018,2017,2016, 2015); Minor in	

										(2019,2018,2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Computational & Financial Mathematics (2014,2013,2012); Minor in Mathematics (2014,2013,2012); Minor in Operations Research & Mathematical Programming (2014,2013)	Mathematics (2019,2018,2017,2016, 2015); Minor in Operations Research & Mathematical Programming (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 (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (Intensive) (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 (1st sem); Dr Z Hua (2nd sem), Mathematics	Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (Intensive) (2019,2018,2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014,2013,2012); Minor in Computational & Financial Mathematics (2014,2013,2012); Minor in Mathematics (2014,2013,2012); Minor in Mathematics (2014,2013,2012); Minor in Operations Research & Mathematical Programming (2014,2013)	Minor in Computational & Financial Mathematics (2019,2018,2017,2016, 2015); Minor in Mathematics (2019,2018,2017,2016, 2015); Minor in Operations Research & Mathematical Programming (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 Y M Chan (1st sem); Dr T W Ching (2nd sem), Mathematics	Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (Intensive) (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 J T Chan, Mathematics	BSc in Actuarial Science (2019,2018,2017,2016, 2015,2014,2013,2012)		
MATH3001	Development of mathematical ideas	6	Pass in MATH2101, MATH2102, MATH2211 and MATH2241	N	N				TBC, Mathematics		Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012)	
MATH3002	Mathematics seminar	6	Pass in MATH2012, MATH2101, MATH2211 and MATH2241 Subject to approval by the Department.	Y	Y	2	No exam	12	Prof W K Ching, Mathematics	Major in Mathematics (Intensive) (2019,2018,2017,2016)	Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014,	

										2013,2012); Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012)
MATH3301	Algebra I	6	Pass in MATH2101	Y	Y	1	Dec	 Dr Y K Lau, Mathematics	Major in Mathematics (2014,2013,2012); Major in Mathematics (Intensive) (2019,2018,2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012)	Major in Mathematics (2019,2018,2017,2016, 2015); Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012)
MATH3303	Matrix theory and its applications	6	Pass in MATH2101 and MATH2102	Y	N	2	May	 Dr Y M Chan, Mathematics		Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012)
MATH3304	Introduction to number theory	6	Pass in MATH2101 and MATH2211	Y	Y	2	May	 Dr B Kane, Mathematics		Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012)
MATH3401	Analysis I	6	Pass in MATH2211	Y	Y	1	Dec	 Prof W S Cheung, Mathematics	Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (Intensive) (2019,2018,2017,2016) ; Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012)	Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012)
MATH3403	Functions of a complex variable	6	Pass in MATH2211 and MATH2241	Y	Y	2	May	 Prof N Mok, Mathematics	Major in Mathematics (2014,2013,2012); Major in Mathematics (Intensive) (2019,2018,2017,2016)	Major in Mathematics (2019,2018,2017,2016, 2015); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012)
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) (2019,2018,2017,2016)	Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Operations Research & Mathematical Programming (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Operations Research & Mathematical Programming (2019,2018,2017,2016,

											2015,2014,2013)	
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 (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Environmental Science (2017,2016,2015,2014, 2013,2012); Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Computational & Financial Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012)	
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 (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (Intensive) (2019,2018,2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012)	
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)	Y	Y	1	Dec		Dr K H Law, Mathematics	Major in Mathematics (Intensive) (2019,2018,2017,2016)	Major in Decision Analytics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Operations Research & Mathematical Programming (2019,2018,2017,2016, 2015,2014,2013)	
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 (2019,2018,2017,2016, 2015,2014,2013,2012)	Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019); Major in Decision Analytics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (Intensive)	

										(2019,2018,2017,2016) ; Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012)	
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) (2019,2018,2017,2016)	Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics/Physics (2017,2016,2014, 2013,2012); Minor in Computational & Financial Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012)	
MATH3901	Operations research I	6	Pass in MATH2014 or MATH2101 or MATH2102	Y	Y	1	Dec	 Dr Z Qu, Mathematics	Minor in Operations Research & Mathematical Programming (2019,2018,2017,2016, 2015,2014,2013)	Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019); Major in Decision Analytics (2019, 2014, 2013, 2012); Major in Mathematics (2019, 2014, 2013, 2012); Major in Mathematics (2019, 2014, 2013, 2012); Major in Mathematics (Intensive) (2019, 2018, 2017, 2016); Major in Mathematics (Intensive) (2019, 2018, 2017, 2016); Major in Mathematics (2017, 2016, 2015, 2014, 2013, 2012); Minor in Mathematics (2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012)	
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 (2019); Major in Decision Analytics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (Intensive) (2019,2018,2017,2016); Minor in Operations Research & Mathematical Programming (2019,2018,2017,2016, 2015,2014,2013)	Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Computational & Financial Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012)	
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 (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012);	

										Minor in Operations Research & Mathematical Programming (2019,2018,2017,2016, 2015,2014,2013)	
MATH3906	Financial calculus	6	Pass in (MATH2101 and MATH2211) or MATH2014 or (MATH1821 and MATH2822) or STAT2601	Y	Y	1	Dec	Dr S P Yung, Mathematics	Minor in Computational & Financial Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012)	Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019); Major in Mathematics (2019, 2014, 2013, 2012); Major in Mathematics (Intensive) (2019, 2018, 2017, 2016); Major in Mathematics (Intensive) (2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012); Minor in Mathematics/Physics (2017, 2016, 2015, 2014, 2013, 2012); Minor in Mathematics (2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012); Minor in Operations Research & Mathematical Programming (2019, 2018, 2017, 2016, 2015, 2014, 2013, 2017, 2016, 2015, 2014, 2013, 2017, 2016, 2015, 2014, 2013)	
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 (2019); Major in Mathematics (2019,2014,2013,2012); Major in Mathematics (1019,2018,2017,2016); Major in Mathematics (Intensive) (2019,2018,2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014,2013,2012); Minor in Computational & Financial Mathematics (2019,2018,2017,2016,2015,2014,2013,2012); Minor in Mathematics (2019,2018,2017,2016,2015,2014,2013,2012); Minor in Mathematics (2019,2018,2017,2016,2015,2014,2013,2012); Minor in Operations Research & Mathematical Programming (2019,2018,2017,2016,2015,2014,2013,2012), 2015,2014,2013,2012,015,2014,2013,2017,2016,2015,2014,2013)	
MATH3943	Network models in operations research	6	Pass in (MATH2101 and MATH2211) or MATH2014; and Pass in MATH3901, or already enrolled in this course.	Y	N	2	May	 Prof W Zang, Mathematics		Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019); Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (Intensive) (2019,2018,2017,2016) ; Major in Mathematics/Physics	

										(2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Operations Research & Mathematical Programming (2019,2018,2017,2016, 2015,2014,2013)	
MATH3999	Directed studies in mathematics	6	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, in addition to a pass in MATH2101, MATH2102, MATH2211 and MATH2102, MATH2211 and MATH2241. Subject to approval by the Department. 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.	Y	Y	1, 2	No exam	 Prof T W Ng, Mathematics		Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012)	Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (Intensive) (2019,2018,2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012)
MATH4302	Algebra II	6	Pass in MATH2102 and MATH3301	Y	Y	2	May	 Prof J H Lu, Mathematics		Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (Intensive) (2019,2018,2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2019,2018,2017,2016,2015,2014,2013,2012)	
MATH4402	Analysis II	6	Pass in MATH3401	Y	Y	2	May	 Dr Y M Chan, Mathematics		Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (Intensive) (2019,2018,2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2019,2018,2017,2016,2015,2014,2013,2012); Minor in Mathematics (2019,2018,2017,2016, 2019,2018,2017,2016, 2019,2018,2017,2016, 2015,2014,2013,2012)	
MATH4404	Functional analysis	6	Pass in MATH2101, MATH2102, MATH2211, MATH2241 and MATH3401	Y	Y	2	May	 Dr Y Gao, Mathematics	Major in Mathematics (Intensive) (2019,2018,2017,2016)	Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012)	
MATH4406	Introduction to partial differential equations	6	Pass in MATH2101, MATH2102, MATH2241; and Pass in MATH3405, or already enrolled	Y	Y	1	Dec	 Dr T K Wong, Mathematics	Major in Mathematics (Intensive) (2019,2018,2017,2016)	Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012);	

			in this course.							Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012)
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 C W Wong, Mathematics	Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012)	Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (Intensive) (2019,2018,2017,2016) ; Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012)
MATH4511	Introduction to differentiable manifolds	6	Pass in MATH3401 (having taken MATH4501 would be helpful; the course can also be taken concurrently with MATH4402).	N	Y		-	 TBC, Mathematics		Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (Intensive) (2019,2018,2017,2016) ; Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012)
MATH4602	Scientific computing	6	Pass in MATH3601	Y	Y	2	May	 Prof X Yuan, Mathematics		Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (Intensive) (2019,2018,2017,2016) ; Major in Mathematics (Intensive) (2019,2018,2017,2016) ; Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Computational & Financial Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012)
MATH4902	Operations research II	6	Pass in MATH2101, MATH2211 and MATH3603.	N	N			 Dr G Han, Mathematics		Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (Intensive) (2019,2018,2017,2016) ; Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Operations Research & Mathematical Programming (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Operations Research & Mathematical Programming (2019,2018,2017,2016, 2015,2014,2013)
MATH4907	Numerical methods for financial calculus	6	Pass in MATH3906 or equivalent.	Y	Y	2	May	 Dr C W Wong, Mathematics		Major in Mathematics (2019,2018,2017,2016,

										2015,2014,2013,2012); Major in Mathematics (Intensive) (2019,2018,2017,2016) ; Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Computational & Financial Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Operations Research & Mathematical Programming (2019,2018,2017,2016, 2015,2014,2013)	
MATH4910	Senior mathematics seminar	6	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. Subject to approval by the Department. 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.	Y	Y	2	No exam	12	Prof T W Ng, Mathematics	Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012)	Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (Intensive) (2019,2018,2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012)
MATH4911	Mathematics capstone project	6	Pass in at least 24 credits of advanced level disciplinary core/elective mathematics courses (MATH3XXX, MATH4XXX, or MATH47XXX) in the Mathematics/ Mathematics (Intensive), and Mathematics/Physics Majors. Subject to approval by the Department. 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.)	N	Z				Dr S P Yung, Mathematics	Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012)	Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (Intensive) (2019,2018,2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012)
MATH4966	Mathematics internship	6	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. 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.	Y	Y	1, 2, S	No exam		Dr C W Wong, Mathematics	Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012)	Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (Intensive) (2019,2018,2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012)
MATH4999	Mathematics project	12	Pass in at least 24 credits of advanced level disciplinary core/elective mathematics courses (MATH3XXX, MATH4XXX, or MATH7XXX) in the Mathematics/ Mathematics (Intensive),	Y	Y	0	No exam		Prof T W Ng, Mathematics	Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012)	Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (Intensive)

			and Mathematics/Physics Majors. Subject to approval by the Department. 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.							(2019,2018,2017,2016) ; Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012)
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 N Mok, Mathematics	Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (Intensive) (2019,2018,2017,2016) ; Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012)	
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 (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (Intensive) (2019,2018,2017,2016) ; Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2019,2018,2017,2016, 2015,2018,2017,2016, 2015,2014,2013,2012)	
MATH7202	Complex manifolds	6	Pass in a first course in Complex Analysis such as MATH3403, a first course in Differential Geometry such as MATH4501, and approval by the course coordinator.	N	N	1		 TBC, Mathematics	Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (Intensive) (2019,2018,2017,2016) ; Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2019,2018,2017,2016, 2015,2018,2017,2016, 2015,2014,2013,2012)	
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.	N	N			 TBC, Mathematics	Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (Intensive) (2019,2018,2017,2016) ; Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Computational & Financial Mathematics (2019,2018,2017,2016) ; Minor in Mathematics (2019,2018,2017,2016) ; Minor in Mathematics (2019,2018,2017,2016)	
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 (2019,2018,2017,2016, 2015,2014,2013,2012);	

									Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012)
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 (2019,2018,2017,2016, 2015,2014,2017,2016, 2015,2014,2013,2012); Major in Mathematics (Intensive) (2019,2018,2017,2016) ; Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Computational & Financial Mathematics (2019,2018,2017,2016) ; Minor in Mathematics (2019,2018,2017,2016) ; Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012)
MATH7501	Topics in algebra	6	Pass in MATH4302	Y	N	1	Dec	 Dr Z Hua, Mathematics	Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (Intensive) (2019,2018,2017,2016) ; Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012)
MATH7502	Topics in applied discrete mathematics	6	Pass in (MATH3301 or MATH3600), and approval of the course coordinator.	N	Z			 Prof W Zang, Mathematics	Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (Intensive) (2019,2018,2017,2016) ; Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2017,2016,2015,2014, 2013,2012); Minor in Operations Research & Mathematical Programming (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Operations Research & Mathematical Programming (2019,2018,2017,2016, 2015,2014,2013)
MATH7503	Topics in mathematical programming and optimization	6	Pass in MATH3901, MATH3904 and (MATH4902 or the approval of the course coordinator)	Y	Y	2	No exam	 Prof X Yuan, Mathematics	Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (Intensive) (2019,2018,2017,2016) ; Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012);

											Minor in Operations Research & Mathematical Programming (2019,2018,2017,2016, 2015,2014,2013)	
MATH7504	Geometric topology	6	Pass in MATH3301 and MATH3401	Z	N			1	TBC, Mathematics		Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Minor in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012)	
MATH7505	Real analysis	6	A good grade in MATH3401 and approval by the course coordinator	Y	Y	2	May		Prof W S Cheung, Mathematics		Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (Intensive) (2019,2018,2017,2016) ; Major in Mathematics/Physics (2017,2016,2015,2014,2013,2012); Minor in Mathematics (2019,2018,2017,2016,2015,2014,2013,2012)	
Department of			,								•	
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 K M Lee, 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 (2014,2013,2012); Major in Physics (Intensive) (2019,2018,2017,2016)	Major in Astronomy (2017,2016,2015); Major in Mathematics/Physics (2017,2016,2015); Major in Physics (2019,2018,2017,2016, 2015); Minor in Physics (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 M Su, Physics			
PHYS1250	Fundamental physics	6	Level 3 or above in HKDSE Physics or	Υ	Υ	1, 2	Dec, May		Dr J H C Lee, Physics	Major in Astronomy	Minor in Astronomy	

			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.							(2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Minor in Astronomy (2017,2016,2015,2014, 2013,2012); Minor in Physics (2019,2018,2017,2016, 2015,2014,2013,2012)	(2019,2018)	
PHYS1650	Nature of the universe	6	NIL	Y	Y	1, 2	Dec, May		Dr K M Lee, Physics	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Minor in Astronomy (2019,2018,2017,2016, 2015,2014,2013,2012)	Major in Physics (Intensive) (2019,2018,2017,2016)	
PHYS2055	Introductory relativity	6	Pass in PHYS1050 or PHYS1150 or PHYS1250 or ENGG1300	Y	Y	2	May		Dr K M Lee, Physics	Major in Physics (Intensive) (2019,2018,2017,2016)	Major in Astronomy (2017,2016,2015); Major in Mathematics/Physics (2017,2016,2015); Major in Physics (2019,2018,2017,2016, 2015); Minor in Astronomy (2019,2018); Minor in Physics (2019,2018)	
PHYS2150	Methods in physics I	6	Pass in MATH1013 or MATH1821 or MATH1851 or PHYS1150	Y	~	1	Dec	-	Dr F K Chow, Physics	Major in Physics (Intensive) (2019,2018,2017,2016)	Major in Astronomy (2017,2016,2015); Major in Mathematics/Physics (2017,2016,2015); Major in Physics (2019,2018,2017,2016, 2015); Minor in Physics (2019,2018)	
PHYS2155	Methods in physics II	6	Pass in MATH1013 or MATH1821 or MATH1851 or PHYS1150	Y	~	2	May		Dr K M Lee, Physics	Major in Physics (Intensive) (2019,2018,2017,2016)	Major in Astronomy (2017,2016,2015); Major in Mathematics/Physics (2017,2016,2015); Major in Physics (2019,2018,2017,2016, 2015); Minor in Physics (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 Physics (2019,2018); Major in Physics (Intensive) (2019,2018,2017,2016) ; Minor in Astronomy (2019); Minor in Physics (2019)	
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, 2013, 2012); Major in Mathematics/Physics (2014, 2013, 2012); Major in Physics (2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012); Major in Physics (Intensive) (2019, 2018, 2017, 2016)	Major in Mathematics/Physics (2017,2016,2015); Minor in Physics (2019,2018)	

									; Minor in Physics (2017,2016,2015,2014, 2013,2012)		
PHYS2255	Introductory electricity and magnetism	6	Pass in PHYS1050 or PHYS1150 or PHYS1250 or ENGG1310	Y	Y	2	May	 Dr J C S Pun, Physics	Major in Astronomy (2014,2013,2012); Major in Physics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Physics (Intensive) (2019,2018,2017,2016)	Major in Astronomy (2017,2016,2015); Major in Mathematics/Physics (2017,2016,2015); Minor in Physics (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, 2013,2012)	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 (2019,2018); Major in Physics (Intensive) (2019,2018,2017,2016)	Minor in Physics (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, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Physics (Intensive) (2019,2018,2017,2016); Minor in Astronomy (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012)	Minor in Physics (2019,2018)	
PHYS2650	Modern astronomy	6	Pass in PHYS1650	Y	Y	2	May	 Dr J J L Lim, Physics	Minor in Astronomy (2019,2018)	Major in Physics (Intensive) (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 (PHYS2250 or PHYS2255 or PHYS2265) and (MATH2211 or PHYS2150)	Y	Y	2	May	 Prof Z D Wang, Physics	Major in Physics (Intensive) (2019,2018,2017,2016)	Major in Astronomy (2017, 2016, 2015, 2014, 2013, 2012); Major in Mathematics/Physics (2017, 2016, 2015, 2014, 2013, 2012); Major in Physics (2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012); Minor in Physics (2019, 2018, 2017, 2016, 2015, 2014, 2013, 2017, 2016, 2015, 2014, 2013, 2017, 2016,	
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	1	Dec	 Dr Z Y Meng, Physics		Major in Astronomy (2017,2016,2015); Major in Mathematics/Physics (2017,2016,2015); Major in Physics (2019,2018,2017,2016, 2015); Major in Physics (Intensive) (2019,2018,2017,2016) ; Minor in Physics	

											(2019,2018)		
PHYS3350	Classical mechanics	6	Pass in PHYS2250	Y	Y	1	Dec		Prof S Q Shen, Physics	Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (Intensive) (2019,2018,2017,2016)	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Physics (2019,2018); Minor in Physics (2019,2018,2017,2016, 2015,2014,2013,2012)		
PHYS3351	Quantum mechanics	6	Pass in PHYS2265	Y	Y	1	Dec		Prof W Yao, Physics	Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (Intensive) (2019,2018,2017,2016)	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Physics (2019,2018); Minor in Physics (2019,2018,2017,2016, 2015,2014,2013,2012)		
PHYS3450	Electromagnetism	6	Pass in PHYS2255	Y	Y	2	May		Prof X D Cui, Physics	Major in Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (Intensive) (2019,2018,2017,2016)	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2019,2018); Minor in Physics (2019,2018,2017,2016, 2015,2014,2013,2012)		
PHYS3550	Statistical mechanics & thermodynamics	6	Pass in PHYS2260	Y	Y	2	May		Dr S Z Zhang, Physics	Major in Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (Intensive) (2019,2018,2017,2016)	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2019,2018); Minor in Physics (2019,2018,2017,2016, 2015,2014,2013,2012)		
PHYS3551	Introductory solid state physics	6	Pass in PHYS2260 and PHYS2265	N	N	-		-	Prof J Gao, Physics		Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012)		
PHYS3650	Observational astronomy	6	Pass in PHYS1650 and (PHYS2250 or PHYS2265)	Y	Y	1	Dec		Dr J J L Lim, Physics	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Minor in Astronomy (2019,2018)	Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Physics (Intensive) (2019,2018,2017,2016); Minor in Astronomy (2017,2016,2015,2014,2013,2012); Minor in Physics (2019,2018,2017,2016,2015,2014,2013,2012); Minor in Physics (2019,2018,2017,2016,2015,2014,2013,2012)		

PHYS3651	The physical universe	6	Pass in PHYS1650 and (PHYS2250 or PHYS2265)	Y	N	1	Dec		Dr K M Lee, Physics	Major in Astronomy (2017,2016,2015,2014, 2013,2012)	Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Minor in Astronomy (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012)	
PHYS3652	Principles of astronomy	6	Pass in PHYS1650 and (PHYS2250 or PHYS2265)	Y	N	2	May	1	Dr L X Dai, Physics	Major in Astronomy (2017,2016,2015,2014, 2013,2012)	Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Minor in Astronomy (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012)	
PHYS3653	Astrophysics	6	Pass in PHYS2250 or PHYS2265 or PHYS2650	N	Y				Dr L X Dai, Physics		Major in Physics (2019,2018); Major in Physics (Intensive) (2019,2018,2017,2016) ; Minor in Astronomy (2019,2018); Minor in Physics (2019,2018)	
PHYS3660	Astronomy laboratory	6	Pass in (PHYS2261 or PHYS2650); and Pass in PHYS3650, or already enrolled in this course.	N	Y			10	Dr S C Y Ng, Physics		Major in Physics (2019,2018); Major in Physics (Intensive) (2019,2018,2017,2016) ; Minor in Astronomy (2019,2018); Minor in Physics (2019,2018)	
PHYS3750	Laser and spectroscopy	6	Pass in PHYS3551, or already enrolled in this course.	N	Y			-	Prof S J Xu, Physics		Major in Astronomy (2017, 2016, 2015, 2014, 2013, 2012); Major in Mathematics/Physics (2017, 2016, 2015, 2014, 2013, 2012); Major in Physics (2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012); Major in Physics (intensive) (2019, 2018, 2017, 2016) ; Minor in Physics (2019, 2018, 2017, 2016) ; Minor in Physics (2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012)	
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, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012)	

PHYS3760	Physics laboratory	6	Pass in any two of the following courses: PHYS3350, PHYS3351, PHYS3450, PHYS3550	N	Y			24	Prof X D Cui, Physics	Major in Physics (Intensive) (2019,2018,2017,2016)	Major in Physics (2019,2018); Minor in Physics (2019,2018)	
PHYS3850	Waves and optics	6	Pass in PHYS2255 and PHYS2260	Y	Y	1	Dec		Dr D K Ki, Physics		Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Physics (Intensive) (2019,2018,2017,2016) ; Minor in Physics (2019,2018,2017,2016) ; Minor in Physics (2019,2018,2017,2016)	
PHYS3851	Atomic and nuclear physics	6	Pass in PHYS3351, or already enrolled in this course	Y	Y	2	May		Dr J H C Lee, Physics		Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Physics (Intensive) (2019,2018,2017,2016) ; Minor in Physics (2019,2018,2017,2016) ; Minor in Physics (2019,2018,2017,2016, 2015,2014,2013,2012)	
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, 2013,2012)	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Physics (Intensive) (2019,2018,2017,2016)
PHYS4150	Computational physics	6	Pass in (MATH3301 or MATH3401 or MATH3403 or MATH3405 or PHYS2160 or PHYS3150); and Pass in any three of the following courses: PHYS3350, PHYS3351, PHYS3450, PHYS3550	Y	Y	1	Dec		Prof J Wang, Physics		Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Physics (Intensive) (2019,2018,2017,2016) ; Minor in Physics (2019,2018,2017,2016) ; Minor in Physics (2019,2018,2017,2016, 2015,2014,2013,2012)	
PHYS4151	Data analysis and modeling in physics	6	Pass in (MATH3301 or MATH3401 or MATH3403 or MATH3405 or PHYS2160 or PHYS3150); and Pass in any one of the following courses: PHYS3350, PHYS3351, PHYS3450, PHYS3550	N	N				Prof H F Chau, Physics		Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in	

PHYS4350	Advanced classical mechanics	6	Pass in PHYS3350	N	Y			 Prof S Q Shen, Physics		Physics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Physics (Intensive) (2019,2018,2017,2016); Minor in Physics (2019,2018,2017,2016, 2015,2014,2013,2012) Major in Astronomy (2017,2016,2015,2014,2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014,2013,2012); Major in Physics (2017,2016,2015,2014,2013,2012); Minor in Physics (2017,2016,2015,2014,2013,2012); Minor in Physics (2017,2016,2015,2014,2013,2012); Minor in Physics (2017,2016,2015,2014,2013,2012); Minor in Physics (2017,2016,2015,2014,2013,2012)	
PHYS4351	Advanced quantum mechanics	6	Pass in PHYS3351	Y	Y	2	May	 Prof W Yao, Physics	Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012)	Major in Astronomy (2017, 2016, 2015, 2014, 2013, 2012); Major in Physics (2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012); Major in Physics (Intensive) (2019, 2018, 2017, 2016) ; Minor in Physics (2019, 2018, 2017, 2016, 2015, 2014, 2013, 2017,	
PHYS4450	Advanced electromagnetism	6	Pass in PHYS3450	Y	Y	1	Dec	 Prof X D Cui, Physics		Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Physics (Intensive) (2019,2018,2017,2016) ; Minor in Physics (2019,2018,2017,2016, 2015,2014,2013,2012)	
PHYS4550	Advanced statistical mechanics	6	Pass in PHYS3550	N	Y	-	1	 Dr Y J Tu, Physics		Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012); Minor in	
PHYS4551	Solid state physics	6	Pass in (PHYS2255 or PHYS2260) and PHYS3351	Y	Y	1	Dec	 Prof M H Xie, Physics		Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics	

PHYS4650	Stellar physics	6	Pass in PHYS3351 and PHYS3651	Y	Y	2	May	 Dr S C Y Ng, Physics	(2019,2018,2017,2016, 2015,2014,2013,2012); Major in Physics (Intensive) (2019,2018,2017,2016) ; Minor in Physics (2019,2018,2017,2016, 2015,2014,2013,2012) Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Minor in Astronomy (2017,2016,2015,2014, 2013,2012); Minor in Astronomy (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012); Minor in Astronomy (2017,2016,2015,2014, 2013,2012); Minor in Physics
PHYS4651	Selected topics in astrophysics	6	Pass in PHYS3351 or PHYS3450 or PHYS3550 or PHYS3651	Y	N	1	Dec	 Prof K S Cheng, Physics	(2017,2016,2015,2014, 2013,2012) Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Minor in
PHYS4652	Planetary science	6	Pass in PHYS3651 or (PHYS3350 and	Y	N	2	May	 Dr M H Lee, Physics	Astronomy (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012) Major in Astronomy
	Pranetary science	6	PHYS3550)			2	May		(2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Physics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Physics (Intensive) (2019,2018,2017,2016) ; Minor in Astronomy (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Physics (2019,2018,2017,2016, 2015,2014,2013,2012)
PHYS4653	Cosmology	6	Pass in PHYS3651 or PHYS3652	N	Y			 Prof K S Cheng, Physics	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Physics (1019,2018,2017,2016, 2015,2014,2013,2012); Major in Physics (Intensive) (2019,2018,2017,2016)

									; Minor in Astronomy (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Physics (2019,2018,2017,2016, 2015,2014,2013,2012)
PHYS4654	General relativity	6	Pass in PHYS2055 and PHYS3350	Y	Y	1	Dec	 Dr M Su, Physics	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Physics (Intensive) (2019,2018,2017,2016); Minor in Astronomy (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Physics (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Physics (2019,2018,2017,2016, 2015,2014,2013,2012)
PHYS4655	Interstellar medium	6	Pass in PHYS3651 or (PHYS3351 and PHY3550)	N	Y	i-	1	 Dr M H Lee, Earth Sciences	Major in Astronomy (2017, 2016, 2015, 2014, 2013, 2012); Major in Mathematics/Physics (2017, 2016, 2015, 2014, 2013, 2012); Major in Physics (2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012); Major in Physics (Intensive) (2019, 2018, 2017, 2016) ; Minor in Astronomy (2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012); Minor in Physics (2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012); Minor in Physics (2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012)
PHYS4656	Advanced astrophysics	6	Pass in PHYS3651 or PHYS3653 or (PHYS3351 and PHYS3450)	N	N			 TBA, Physics	Major in Physics (2019,2018); Major in Physics (Intensive) (2019,2018,2017,2016) ; Minor in Astronomy (2019,2018); Minor in Physics (2019,2018)
PHYS4750	Experimental physics	6	TBC	N	N			 TBC, Physics	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012)
PHYS4850	Particle physics	6	Pass in PHYS3351	Y	Y	2	May	 Dr Y J Tu, Physics	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in

DING 1000	District	6		Y	Y	S		Dr J C S Pun, Physics	Physics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Physics (Intensive) (2019,2018,2017,2016) ; Minor in Physics (2019,2018,2017,2016, 2015,2014,2013,2012)	
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	0	No exam	 Dr J C S Pun, Physics	Minor in Physics (2017,2016,2015,2014, 2013,2012) Major in Astronc (2017,2016,201,2013,2012); Maj Mathematics/Ph (2017,2016,201; 2013,2012); Maj Physics (2019,2018,201; 2015,2014,2013 Major in Physics (intensive) (2019,2018,201;	5,2014, ajor in nysics 5,2014, ajor in 7,2016, 3,2012);
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 J J L Lim, Physics	Minor in Physics (2017,2016,2015,2014, 2013,2012) Major in Astrono (2017,2016,2012, Maj Mathematics/Ph (2017,2016,2012, Maj Physics (2019,2018,2012, Maj Physics (2019,2014,2013, Major in Physics (Intensive) (2019,2018,2012, Maj Physics (Intensive) (2019,2018,2013, Major in Physics (Intensive) (2017,2016,2013, Major in Physics (Intensive)	5,2014, ajor in nysics 5,2014, ajor in 7,2016, 3,2012);
PHYS7350	Graduate classical mechanics	6	Pass in PHYS4350	Z	N			 TBC, Physics	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Physics (Intensive) (2019,2018,2017,2016) ; Minor in Physics (2019,2018,2017,2016) ; Minor in Physics (2019,2018,2017,2016)	
PHYS7351	Graduate quantum mechanics	6	Pass in PHYS4351	Y	Y	2	May	 Prof S Q Shen, Physics	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Physics (Intensive) (2019,2018,2017,2016) ; Minor in Physics (2019,2018,2017,2016) ; Minor in Physics (2019,2018,2017,2016)	
PHYS7450	Graduate electromagnetism	6	Pass in PHYS4450	Y	Y	1	Dec	 Prof Z D Wang, Physics	Major in Astronomy (2017,2016,2015,2014,	

								2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Physics (Intensive) (2019,2018,2017,2016) ; Minor in Physics (2019,2018,2017,2016) ; Minor in Physics (2019,2018,2017,2016)
PHYS7550	Graduate statistical mechanics	6	Pass in PHYS4550	N	Y	 	 Prof J Wang, Physics	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Physics (Intensive) (2019,2018,2017,2016) ; Minor in Physics (2019,2018,2017,2016) ; Minor in Physics (2019,2018,2017,2016) ; Minor in Physics (2019,2018,2017,2016)
PHYS7551	Graduate solid state physics	6	Pass in PHYS3551 and PHYS4351	N	N	 	 Prof J Wang, Physics	Major in Astronomy (2017, 2016, 2014, 2013, 2012), Major in in Mathematics/Physics (2017, 2016, 2015, 2014, 2013, 2012); Major in Physics (2017, 2016, 2015, 2014, 2013, 2012); Minor in Physics (2017, 2016, 2015, 2014, 2013, 2012); Minor in Physics (2017, 2016, 2015, 2014, 2013, 2012)
PHYS7650	Stellar atmospheres	6	TBC	N	N	 	 TBC, Physics	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2017,2016,2015,2014, 2013,2012); Minor in Astronomy (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012); Minor in Physics (2017,2016,2015,2014, 2013,2012)
PHYS7750	Nanophysics	6	Pass in PHYS3551 and PHYS4351	N	N	 	 Prof S J Xu, Physics	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Mathematics/Physics (2017,2016,2015,2014, 2013,2012); Major in Physics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Physics (Intensive) (2019,2018,2017,2016) ; Minor in Physics

											(2019,2018,2017,2016, 2015,2014,2013,2012)	
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 (2014,2013,2012); Minor in Environmental Science (2017,2016,2015,2014, 2013,2012)	
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 (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012)	
Faculty of So	ience				•	•	•	•		•		
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 (2019,2018,2017)		
ENTR3001	Science-based innovation development	6	Pass in IIMT1611 and ENTR2001	Y	Y	2	No exam	20	Dr M Kotaka, Biomedical Sciences	Minor in Science Entrepreneurship (2019,2018,2017)		
ENTR3002	Customer analysis and strategic marketing	6	Pass in IIMT1611 and ENTR2001	Y	Y	2	No exam	20	Dr R Law, Faculty	Minor in Science Entrepreneurship (2019,2018,2017)		
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	20	Dr R Law, Faculty	Minor in Science Entrepreneurship (2019,2018,2017)		
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.	N	Y			20	Dr R Law, Faculty	Minor in Science Entrepreneurship (2019,2018,2017)		
SCNC1111	Scientific method and reasoning	6	NIL (This course is compulsory for all students taking a Science major offered by the Faculty of Science. Students should take this course in their first year.)	Y	Y	1, 2	Dec, May		Dr K F Lam, Statistics & Actuarial Science	Major in Astronomy (2017,2016,2015,2014, 2013,2012); Major in Biochemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Biological Sciences (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015); Major in Decision Analytics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Earth System Science (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Ecology & Biodiversity (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Ecology & Biodiversity (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Ecology & Biodiversity (Intensive)		

									(2019,2018,2017,2016, 2015); Major in Environmental Science (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (1019,2018,2017,2016, 2015); Major in Geology (Intensive) (2019,2018,2017,2016, 2015); Major in Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (Intensive) (2019,2018,2017,2016); Major in Mathematics (Intensive) (2019,2018,2017,2016); Major in Mathematics/Physics (2017,2016,2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (Intensive) (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (Intensive) (2019,2018,2017,2016, 2015); Major in Physics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Physics (1019,2018,2017,2016, 2015,2014,2013,2012); Major in Risk Management (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Risk Management (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012)	
SCNC1112	Fundamentals of modern science	6	NIL (This course is compulsory for all students taking a Science major offered by the Faculty of Science. 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, 2013,2012); Major in Biochemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Biological Sciences (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Chemistry (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015); Major in Decision Analytics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Earth System	

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	N	Υ		50	Dr W M Y Cheung, Faculty	Major in Food & Nutritional Science (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (Intensive) (2019,2018,2017,2016, 2015); Major in Mathematics (Intensive) (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (Intensive) (2019,2018,2017,2016); Major in Mathematics (Intensive) (2019,2018,2017,2016); Major in Mathematics (2017,2016,2015,2014, 2013,2012); Major in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Molecular Biology & Biotechnology (2019,2018,2017,2016, 2015); Major in Molecular Biology & Biotechnology (1019,2018,2017,2016, 2015); Major in Physics (2019,2018,2017,2016, 2015); Major in Ryhysics (2019,2018,2017,2016, 2015); Major in Ryhysics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Risk Management (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012)	
									Mathematics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Mathematics (Intensive) (2019,2018,2017,2016) ; Major in Mathematics/Physics	
									2015,2014,2013,2012); Major in Geology (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Geology (Intensive) (2019,2018,2017,2016,	
									Nutritional Science (2019,2018,2017,2016,	
									Science (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Ecology & Biodiversity (2019,2018,2017,2016,	

			need to pass an interview in order to be enrolled in the course.									
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 SCNC1111, SCNC1112 and a level 2 science course. 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	Prof J J F Yao, Statistics & Actuarial Science	Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019)		
APAI3001	Deep learning	6	TBC	Z	Y				TBC	Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019)		
APAI3010	Image processing and computer vision	6	TBC	N	Y				TBC		Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019)	
APAI3021	Modern biostatistics	6	TBC	N	Y				TBC		Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019)	
APAI3799	Directed studies in Applied Al	6	TBC	N	Y				TBC			Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019)
APAI4011	Natural language processing	6	ТВС	N	Y				TBC		Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019)	
APAI4012	High-performance computing	6	ТВС	N	Y				TBC		Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019)	
APAI4022	Omics data analysis	6	TBC	N	Y				TBC		Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019)	
APAI4023	Medical image analysis	6	TBC	Z	Y				TBC		Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019)	
APAI4099	Special topics of applied Al	6	TBC	N	Y				ТВС		Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019,2019,2019,2019, 2019)	
APAI4766	Applied Al internship	6	TBC	N	Y				TBC			Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019)
APAI4798	Applied Al project	12	ТВС	N	Y				TBC			Bachelor of Arts and Sciences in Applied Artificial Intelligence

											(2019)
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 (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012)		
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 Environmental Science (2012)	Major in Chemistry (Intensive) (2019,2018,2017,2016, 2015); Major in Environmental Science (2017,2016,2015,2014, 2013); Minor in Risk Management (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012)	
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	Y	1, 2	Dec, May	 Dr R W L Wong, Statistics & Actuarial Science		Minor in Risk Management (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012)	
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	Y	1, 2	Dec, May	 Dr K P Wat, Statistics & Actuarial Science	Major in Environmental Science (2012)	Major in Chemistry (Intensive) (Intensive) (2019,2018,2017,2016, 2015); Major in Environmental Science (2017,2016, 2015,2014, 2013); Major in Physics (Intensive) (2019,2018,2017,2016); Minor in Risk Management (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Statistics (2019,2018,2017,2016, 2019,2018,2017,2016, 2019,2018,2017,2016, 2019,2018,2017,2016, 2019,2018,2017,2016, 2019,2018,2017,2016, 2015,2014,2013,2012)	
STAT2601	Probability and statistics I	6	Pass or already enrolled in MATH2014, or (MATH2101 and MATH2211), for students admitted in 2014 or thereafter; or Pass in MATH1013, or already enrolled in this course, for students admitted in 2013 or before; or Pass in MATH1851 and MATH1853, for students admitted in 2013 or before; and Not for students who have passed in STAT1603, or already enrolled in this course; Not for students who have passed in STAT2901, or already enrolled in this course; Not for students who have passed in STAT2901, or already enrolled in this course; and Not for BSc(ActuarSc) students.	Y	Y	1, 2	Dec, May	 Dr K P Wat, Statistics & Actuarial Science	Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019); Major in Decision Analytics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Risk Management (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012)	Minor in Actuarial Studies (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Risk Management (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012)	
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 K Zhu, Statistics & Actuarial Science	Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019); Major in Decision Analytics (2019,2018,2017,2016,	Minor in Actuarial Studies (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Risk Management	

										2015,2014,2013,2012); Major in Risk Management (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012)	(2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012)	
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	Major in Risk Management (2013,2012); Major in Statistics (2013,2012)	Minor in Risk Management (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012)	
STAT2604	Introduction to R programming and elementary data analysis	6	Pass or already enrolled in STAT1600 or MATH1821.	Y	Y	2	May	50	Dr Z Liu, Statistics & Actuarial Science		Minor in Risk Management (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012)	
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	Y	Y	2	May		Ms L M S Kwan, Statistics & Actuarial Science		Minor in Actuarial Studies (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012)	
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 (2019,2018,2017,2016, 2015,2014,2013,2012)	Minor in Actuarial Studies (2019,2018,2017,2016, 2015,2014,2013,2012)	
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 (2019,2018,2017,2016, 2015,2014,2013,2012)		
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 (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Risk Management (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012)	Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019); Minor in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012)	
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, 2013,2012); Major in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012)	

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 (2019,2018,2017,2016, 2015,2014,2013,2012)	Major in Risk Management (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012)	
STAT3604	Design and analysis of experiments	6	Pass in STAT2602 or STAT3611 or STAT3902	N	Y			 TBC, Statistics & Actuarial Science		Major in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012)	
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 STAT3902	N	N			 TBC, Statistics & Actuarial Science		Major in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012)	
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	 Ms O T K Choi, Statistics & Actuarial Science		Major in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012)	
STAT3607	Statistics in clinical medicine and bio- medical research	6	Pass in STAT2602 or STAT3902	N	Y			 Prof G Yin, Statistics & Actuarial Science		Major in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012)	
STAT3608	Statistical genetics	6	Pass in STAT2602 or STAT3902	N	Y			 Prof T W K Fung, Statistics & Actuarial Science		Major in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012)	
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) or STAT3611 or STAT3614; 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 (2019,2018,2017,2016, 2015,2014,2013,2012)	Minor in Risk Management (2019,2018,2017,2016, 2015,2014,2013,2012)	
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)	Y	Y	2	May	 Dr R W L Wong, Statistics & Actuarial Science		Major in Risk Management (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Risk Management (2019,2018,2017,2016, 2015,2014,2013,2012)	
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	N	N			 Dr E K F Lam, Statistics & Actuarial Science		Major in Environmental Science (2017,2016,2015,2014, 2013,2012); Minor in Risk Management	

			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								(2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012)	
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 A J Zhang, Statistics & Actuarial Science	Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019); Major in Decision Analytics (2019,2018,2017,2016, 2015,2014,2013,2012)	BSc in Actuarial Science (2017, 2016, 2015, 2014, 2013, 2012); Major in Risk Management (2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012); Major in Statistics (2019, 2018, 2017, 2016, 2015, 2014, 4, 2013, 2012); Minor in Risk Management (2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012); Minor in Statistics (2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012); Minor in Statistics (2019, 2018, 2017, 2016, 2019, 2018, 2017, 2016, 2019, 2018, 2017, 2016, 2019, 2018, 2017, 2016,	
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 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 (2019); Major in Statistics (2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012); Minor in Statistics (2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012)	
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 Not for students who have passed or already enrolled in any of these courses: STAT2601, STAT2901, STAT3907, STAT4601, ECON2280.	Z	Z	1			Dr R W L Wong, Statistics & Actuarial Science		Minor in Risk Management (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012)	
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		Dr A G Benchimol, Statistics & Actuarial Science	Major in Risk Management (2019,2018,2017,2016, 2015,2014,2013,2012)	Minor in Actuarial Studies (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Risk Management (2019,2018,2017,2016, 2015,2014,2013,2012)	
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, 2013, 2012); Major in Decision Analytics (2017, 2016, 2015, 2014, 2013, 2012); Major in Statistics (2017, 2016, 2015, 2014, 2013, 2012); Minor in Statistics (2017, 2016, 2015, 2014, 2013, 2012); Minor in	
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	Y	Υ	2	Мау		Ms O T K Choi, Statistics & Actuarial Science		Major in Food & Nutritional Science (2019); Major in Statistics	

			(STAT1602 and any University level 2 course), or STAT2601, or (STAT1603 and any University level 2 course), or STAT2901.								(2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012)	
STAT3618	Derivatives and risk management	6	Pass in STAT3615; and Not for students who have passed in STAT3910, or have already enrolled in this course; and Not for students who have passed in STAT3905, or have already enrolled in this course; and Not for students who have passed in FINA2322, or have already enrolled in this course; and Not for BSc(Actuarial Science) students.	Y	Y	1	Dec		Dr R W L Wong, Statistics & Actuarial Science		Major in Risk Management (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Risk Management (2019,2018,2017,2016, 2015,2014,2013,2012)	
STAT3620	Modern nonparametric statistics	6	Pass in STAT2602 or STAT3902	Y	Y	1	Dec		Dr P L H Yu, Statistics & Actuarial Science		Major in Decision Analytics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012)	
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 D Y Zhang, Statistics & Actuarial Science		Major in Decision Analytics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012)	
STAT3622	Data visualization	6	Pass in STAT2602 or STAT3902	Y	Y	2	No exam	50	Dr A J Zhang, Statistics & Actuarial Science		Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019); Major in Decision Analytics (2019,2018,2017,2016, 2015,2014,2013,2012)	
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 (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Risk Management (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012)
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 (2019,2018,2017,2016, 2015,2014,2013,2012)	Minor in Actuarial Studies (2019,2018,2017,2016, 2015,2014,2013,2012)	
STAT3902	Statistical models	6	Pass in STAT2901; and Not for students who have passed in	Y	Y	1	Dec		Dr J F Xu, Statistics & Actuarial Science	BSc in Actuarial Science		

			STAT2602, or already enrolled in this course; and For BSc(Actuarial Science) students only.						(2019,2018,2017,2016, 2015,2014,2013,2012)		
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	 Prof J J F Yao, Statistics & Actuarial Science	BSc in Actuarial Science (2019,2018,2017,2016, 2015,2014,2013,2012)		
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	May	 Dr D Lee, Statistics & Actuarial Science	BSc in Actuarial Science (2019,2018,2017,2016, 2015,2014,2013,2012)	Minor in Actuarial Studies (2019,2018,2017,2016, 2015,2014,2013,2012)	
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 FINA2322, or have already enrolled in this course; and For BSc(Actuarial Science) students only.	Y	Y	1	Dec	 Dr K C Cheung, Statistics & Actuarial Science	BSc in Actuarial Science (2019,2018,2017,2016, 2015,2014,2013,2012)		
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 (2019,2018,2017,2016, 2015,2014,2013,2012)	Minor in Actuarial Studies (2019,2018,2017,2016, 2015,2014,2013,2012)	
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	 Dr J T Y Wong, Statistics & Actuarial Science	BSc in Actuarial Science (2019,2018,2017,2016, 2015,2014,2013,2012)		
STAT3908	Credibility theory and loss distributions	6	Pass in STAT2602 or STAT3902 or STAT3906	Y	Y	2	May	 Dr A G Benchimol, Statistics & Actuarial Science	BSc in Actuarial Science (2019,2018,2017,2016, 2015,2014,2013,2012)	Minor in Actuarial Studies (2019,2018,2017,2016, 2015,2014,2013,2012)	
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 (2019,2018,2017,2016, 2015,2014,2013,2012)		
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 (2019,2018,2017,2016, 2015,2014,2013,2012)	Minor in Actuarial Studies (2019,2018,2017,2016, 2015,2014,2013,2012)	
STAT3911	Financial economics II	6	Pass in MATH3603 or STAT3603 or STAT3903 or STAT3910	Y	Y	2	Мау	 Prof H L Yang, Statistics & Actuarial Science	BSc in Actuarial Science (2017,2016,2015,2014, 2013,2012)	BSc in Actuarial Science (2019,2018); Major in Risk Management (2019,2018,2017,2016,	

STAT3951	Further topics in contingencies	6	Pass in STAT3909; and Pass in STAT3910, or already enrolled	Y	Y	1	Dec		Dr D Lee, Statistics & Actuarial Science		2015,2014,2013,2012); Minor in Actuarial Studies (2019,2018,2017,2016, 2015,2014,2013,2012) BSc in Actuarial Science	
			in this course; and For BSc(Actuarial Science) students only.								(2019,2018,2017,2016, 2015,2014,2013,2012)	
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		BSc in Actuarial Science (2012)	
STAT3953	Fundamentals of actuarial practice	6	Pass in STAT3909; and For BSc(Actuarial Science) students only.	Y	Y	1	No exam		Dr A G Benchimol, Statistics & Actuarial Science		BSc in Actuarial Science (2019,2018,2017,2016, 2015,2014,2013,2012)	
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 (2019,2018,2017,2016, 2015,2014,2013,2012)	
STAT3955	Survival analysis	6	Pass in STAT3902, or already enrolled in this course; or Pass in STAT3600 or STAT3901	Y	Y	2	May		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, 2015,2014,2013,2012); Major in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012)	
STAT3956	Pension funds and pension mathematics	6	Pass in STAT3909; and For BSc(Actuarial Science) students only.	Y	Y	1	Dec		Prof G Ma, Statistics & Actuarial Science		BSc in Actuarial Science (2019,2018,2017,2016, 2015,2014,2013,2012)	
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		Dr G Li, Statistics & Actuarial Science	Major in Risk Management (2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012); Major in Statistics (2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012)	Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019); Major in Decision Analytics (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Risk Management (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Statistics (2019,2018,2017,2016, 2015,2014,2013,2017,2016, 2015,2014,2013,2012)	
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 (2019,2018,2017,2016, 2015,2014,2013,2012)	Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019); BSc in Actuarial Science (2017,2016,2015,2014, 2013,2012); Major in Decision Analytics	

STAT4603	Current topics in risk management Risk management and Basel	6	Pass in (STAT3618 or FINA2322) Pass in STAT3618 or STAT3910 or	Y	Y	1	Dec		Ms O T K Choi, Statistics & Actuarial Science		(2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012) Major in Risk Management (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Risk Management (2019,2018,2017,2016, 2015,2014,2013,2012)	
01A14000	Accords in banking and finance	Ü	STAT3905 or (FINA2322 and any University level 3 course)	'		-	May		Science		Management (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Risk Management (2019,2018,2017,2016, 2015,2014,2013,2012)	
STAT4607	Credit risk analysis	6	Pass in STAT3618 or STAT3905 or STAT3910 or (FINA2322 and any University level 3 course)	Y	Y	2	May		Dr K P Wat, Statistics & Actuarial Science		BSc in Actuarial Science (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Risk Management (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Risk Management (2019,2018,2017,2016, 2015,2014,2013,2012)	
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, 2015,2014,2013,2012); Major in Risk Management (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Risk Management (2019,2018,2017,2016, 2015,2014,2013,2012)	
STAT4609	Big data analytics	6	Pass in STAT3612 or STAT4904	Y	Y	2	No exam	50	Dr P L H Yu, Statistics & Actuarial Science	Major in Decision Analytics (2019,2018,2017,2016, 2015,2014,2013,2012)		
STAT4610	Bayesian learning	6		N	Y				, Statistics & Actuarial Science		Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019)	
STAT4710	Capstone experience for statistics undergraduates	6	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. This capstone course is only for students majoring in Decision Analytics/Risk Management/Statistics, and is mutually exclusive with STAT3799, STAT4766 and STAT4799.	Y	Y	1, 2	No exam	50	Prof G Yin, Statistics & Actuarial Science			Major in Decision Analytics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Risk Management (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012)

			The earliest that a student is allowed to take this capstone course is their year 3 study.								
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 (2019,2018,2017,2016, 2015,2014,2013,2012)
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 (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Risk Management (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012)
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 A G Benchimol, Statistics & Actuarial Science		BSc in Actuarial Science (2019,2018,2017,2016, 2015,2014,2013,2012)
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 (2019,2018,2017,2016, 2015,2014,2013,2012)
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.	Y	Y	0	No exam	50	Prof S M S Lee, Statistics & Actuarial Science		Major in Decision Analytics (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Risk Management (2019,2018,2017,2016, 2015,2014,2013,2012); Major in Statistics (2019,2018,2017,2016, 2015,2014,2013,2012)

			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.									
STAT4901	Risk theory II	6	Pass in STAT3906	N	N				TBC, Statistics & Actuarial Science		BSc in Actuarial Science (2019,2018,2017,2016, 2015,2014,2013,2012)	
STAT4902	Selected topics in actuarial science	6	Pass in STAT3906	N	N				TBC, Statistics & Actuarial Science		BSc in Actuarial Science (2019,2018,2017,2016, 2015,2014,2013,2012)	
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 (2019,2018,2017,2016, 2015,2014,2013,2012); Minor in Actuarial Studies (2019,2018,2017,2016, 2015,2014,2013,2012)	
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	May		Dr C Wang, Statistics & Actuarial Science	BSc in Actuarial Science (2019,2018)	BSc in Actuarial Science (2017,2016,2015,2014, 2013,2012)	
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	Y	1	Dec		Prof G Yin, Statistics & Actuarial Science			
STAT7614	Advanced statistical modelling	6	Pass in STAT3600 or STAT3907	Y	Y	1, 2	Dec, May		Dr Y K Chung, Statistics & Actuarial Science			
STAT7615	Advanced quantitative risk management and finance	6	Pass in STAT4608	Υ	Υ	2	May		Dr Z Zhang, Statistics & Actuarial Science			
Common Co	re Courses											
CCCH9020	Science and Technology: Lessons from China	6	NIL	Υ	Υ	1	Dec	120	Dr W M Y Cheung, Faculty			
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	Υ	1	Dec	120	Dr T Sobko, 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			
CCST9012	Our Place in the Universe	6	NIL	Υ	Υ	2	May	120	Dr T D Wotherspoon, Faculty			
CCST9013	Our Living Environment	6	NIL	Y	Y	2	No exam	120	Dr S C Chang, Earth Sciences			
CCST9014	Science and Music	6	NIL	Υ	Υ	2	No exam	120	Prof H F Chau,			

		1							Physics
CCST9017	Hidden Order in Daily Life: A Mathematical Perspective	6	NIL	Y	Υ	1	No exam	120	0 Prof T W Ng, Mathematics
CCST9018	Origin and Evolution of Life	6	NIL	Y	Υ	2	No exam	120	D Dr K H Lemke, Earth Sciences
CCST9019	Understanding Climate Change	6	NIL	Y	Υ	2	No exam	120	D Dr Z H Liu, Earth Sciences
CCST9021	Hong Kong: Our Marine Heritage	6	NIL	Y	Υ	2	No exam	120	D Prof K M Y Leung, Biological Sciences
CCST9022	How the Mass Media Depicts Science, Technology and the Natural World	6	NIL	Y	Υ	1	No exam	120	O Prof H F Chau, Physics
CCST9023	The Oceans: Science and Society	6	NIL	Y	Υ	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	Y	Υ	1	No exam	120	D Prof D L Phillips, Chemistry
CCST9036	Material World: Past, Present, and Future	6	NIL	N	Υ			120	D Prof D L Phillips, Chemistry
CCST9037	Mathematics: A Cultural Heritage	6	NIL	Y	Υ	1	No exam	120	Dr B R Kane, Mathematics
CCST9038	Science and Science Fiction	6	NIL	Y	Υ	2	No exam	120	D Prof A B Djurisic, Physics
CCST9039	Statistics and Our Society	6	NIL	N	Υ			120	0 TBA, Statistics & Actuarial Science
CCST9043	Time's Arrow	6	NIL	Y	Υ	2	May	120	D Dr Y L Li, Earth Sciences
CCST9045	The Science and Lore of Culinary Culture	6	NIL	Y	Υ	2	No exam	120	D Dr A M Y Yuen, Chemistry
CCST9048	Simplifying Complexity	6	NIL	Y	Υ	1	No exam	120	Dr T D Wotherspoon, Faculty
CCST9051	What are We Made of - the Fundamental Nature of Matter	6	NIL	Y	Y	1	No exam	120	O Prof S Xu, Physics
CCST9054	War, Peace, and the Natural World	6	NIL	Y	Υ	S	No exam	120	D Dr D M Baker, Biological Sciences
CCST9056	The Force is with You: How Things Work	6	NIL	Y	Υ	1	No exam	120	Dr F C C Ling, Physics
CCST9065	Women in Science	6	NIL	Y	Υ	2	No exam	120	D Prof A B Djurisic, Physics
CCST9067	Leaving Earth: Our Future in Space	6	NIL	Y	Υ	2	May	120	D Dr J R Michalski, Earth Sciences
CCST9068	Artificial Intelligence: Utopia or Dystopia?	6	NIL	Y	Υ	1	No exam	120	D 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

HINDER		Equivalent Qualification 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		fulfillment of all 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 written approval from the Course Selection Adviser of the course offering department/school 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 2019-2020

SCIENCE

SECTION VI Science Majors on offer in 2019/2020

Majors offered by Science Faculty

Majors

Astronomy (only for 2017 cohort or before)

Biochemistry

Biological Sciences

Chemistry

Chemistry (Intensive) (for 2015 cohort and thereafter)

Decision Analytics (not for BASc(AppliedAI) students)

Earth System Science

Ecology & Biodiversity

Ecology & Biodiversity (Intensive) (for 2015 cohort and thereafter)

Environmental Science

Food & Nutritional Science

Geology

Geology (Intensive) (for 2015 cohort and thereafter)

Mathematics

Mathematics (Intensive) (for 2016 cohort and thereafter)

Mathematics/Physics (only for 2017 cohort or before)

Molecular Biology & Biotechnology

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

Physics

Physics (Intensive) (for 2016 cohort and thereafter)

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)

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)

I		
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	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)	
At least 6 credits selected	rom the following courses:	
PHYS3999	Directed studies in physics (6)	
PHYS4966	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 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.
- 5. 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.

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- 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:

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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)

PHYS4652
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)

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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	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)	
	from the following courses:	
PHYS3999	Directed studies in physics (6)	
PHYS4966	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 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 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)
- 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)

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)

PHYS4652
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)	
PHYS3750	Laser and spectroscopy (6)	
PHYS3751	Physics of nanomaterials (6)	
PHYS3850	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 cr	edits)	
At least 6 credits selected from	m the following courses:	
PHYS3999	Directed studies in physics (6)	
PHYS4966	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 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)

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

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l	PHYS4151	Data analysis and modeling in physics (6)
ı	PHYS4350	Advanced classical mechanics (6)
ı	PHYS4351	Advanced quantum mechanics (6)
ı	PHYS4450	Advanced electromagnetism (6)
ı	PHYS4550	Advanced statistical mechanics (6)
ı	PHYS4551	Solid state physics (6)
ı	PHYS4654	General relativity (6)
ı	PHYS4750	Experimental physics (6)
ı	PHYS4850	Particle physics (6)
ı	PHYS7350	Graduate classical mechanics (6)
ı	PHYS7351	Graduate quantum mechanics (6)
ı	PHYS7450	Graduate electromagnetism (6)
ı	PHYS7550	Graduate statistical mechanics (6)
ı	PHYS7551	Graduate solid state physics (6)
ı	PHYS7750	Nanophysics (6)
ı	3. Capstone requirement (6	credits)
ı	At least 6 credits selected	from the following courses:
ı	PHYS3999	Directed studies in physics (6)
ı	PHYS4966	Physics internship (6)
ı	PHYS4999	Physics 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 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 Waves and optics (6)
PHYS3851 Atomic and nuclear physics (6)
PHYS4150 Computational physics (6)

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l	PHYS4151	Data analysis and modeling in physics (6)
ı	PHYS4350	Advanced classical mechanics (6)
ı	PHYS4351	Advanced quantum mechanics (6)
ı	PHYS4450	Advanced electromagnetism (6)
ı	PHYS4550	Advanced statistical mechanics (6)
ı	PHYS4551	Solid state physics (6)
ı	PHYS4654	General relativity (6)
ı	PHYS4750	Experimental physics (6)
ı	PHYS4850	Particle physics (6)
ı	PHYS7350	Graduate classical mechanics (6)
ı	PHYS7351	Graduate quantum mechanics (6)
ı	PHYS7450	Graduate electromagnetism (6)
ı	PHYS7550	Graduate statistical mechanics (6)
ı	PHYS7551	Graduate solid state physics (6)
ı	PHYS7750	Nanophysics (6)
ı	3. Capstone requirement (6 credits)
ı	At least 6 credits selecte	d from the following courses:
ı	PHYS3999	Directed studies in physics (6)
ı	PHYS4966	Physics internship (6)
ı	PHYS4999	Physics 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 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.
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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 Physics or equivalent to take this major. Students who do not fulfill this requirement are advised to take PHYS1240.

Remarks:

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)

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

l	PHYS4151	Data analysis and modeling in physics (6)
ı	PHYS4350	Advanced classical mechanics (6)
ı	PHYS4351	Advanced quantum mechanics (6)
ı	PHYS4450	Advanced electromagnetism (6)
ı	PHYS4550	Advanced statistical mechanics (6)
ı	PHYS4551	Solid state physics (6)
ı	PHYS4654	General relativity (6)
ı	PHYS4750	Experimental physics (6)
ı	PHYS4850	Particle physics (6)
ı	PHYS7350	Graduate classical mechanics (6)
ı	PHYS7351	Graduate quantum mechanics (6)
ı	PHYS7450	Graduate electromagnetism (6)
ı	PHYS7550	Graduate statistical mechanics (6)
ı	PHYS7551	Graduate solid state physics (6)
ı	PHYS7750	Nanophysics (6)
ı	3. Capstone requirement (6	6 credits)
ı	At least 6 credits selected	from the following courses:
ı	PHYS3999	Directed studies in physics (6)
ı	PHYS4966	Physics internship (6)
ı	PHYS4999	Physics 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 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 Biochemistry

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:

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 (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.

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)

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)

At least 18 credits selected from the following courses:

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

Offered to students 2018

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)
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- 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)

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

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)

BIOC3601 Basic metabolism (6)

Essential techniques in biochemistry and molecular biology (6) BIOC3604

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

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) Nutritional biochemistry (6) BIOL3202 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)
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.
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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

Major Title Major in Biochemistry

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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- 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.

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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:

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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:

- 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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- 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 Biochemistry

Offered to students 2016

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)
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- 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

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

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

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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:

BIOC3605 Sequence bioinformatics (6)
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BIOL3202 Nutritional biochemistry (6)
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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.
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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

Major Title Major in Biochemistry

Offered to students 2015

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:

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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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Disciplinary Core Courses (30 credits)

Basic metabolism (6) BIOC3601

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Protein structure and function (6) BIOL3404

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CHEM3441 Organic chemistry II (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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- 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 Biochemistry

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.

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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)

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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

Major Title Major in Biochemistry

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:

Major Title Major in Biochemistry

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** Fundamentals of modern science (6) SCNC1112

Disciplinary Core Courses (30 credits)

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

BIOL3401 Molecular biology (6) 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) **BIOI 4417** Medicinal chemistry (6) CHEM4145 Chemical biology (6) CHEM4444

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 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 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 Scientific method and reasoning (6) 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

exclus

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)

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)
BIOL3314	Plant structure and evolution (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. 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 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.

exclusive

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

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

BIOL3105 BIOL3205 BIOL3403	Animal physiology and environmental adaptation (6) Human physiology (6) Immunology (6)		
BIOL3406	Reproduction and reproductive biotechnology (6)		
BIOL3503	Endocrinology: human physiology II (6)		
List II			
BIOL3107	Plant physiology (6)		
BIOL3314	Plant structure and evolution (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 sel	ected 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 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 Scientific method and reasoning (6) 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

exclusiv

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)

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)

List

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)		
BIOL3314	Plant structure and evolution (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 sel	ected 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 Fundamentals of modern science (6) **SCNC1112**

Disciplinary Core Courses (36 credits)

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

BIOL2102 Biostatistics (6)

Biological sciences laboratory course (6) BIOL2103

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	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)		
BIOL3314	Plant structure and evolution (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 sel	ected 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 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:

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) Fundamentals of modern science (6) **SCNC1112**

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

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

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

Animal physiology and environmental adaptation (6) BIOL3105

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

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)

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:

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)

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

BIOL2103 Biological sciences laboratory course (6)

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

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)

Cell biology and cell technology (6) BIOL3402

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

BIOL3105 Animal physiology and environmental adaptation (6)

Plant physiology (6) BIOL3107

Microbial physiology (6) **BIOL3108**

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

exclusive.

Human physiology (6) BIOL3205

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

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

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

(D) Applied biology

Conservation biology (6) **BIOL3303**

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

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:

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) Fundamentals of modern science (6) **SCNC1112**

Disciplinary Core Courses (36 credits)

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

BIOL2103 Biological sciences laboratory course (6)

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

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)

Cell biology and cell technology (6) BIOL3402

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

BIOL3105 Animal physiology and environmental adaptation (6)

Plant physiology (6) BIOL3107 **BIOL3108**

Microbial physiology (6)

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

exclusive.

Human physiology (6) BIOL3205

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

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

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

(D) Applied biology

Conservation biology (6) **BIOL3303**

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)

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.
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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.

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 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:

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) Fundamentals of modern science (6) **SCNC1112**

Disciplinary Core Courses (36 credits)

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

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

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

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)

Cell biology and cell technology (6) BIOL3402

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

BIOL3105 Animal physiology and environmental adaptation (6)

Plant physiology (6) BIOL3107 **BIOL3108**

Microbial physiology (6)

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

Human physiology (6) BIOL3205

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

BIOL3109 Environmental microbiology (6) Environmental toxicology (6) BIOL3110 BIOL3301 Marine biology (6)

Systematics and phylogenetics (6) BIOL3302

(D) Applied biology

Conservation biology (6) **BIOL3303**

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 Chemistry

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.

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:

Major in Chemistry (Intensive)

Minor in Chemistry

Required courses (96 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.
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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:

Major Title Major in Chemistry

Offered to students 2018

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 or directed studies of no less than three weeks with chemistry-related companies or research laboratories)

Impermissible Combinations:

Major in Chemistry (Intensive)

Minor in Chemistry

Required courses (96 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)

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)

Introductory physical chemistry (6) CHEM2541

2. Advanced level courses (42 credits)

Disciplinary Core Course (30 credits)

Analytical chemistry II: chemical instrumentation (6) CHEM3241

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 CHFM4143

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

CHEM4144 Advanced materials (6) 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.
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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:

Major Title Major in Chemistry

Offered to students 2017

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)
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- 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:

Major in Chemistry (Intensive)

Minor in Chemistry

Required courses (96 credits)

1. Introduc	tory ie	vei co	urses (48	creaits)	
	_	_		_	

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)
CHEM4148 Exprison in Modern Chemical S

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.
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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:

Major Title Major in Chemistry

Offered to students 2016

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)
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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:

Major in Chemistry (Intensive)

Minor in Chemistry

List A

Required courses (96 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)

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)

Introductory physical chemistry (6) CHEM2541

2. Advanced level courses (42 credits)

Disciplinary Core Course (30 credits)

Analytical chemistry II: chemical instrumentation (6) CHEM3241

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.

CHEM4142 CHFM4143

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

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.
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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:

Major Title Major in Chemistry

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)
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- 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:

Major in Chemistry (Intensive)

Minor in Chemistry

Required courses (96 credits)

1. Introduct	ory i	evei c	ourses	(40	creaits)		
	_	_	_		_	 _	

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)

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:

Major Title Major in Chemistry

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, 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 or directed studies of no less than three weeks with chemistry-related companies or research laboratories)

Impermissible Combinations:

Major in Chemistry (Intensive)

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)]

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

CHFM2541 Introductory physical chemistry (6) [previous title: Physical chemistry I (6)]

2. Advanced level courses (48 credits)

Disciplinary Core Course (30 credits)

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

Analytical chemistry II: chemical CHEM3241 instrumentation (6)

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

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

chémistry (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:

Integrated organic synthesis (6)

List A

CHFM4443

CHEM3542 Physical chemistry: statistical

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

Take either CHEM4443 or CHEM4441 to fulfill this 12 credits requirement, but not both.

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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CHEM3141	Environmental chemistry (6)
CHEINS 14 I	Lifvilorifierital Crieffistry (0)

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:

Major Title Major in Chemistry

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, 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 or directed studies of no less than three weeks with chemistry-related companies or research laboratories)

Impermissible Combinations:

Major in Chemistry (Intensive)

Minor in Chemistry

Required courses (96 credits)

1. Introductory level courses (42 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 (30 credits)

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

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

CHFM2541 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 and analytical techniques (6) CHEM3146

Analytical chemistry II: chemical CHEM3241 instrumentation (6) Inorganic chemistry II (6) CHEM3341

Organic chemistry II (6) CHEM3441 Physical chemistry: Introduction to quantum [previous title: Physical chemistry II: Introduction to CHEM3541

chémistry (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

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

Advanced inorganic chemistry (6) CHEM4341 CHEM4441 Advanced organic chemistry (6)

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

CHEM4443 credits requirement, but not both.

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

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

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

CHEM4241 Modern chemical instrumentation ar 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

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)
- 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 or directed studies of no less than three weeks with chemistry-related companies or research laboratories)

Impermissible Combinations:

Major in Chemistry (Intensive)

Minor in Chemistry

Required courses (96 credits)

1. Introductory level courses (42 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 (30 credits)

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

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

CHFM2541 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 and analytical techniques (6) CHEM3146

Analytical chemistry II: chemical CHEM3241 instrumentation (6) Inorganic chemistry II (6) CHEM3341

Organic chemistry II (6) CHEM3441 Physical chemistry: Introduction to quantum [previous title: Physical chemistry II: Introduction to CHEM3541

chémistry (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

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

Advanced inorganic chemistry (6) CHEM4341 CHEM4441 Advanced organic chemistry (6) Take either CHEM4443 or CHEM4441 to fulfill this 12 credits requirement, but not both.

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

CHEM4541 Physical chemistry III: statistical Take either CHEM3542 or CHEM4541 to fulfill this 12 credits requirement, but not both.

thermodynamics and kinetics theory (6)

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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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:

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 student internship opportunities or 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 cours		
	s: Science Foundation Courses (12 credits)	
SCNC1111	Scientific method and reasoning (6)	(Note 2)
SCNC1112	Fundamentals of modern science (6)	(Note 2)
Disciplinary Core Courses	s (36 credits)	• • •
CHEM1042	General chemistry I (6)	(Note 2)
CHEM1043	General chemistry II (6)	(Note 2)
CHEM2241	Analytical chemistry I (6)	(Note 2)
CHEM2341	Inorganic chemistry I (6)	(Note 2)
CHEM2441	Organic chemistry I (6)	(Note 2)
CHEM2541	Introductory physical chemistry (6)	(Note 2)
Disciplinary Electives (6 o	eredits)	
(Students are encourage	ed to meet with a Chemistry Course Selection Advisor in the course se	election period to discuss
	urses they should take based on their previous background in Mathen	
CHEM1044	Mathematics in chemistry (6)	ŕ
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 courses	s (78 credits)	
Disciplinary Core Course	(66 credits)	
CHEM3143	Introduction to materials chemistry (6)	
CHEM3241	Analytical chemistry II: chemical instrumentation (6)	(Note 2)
CHEM3341	Inorganic chemistry II (6)	(Note 2)
CHEM3441	Organic chemistry II (6)	(Note 2)
CHEM3443	Organic chemistry laboratory (6)	(Note 2)
CHEM3445	Integrated laboratory (6)	
CHEM3541	Physical chemistry: Introduction to quantum chemistry (6)	(Note 2)
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)
CHEM4441 Advanced organic chemistry (6)
CHEM4443 Integrated organic synthesis (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. 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.
- 2. These are core courses in the regular Chemistry Major (96 credits) curriculum.
- 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 student internship opportunities or 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 cours	ses (54 credits)	
Disciplinary Core Course	s: Science Foundation Courses (12 credits)	
SCNC1111	Scientific method and reasoning (6)	(Note 2)
SCNC1112	Fundamentals of modern science (6)	(Note 2)
Disciplinary Core Course	s (36 credits)	
CHEM1042	General chemistry I (6)	(Note 2)
CHEM1043	General chemistry II (6)	(Note 2)
CHEM2241	Analytical chemistry I (6)	(Note 2)
CHEM2341	Inorganic chemistry I (6)	(Note 2)
CHEM2441	Organic chemistry I (6)	(Note 2)
CHEM2541	Introductory physical chemistry (6)	(Note 2)
Disciplinary Electives (6 of	credits)	
(Students are encourage	ed to meet with a Chemistry Course Selection Advisor in the course sele	ection period to discus:
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		
Disciplinary Core Course		
CHEM3143	Introduction to materials chemistry (6)	
CHEM3241	Analytical chemistry II: chemical instrumentation (6)	(Note 2)
CHEM3341	Inorganic chemistry II (6)	(Note 2)
CHEM3441	Organic chemistry II (6)	(Note 2)
CHEM3443	Organic chemistry laboratory (6)	(Note 2)
CHEM3445	Integrated laboratory (6)	
CHEM3541	Physical chemistry: Introduction to quantum chemistry (6)	(Note 2)
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)
CHEM4441 Advanced organic chemistry (6)
Integrated organic synthesis (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. 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.

- 2. These are core courses in the regular Chemistry Major (96 credits) curriculum.
- 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 student internship opportunities or 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 2)
SCNC1112	Fundamentals of modern science (6)	(Note 2)
Disciplinary Core Course	s (36 credits)	
CHEM1042	General chemistry I (6)	(Note 2)
CHEM1043	General chemistry II (6)	(Note 2)
CHEM2241	Analytical chemistry I (6)	(Note 2)
CHEM2341	Inorganic chemistry I (6)	(Note 2)
CHEM2441	Organic chemistry I (6)	(Note 2)
CHEM2541	Introductory physical chemistry (6)	(Note 2)
Disciplinary Electives (6 o	credits)	
(Students are encourage	ed to meet with a Chemistry Course Selection Advisor in the course selec	tion period to discus
which of the following co	urses they should take based on their previous background in Mathemati	cs.)
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		
CHEM3143	Introduction to materials chemistry (6)	
CHEM3241	Analytical chemistry II: chemical instrumentation (6)	(Note 2)
CHEM3341	Inorganic chemistry II (6)	(Note 2)
CHEM3441	Organic chemistry II (6)	(Note 2)
CHEM3443	Organic chemistry laboratory (6)	(Note 2)
CHEM3445	Integrated laboratory (6)	
CHEM3541	Physical chemistry: Introduction to quantum chemistry (6)	(Note 2)
CHEM3542	Physical chemistry: statistical thermodynamics and kinetics theory (6)	

(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) (lab)

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. 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.
- 2. These are core courses in the regular Chemistry Major (96 credits) curriculum.
- 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 student internship opportunities or 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 cours		
	s: Science Foundation Courses (12 credits)	
SCNC1111	Scientific method and reasoning (6)	(Note 2)
SCNC1112	Fundamentals of modern science (6)	(Note 2)
Disciplinary Core Courses	s (36 credits)	• • •
CHEM1042	General chemistry I (6)	(Note 2)
CHEM1043	General chemistry II (6)	(Note 2)
CHEM2241	Analytical chemistry I (6)	(Note 2)
CHEM2341	Inorganic chemistry I (6)	(Note 2)
CHEM2441	Organic chemistry I (6)	(Note 2)
CHEM2541	Introductory physical chemistry (6)	(Note 2)
Disciplinary Electives (6 o	eredits)	
(Students are encourage	ed to meet with a Chemistry Course Selection Advisor in the course se	election period to discuss
	urses they should take based on their previous background in Mathen	
CHEM1044	Mathematics in chemistry (6)	ŕ
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 courses	s (78 credits)	
Disciplinary Core Course	(66 credits)	
CHEM3143	Introduction to materials chemistry (6)	
CHEM3241	Analytical chemistry II: chemical instrumentation (6)	(Note 2)
CHEM3341	Inorganic chemistry II (6)	(Note 2)
CHEM3441	Organic chemistry II (6)	(Note 2)
CHEM3443	Organic chemistry laboratory (6)	(Note 2)
CHEM3445	Integrated laboratory (6)	
CHEM3541	Physical chemistry: Introduction to quantum chemistry (6)	(Note 2)
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)
CHEM4441 Advanced organic chemistry (6)
CHEM4443 Integrated organic synthesis (6)

CHEM4443 Integrated organic synthesis (6) (lab)
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. 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.
- 2. These are core courses in the regular Chemistry Major (96 credits) curriculum.
- 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 student internship opportunities or 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 2)
SCNC1112	Fundamentals of modern science (6)	(Note 2)
Disciplinary Core Course	s (36 credits)	
CHEM1042	General chemistry I (6)	(Note 2)
CHEM1043	General chemistry II (6)	(Note 2)
CHEM2241	Analytical chemistry I (6)	(Note 2)
CHEM2341	Inorganic chemistry I (6)	(Note 2)
CHEM2441	Organic chemistry I (6)	(Note 2)
CHEM2541	Introductory physical chemistry (6)	(Note 2)
Disciplinary Electives (6 o	credits)	
(Students are encourage	ed to meet with a Chemistry Course Selection Advisor in the course selec	tion period to discus
which of the following co	urses they should take based on their previous background in Mathemati	cs.)
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 2)
CHEM3341	Inorganic chemistry II (6)	(Note 2)
CHEM3441	Organic chemistry II (6)	(Note 2)
CHEM3443	Organic chemistry laboratory (6)	(Note 2)
CHEM3445	Integrated laboratory (6)	
CHEM3541	Physical chemistry: Introduction to quantum chemistry (6)	(Note 2)
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. 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.
- 2. These are core courses in the regular Chemistry Major (96 credits) curriculum.
- 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 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)
STAT4601 Time-series 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)

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 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.

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)
- 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)
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- 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)
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)

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:

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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

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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)
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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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2. Advanced level courses (42 credits)

Disciplinary Core Courses (30 credits)

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Big data analytics (6)

Disciplinary Electives (12 credits)

STAT4609

At least 12 credits selected from the following courses:

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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:

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STAT3620 Modern nonparametric statistics

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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

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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:

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

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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

MATH3600 Discrete mathematics

MATH3901 Operations research I

MATH3943 Network models in operations research

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STAT3606 Business logistics

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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)

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2. Advanced level courses (42 credits)

Disciplinary Core Courses (30 credits)

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Big data analytics (6)

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STAT4609

At least 12 credits selected from the following courses:

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COMP3270 Artificial intelligence (6)
COMP3323 Advanced database systems (6)

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MATH3601 Numerical analysis (6)
MATH3901 Operations research I (6)
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[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

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Plus advanced level courses listed for the Major in Risk Management

c. Operational Analytics

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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.

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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

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Minor in Statistics

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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 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)
- 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)

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.
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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 http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

Offered to students 2012

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)

COMP1117 Computer programming (6)

COMP2119 Introduction to data structures and algorithms (6)

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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:

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.

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, 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)

Blue Planet (6) EASC1401

Introduction to the earth-life system (6) EASC1406 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) FASC2410

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) Meteorology (6) EASC3415

EASC3418 Coasts and coastal change (6) 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 Earth resources (6) EASC3412

Earth through time (6) EASC3417 Earth System Science Field Studies (6) **FASC3419 EASC3999** Directed studies in earth sciences (6) ENVS3007 Natural hazards and mitigation (6) Special topics in earth sciences (6) EASC4408 Earth sciences project (12) **EASC4999**

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, 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)

Blue Planet (6) EASC1401

Introduction to the earth-life system (6) EASC1406 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) FASC2410

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) Meteorology (6) EASC3415

EASC3418 Coasts and coastal change (6) ENVS3313 Environmental oceanography (6)

List B

EASC3406

EASC3020 Global change: anthropogenic impacts (6) Sedimentary environments (6) EASC3403 EASC3405 Environmental remote sensing (6) Reconstruction of past climate (6)

Earth resources (6) EASC3412 Earth through time (6) EASC3417

Earth System Science Field Studies (6) **FASC3419 EASC3999** Directed studies in earth sciences (6) ENVS3007 Natural hazards and mitigation (6) Special topics in earth sciences (6) EASC4408 Earth sciences project (12) **EASC4999**

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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- 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, 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)
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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

SCNC1112

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)

Disciplinary Core Courses (36 credits)

Blue Planet (6) EASC1401

Introduction to the earth-life system (6) EASC1406 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) FASC2410

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) Meteorology (6) EASC3415

EASC3418 Coasts and coastal change (6) 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 Earth resources (6) EASC3412 Earth through time (6) EASC3417

Earth System Science Field Studies (6) **FASC3419 EASC3999** Directed studies in earth sciences (6) ENVS3007 Natural hazards and mitigation (6) Special topics in earth sciences (6) EASC4408 Earth sciences project (12) **EASC4999**

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 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, 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)

SCNC1111 Scientific friends and reasoning (o)
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)

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

Disciplinary Core Courses (30 credits)

Blue Planet (6) EASC1401 EASC1402 Principles of geology (6)

Fluid/solid interactions in earth processes (6) EASC2401

EASC2402 Field and laboratory methods (6)

EASC2404 Introduction to atmosphere and hydrosphere (6)

Disciplinary Electives (6 credits)

BIOL1309 Evolutionary diversity (6)

Introduction to the earth-life system (6) EASC1406

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

Hydrogeology (6) EASC3410 EASC3415 Meteorology (6)

ENVS3313 Environmental oceanography (6)

List B

EASC3403 Sedimentary environments (6) EASC3405 Environmental remote sensing (6) Reconstruction of past climate (6) FASC3406 Geophysics (6) EASC3408

Earth resources (6) EASC3412 **FASC3416**

Advanced geochemistry and geochronology (6)

EASC3417 Earth through time (6)

EASC3999 Directed studies in earth sciences (6) Natural hazards and mitigation (6) ENVS3007 Special topics in earth sciences (6) EASC4408 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) SCNC1112 Fundamentals of modern science (6)

Disciplinary Core Courses (36 credits)
BIOL1309 Evolu

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.
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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 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

EASC3403 Sedimentary environments (6) EASC3405 Environmental remote sensing (6) Reconstruction of past climate (6) EASC3406 EASC3408 Geophysics (6)

Earth resources (6) FASC3412 EASC3416

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) 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 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) 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) EASC3416 Earth through time (6) EASC3417 Directed studies in earth sciences (6) FASC3999 ENVS3007 Natural hazards and mitigation (6)

EASC4999 Earth sciences project (12)

3. Capstone requirement (6 credits)

EASC4911 Earth system: contemporary issues (6)

Notes:

EASC4408

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

Special topics in earth sciences (6)

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

2019 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:

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 (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:

Animal behaviour (6) BIOL3101 BIOL3303 Conservation biology (6)

Tropical and temperate marine ecology field course (6) BIOL3305

Freshwater ecology (6) BIOL3313 Plant structure and evolution (6) BIOL3314 Experimental intertidal ecology (6) **BIOL3318 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 (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)

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, 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 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 (6)
BIOL4861	Ecology & biodiversity internship (6)
ENVS3019	Urban ecology (6)
ENVS3020	Global change ecology (6)
3. Capstone requir	rement (6 credits)
At least 6 credits	selected from the following courses:
BIOL3991	Directed studies in ecology & biodiversity (6)
BIOL4911	Conservation science in practice (6)

Ecology & biodiversity project (12)

Notes:

BIOL4991

- 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 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 (6)	
BIOL4861	Ecology & biodiversity internship (6)	
ENVS3019	Urban ecology (6)	
ENVS3020	Global change ecology (6)	
3. Capstone requirement (6 credits)		
At least 6 credits se	lected from the following courses:	
BIOL3991	Directed studies in ecology & biodiversity (6)	
BIOL4911	Conservation science in practice (6)	

Ecology & biodiversity project (12)

Notes:

BIOL4991

- 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)]

II.		II.
BIOL3320	The biology of marine mammals (6)	
BIOL3322	Marine invertebrate zoology (6)	
BIOL3328	Nearshore marine and estuarine ecology (6)	
BIOL3419	Insect ecology: the little things that run the world (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.
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 (6)	Take either BIOL3505 or BIOL4505 to fulfill this 30 credits requirement, but not both. BIOL3505 and BIOL4505 are mutually exclusive.
BIOL4861	Ecology & biodiversity internship (6)	
ENVS3019	Urban ecology (6)	
ENVS3020	Global change ecology (6)	
3. Capstone requir	ement (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)	

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

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 BIOL3419	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) 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.
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
DIOL4303	, tillital Bellaviour (o)	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 (6)	Take either BIOL3505 or BIOL4505 to fulfill this 30 credits requirement, but not both. BIOL3505 and BIOL4505 are mutually exclusive.
BIOL4861	Ecology & biodiversity internship (6)	
ENVS3019	Urban ecology (6)	
ENVS3020	Global change ecology (6)	
3. Capstone require	G G, ()	
	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)	BIOL492 I are matually exclusive.
BIOL4911	Conservation science in practice (6)	
BIOL4911	Animal behaviour and behavioural ecology: field course (6)	Take either BIOL3951 (subclass B) or
BIOL4921	Allilliai beriaviour and beriavioural ecology, lield course (0)	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

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:

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 (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 BIOL3318 BIOL3319 BIOL3320 BIOL3322 BIOL3328 BIOL3419	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) 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 (6)	Take either BIOL3505 or BIOL4505 to fulfill this 30 credits requirement, but not both. BIOL3505 and BIOL4505 are mutually exclusive.
BIOL4861	Ecology & biodiversity internship (6)	
ENVS3019	Urban ecology (6)	
ENVS3020	Global change ecology (6)	
3. Capstone requir	rement (6 credits)	
At least 6 credits	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)	
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)	ŕ

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

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:

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 BIOL3419	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) 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 (6)	Take either BIOL3505 or BIOL4505 to fulfill this 30 credits requirement, but not both. BIOL3505 and BIOL4505 are mutually exclusive.
BIOL4861	Ecology & biodiversity internship (6)	
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)	are managery on a series.
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

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:

Major in Ecology & Biodiversity (Intensive)

Minor in Ecology & Biodiversity

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)

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

BIOL2102 Biostatistics (6)

BIOL2103 Biological sciences laboratory course (6)

BIOL2306 Ecology and evolution (6)

2. Advanced level courses (48 credits)

Disciplinary Core Courses (12 credits)
BIOL3302 Systematics and ph

BIOL 3302 Systematics and phylogenetics (6)

BIOL3303 Conservation biology (6)

Disciplinary Electives (36 credits)

At least 36 credits selected from the following courses:

BIOL3101 Animal behaviour (6)

Take either BIOL3101 or BIOL4303 to fulfill this 36 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: 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)	S.Koldon G.
BIOL4302	Environmental impact assessment (6)	
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)	
BIOL4451	Cetacean behaviour, ecology and conservation: field research experience (6)	
BIOL4505	Oyster aquaculture (6)	Take either BIOL3505 or BIOL4505 to fulfill this 36 credits requirement, but not both. BIOL3505 and BIOL4505 are mutually exclusive.
BIOL4861	Ecology & biodiversity internship (6)	
ENVS3019	Urban ecology (6)	
ENVS3020	Global change ecology (6)	
3. Capstone requir	o, ()	
	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)

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.

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 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) BIOL1110 (Note 1) 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)
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 (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.

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 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) BIOL1110 (Note 1) 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**

Blue Planet (6) EASC1401

Environmental data analysis (6) ENVS2002 (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. Take either CHEM1041 or CHEM1042 to CHEM1042 General chemistry I (6) 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

Marine biology (6) (Note 1) BIOL3301 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)

Plant structure and evolution (6) **BIOL3314 BIOL3318** Experimental intertidal ecology (6) Marine invertebrate zoology (6) **BIOL3322**

BIOL3328 Nearshore marine and estuarine ecology (6) Insect ecology: the little things that run the world (6) BIOL3419

BIOL3506 Evolutionary biology (6) Fish and fisheries (6) BIOL4301

BIOL4302 Environmental impact assessment (6) **BIOL4304** Ecosystem functioning and services (6)

Oyster aquaculture (6) **BIOI 4505** Urban ecology (6) ENVS3019 ENVS3020 Global change ecology (6)

3. Capstone requirement (12 to 18 credits) (Note 2)

Disciplinary Core Courses (12 credits)

Ecology & biodiversity project (12) BIOL4991

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 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)
SCNC1112	Fundamentals of modern science (6)

Disciplinary Core Courses (42 credits)

From molecules to cells (6) BIOL1110 (Note 1) BIOL1309 Evolutionary diversity (6) (Note 1) BIOL2102 Biostatistics (6) (Note 1) (Note 1) BIOL2103 Biological sciences laboratory course (6) Ecology and evolution (6) (Note 1) **BIOL2306**

(Note 1) (Note 1) EASC1401 Blue Planet (6)

Environmental data analysis (6) ENVS2002 (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. Take either CHEM1041 or CHEM1042 to CHEM1042 General chemistry I (6) 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

Marine biology (6) (Note 1) BIOL3301 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)

Plant structure and evolution (6) **BIOL3314** BIOL3318 Experimental intertidal ecology (6) Marine invertebrate zoology (6) **BIOL3322**

BIOL3328 Nearshore marine and estuarine ecology (6) Insect ecology: the little things that run the world (6) BIOL3419

BIOL3506 Evolutionary biology (6) Fish and fisheries (6) BIOL4301

BIOL4302 Environmental impact assessment (6) **BIOL4304** Ecosystem functioning and services (6)

Oyster aquaculture (6) **BIOI 4505** Urban ecology (6) ENVS3019 ENVS3020 Global change ecology (6)

3. Capstone requirement (12 to 18 credits) (Note 2)

Disciplinary Core Courses (12 credits)

Ecology & biodiversity project (12) BIOL4991

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.

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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)

2016

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:

- 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)
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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 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) (Note 1) Fundamentals of modern science (6) **SCNC1112 Disciplinary Core Courses (42 credits)** From molecules to cells (6) (Note 1) BIOL1110 Evolutionary diversity (6) BIOL1309 (Note 1) BIOL2102 Biostatistics (6) (Note 1) Biological sciences laboratory course (6) (Note 1) BIOL2103 **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:

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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)
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 (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.

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.

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 Ecology & Biodiversity

Minor in Ecology & Biodiversity

Ι,					
Ш	Required courses (144 credits)				
Ш	1. Introductory level courses (60 credits)				
Ш	Disciplinary Core Courses: Science Foundation Courses (12 credits)				
Ш	SCNC1111	Scientific method and reasoning (6)	(Note 1)		
Ш	SCNC1112	Fundamentals of modern science (6)	(Note 1)		
Ш	Disciplinary Core Courses (42 credits)				
Ш	BIOL1110	From molecules to cells (6)	(Note 1)		
Ш	BIOL1309	Evolutionary diversity (6)	(Note 1)		
Ш	BIOL2102	Biostatistics (6)	(Note 1)		
Ш	BIOL2103	Biological sciences laboratory course (6)	(Note 1)		
Ш	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 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)

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)
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 (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.

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)
- 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:

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)

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)

ENVS3022 Environmental science field course (6)

ENVS3028 Coastal Sustainability (6)

ENVS3042 Pollution (6)

ENVS3313 Environmental oceanography (6)
BIOL4302 Environmental impact assessment (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.

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:

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)

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)

ENVS3022 Environmental science field course (6)

ENVS3028 Coastal Sustainability (6)

ENVS3042 Pollution (6)

ENVS3313 Environmental oceanography (6)
BIOL4302 Environmental impact assessment (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.

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:

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)
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.

ENVS3022 Environmental science field course (6)

ENVS3028 Coastal Sustainability (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)

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:

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)
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.

ENVS3022 Environmental science field course (6)

ENVS3028 Coastal Sustainability (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)

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:

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)
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.

ENVS3022 Environmental science field course (6)

ENVS3028 Coastal Sustainability (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)

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)
- 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 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

Offered to students 2019

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 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 (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)

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)

Basic biochemistry (6)

BIOL2220 Principles of biochemistry (6)

BIOL2220 and BIOC2600 are mutually exclusive.

Take either BIOL2220 or BIOC2600 to fulfill this.

this 36 credits requirement, but not both.

Take either BIOL2220 or BIOC2600 to fulfill

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

exclusive.

Disciplinary Electives (12 credits)

BIOC2600

At least 12 credits of introductory level course from the list below, of which at least 6 credits of CHEMXXXX from the list below:

CHEM1042 General chemistry I (6)

CHEM2442 Fundamentals of organic chemistry (6) GEOG2013 Sustainable development (6)

GEOG2030 Global development (6)

2. Advanced level courses (30 credits)

Disciplinary Core Courses (12 credits)

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) Principles of toxicology (6) BIOL3207 BIOL3209 Food and nutrient analysis (6) BIOL3211 Nutrigenomics (6) BIOL3216 Food waste management (6) BIOL3217 Food, environment and health (6) Food hygiene and quality control (6) BIOL3218 BIOL3503 Endocrinology: human physiology II (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) BIOL4209 Functional foods (6) 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 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. 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 BIOL42XXX in the list: BIOL3204, BIOL3205, BIOL3207, BIOL3209, BIOL3211, BIOL3217, BIOL3503, BIOL3606, BIOL4202, BIOL4209, BIOL4210, BIOC3606, STAT3617, and BBMS4004. Capstone requirement: any 1 Capstone Course: BIOL3992, BIOL4922, 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 and GEOG2030.
 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, BIOL3218, BIOL3208, BIOL3608, BIOL4205, BIOL4209, BIOL4210, BIOL4411, ENVS3019, GEOG3202, POLI3121; STAT3617, and BBMS4004.
 Capstone requirement: any 1 Capstone Course: BIOL3992, 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, BBMS1001, CHEM1042 and CHEM2442 in Year 1 of the study. Students should also take BIOL3204 and Level 3/4 courses related to molecular biology.

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)
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- 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 Scientific method and reasoning (6) 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 by 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)	(0)]	
BIOL3211	Principles of dietary assessment (6)		
BIOL3216	Food waste management (6)		
BIOL3217	Food, environment and health (6)		
BIOL 3218	Food hygiene and quality control (6)		
BIOL3606	Diet and disease (6)	Take either BIOL3206 or BIOL3606 to fulfill	
Biologo		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)	CACIUSIVO.	
BIOL4202	Nutrition and sports performance (6)		
BIOL4205	Food technology (6)	[previous title: Food processing and	
		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.	
BIOL4209	Functional foods (6)	GAGIUSIVE.	
BIOL4203	Plant and food biotechnology (6)		
3. Capstone requi			
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)		

Notes:

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- (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.

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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)
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Impermissible Combinations:

Minor in Food & Nutritional Science

Required courses (96 credits)

1. Introductory level courses (48 credits)

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BIOL3205 Human physiology (6)
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Principles of toxicology (6)

BIOL3207		[previous title: Food and nutritional toxicology		
BIOL3211 BIOL3215	Nutrigenomics (6) Principles of dietary assessment (6)	(6)]		
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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 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 1000	Mark daims and main asimus (0)	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.		
BIOL4209	Functional foods (6)	exclusive.		
BIOI 4411	Plant and food biotechnology (6)			
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At least 6 credits selected from the following courses:				
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Notes:

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Remarks

Major Title Major in Food & Nutritional Science

Offered to students 2016

admitted to Year 1 in

Objectives:

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Impermissible Combinations:

Minor in Food & Nutritional Science

Required courses (96 credits)

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Disciplinary Core Courses (36 credits)

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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.

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Disciplinary Core Courses (18 credits)

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BIOL3202 Nutritional biochemistry (6)
BIOL3203 Food microbiology (6)

Disciplinary Electives (24 credits)

At least 24 credits selected from the following courses:
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BIOL3205 Human physiology (6) BIOL3206 Clinical nutrition (6)

Principles of toxicology (6)

Take either BIOL3206 or BIOL3606 to fulfill this 24 credits requirement, but not both. BIOL3206 and BIOL3606 are mutually exclusive.

В	IOL3207		[previous title: Food and nutritional toxicology
_	101 0000		(6)]
В	IOL3208	Food safety and quality management (6)	Take either BIOL3208 or BIOL3218 to fufill this 24 credits requirement, but not both.
			BIOL3208 and BIOL3218 are mutually
_			exclusive.
II.	IOL3209	Food and nutrient analysis (6)	Take aither DIOL 2040 as DIOL 4000 to fulfill
В	IOL3210	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.
II.	IOL3211	Nutrigenomics (6)	
	IOL3215	Principles of dietary assessment (6)	
	IOL3216	Food waste management (6)	
II.	IOL3217 IOL3218	Food, environment and health (6) Food hygiene and quality control (6)	Take either BIOL3208 or BIOL3218 to fufill
Р	IUL3210	rood hygiene and quality control (o)	this 24 credits requirement, but not both.
			BIOL3208 and BIOL3218 are mutually
			exclusive.
В	IOL3606	Diet and disease (6)	Take either BIOL3206 or BIOL3606 to fulfill
			this 24 credits requirement, but not both. BIOL3206 and BIOL3606 are mutually
			exclusive.
В	IOL3608	Food commodities (6)	Take either BIOL3608 or BIOL4208 to fulfill
			this 24 credits requirement, but not both.
			BIOL3608 and BIOL4208 are mutually exclusive.
B	IOL4201	Public health nutrition (6)	exclusive.
	IOL4202	Nutrition and sports performance (6)	
l .	IOL4204	Diet, brain function and behavior (6)	
В	IOL4205	Food technology (6)	[previous title: Food processing and
_			engineering (6)]
В	IOL4207	Meat and dairy sciences (6)	Take either BIOL4207 or BIOL4208 to fufill this 24 credits requirement, but not both.
			BIOL4207 and BIOL4208 are mutually
			exclusive.
В	IOL4208	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.
	IOL4209	Functional foods (6)	
_	IOL4411	Plant and food biotechnology (6)	
3. Ca	pstone requirem	ent (6 credits) ected from the following courses:	
	least 6 credits sei IOL3992	Directed studies in food & nutritional science (6)	
l .	IOL3992 IOL4912	Sensory evaluation of food (6)	
	IOL4912 IOL4913	Advanced practicum on food and nutrient analysis (6)	
	IOL4913	Food product development and evaluation (6)	
	IOL4962	Food & nutritional science internship (6)	
	IOL4992	Food & nutritional science project (12)	

Notes:

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Major Title Major in Food & Nutritional Science

Offered to students 2015

admitted to Year 1 in

Objectives:

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Impermissible Combinations:

Minor in Food & Nutritional Science

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Disciplinary Electives (24 credits)

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Principles of toxicology (6)

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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.
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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 requir		
	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) BIOL3204

Human physiology (6) BIOL3205 Clinical nutrition (6) BIOL3206

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 fulfill
	, , , , , , , , , , , , , , , , , , , ,	this 24 credits requirement, but not both.
		BIOL3208 and BIOL3218 are mutually exclusvie.
BIOL3209	Food and nutrient analysis (6)	OXOIGOTO.
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 environment and health (6)	
BIOL3217 BIOL3218	Food, environment and health (6) Food hygiene and quality control (6)	Take either BIOL3208 or BIOL3218 to fulfill
DIOL3210	1 ood flygiene and quality control (0)	this 24 credits requirement, but not both.
		BIOL3208 and BIOL3218 are mutually
DIOL 2000	Diet and disease (6)	exclusive. Take either BIOL3206 or BIOL3606 to fulfill
BIOL3606	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)	
BIOL4204	Diet, brain function and behavior (6)	formations (idea Food managed and
BIOL4205	Food technology (6)	[previous title: Food processing and engineering (6)]
BIOL4207	Meat and dairy sciences (6)	BIOL4207 or BIOL4208 to fulfill this 24
		credits requirement, but not both. BIOL4207
BIOL4208	Meat, dairy and grain sciences (6)	and BIOL4208 are mutually exclusive. Take either BIOL3210 or BIOL4208;
DIOL4200	weat, dairy and grain sciences (b)	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)	2.02 1200 at 0 mataday oxoldolvo.
BIOL4210	Food product development (6)	
BIOL4411	Plant and food biotechnology (6)	
3. Capstone requir		
	s selected from the following courses:	
BIOL3992 BIOL4912	Directed studies in food & nutritional science (6) Sensory evaluation of food (6)	
BIOL4912	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; 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)
- 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 (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
BIOL3207	Principles of toxicology (6)	exclusive. [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	Food and nutrient analysis (6)	Oxoldelve.
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 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)	Oxoldol Vo.
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 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	Food product development (6)	
BIOL4411	Plant and food biotechnology (6)	
3. Capstone requirer		
	elected from the following courses:	
BIOL3992	Directed studies in food & nutritional science (6) Sensory evaluation of food (6)	
BIOL4912 BIOL4913	Advanced practicum on food and nutrient analysis (6)	
BIOL4913	Food product development and evaluation (6)	
BIOL4962	Food & nutritional science internship (6)	
BIOL4902 BIOL4992	Food & nutritional science project (12)	
BIOL TOOL		

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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- 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 2012

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

1. Introductory	level cours	es (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)

BIOI 2102 Biostatistics (6)

Biological sciences laboratory course (6) BIOL2103

BIOL2220 Principles of biochemistry (6)

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

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) Food microbiology (6) BIOL3203

Disciplinary Electives (24 credits)

At least 24 credits selected from the following courses: Nutrition and the life cycle (6) **BIOL3204**

Human physiology (6) **BIOL3205** 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

[previous title: Food and nutritional toxicology (6)1

BIOL3208		Take either BIOL3208 or BIOL3218 to fulfill this 24 credits requirement, but not both. BIOL3208 and BIOL3218 are mutually
DIOL 0000	For all and matricest and conclusion (0)	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	Nutrigenomics (6)	onoiden or
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 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)	onoiden or
BIOL4202	Nutrition and sports performance (6)	
BIOL4204	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
BIOL4208	Meat, dairy and grain sciences (6)	exclusive. Take either BIOL3210 or BIOL4208;
BIOL4206	Meat, daily and grain sciences (0)	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	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
- 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 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:

- 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.
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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:

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Offered to students 2018

admitted to Year 1 in

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3. Capstone requirement (6 credits)

EASC4955 Integrated field studies (6)

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Remarks:

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Offered to students 2017

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3. Capstone requirement (6 credits)

EASC4955 Integrated field studies (6)

Notes:

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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 2016

admitted to Year 1 in

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Major in Geology (Intensive)

Minor in Earth Sciences

Required courses (96 credits)

1. Introductory level courses (42 credits)

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Disciplinary Core Courses (30 credits)

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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)

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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:

- 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.
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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 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:

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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

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Special topics in earth sciences (6) EASC4408 Earth sciences project (12) **EASC4999**

3. Capstone requirement (6 credits)

EASC4955 Integrated field studies (6)

Notes:

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Remarks:

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Offered to students 2014

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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 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)
- 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:

- 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 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:

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:

- 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:

Maior Title	Maior in Geology (Intensive	١

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

Minor in Earth Sciences

Minor in Earth Sciences		
Required courses (150	credits)	
1. Introductory level coul	rses (54 to 66 credits) (Note 1)	
Disciplinary Core Course	es: Science Foundation Courses (12 credits)	
SCNC1111	Scientific method and reasoning (6)	(Note 2)
SCNC1112	Fundamentals of modern science (6)	(Note 2)
Disciplinary Core Course		
EASC1401	Blue Planet (6)	
EASC1402	Principles of geology (6)	(Note 2)
EASC2401	Fluid/solid interactions in earth processes (6)	(Note 2)
EASC2402	Field and laboratory methods (6)	(Note 2)
EASC2406	Geochemistry (6)	(Note 2)
EASC2407	Mineralogy (6)	(Note 2)
EASC2409	Regional field studies (6)	
	es (78 to 90 credits) (Note 1)	
Disciplinary Core Course		
EASC3402	Petrology (6)	(Note 2)
EASC3403	Sedimentary environments (6)	(Note 2)
EASC3404	Structural geology (6)	(Note 2)
EASC3408	Geophysics (6)	(Note 2)
EASC3409	Igneous and metamorphic petrogenesis (6)	(Note 2)
EASC3417	Earth through time (6)	
EASC4406	Earth dynamics & global tectonics (6)	(Note 2)
EASC4407	Regional geology (6)	
EASC4999	Earth sciences project (12)	(Note 3)
Disciplinary Electives (30		
	eted from the following introductory and advanced level courses in L	ist A and List B, among which
at least 6 credits from L	ist 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 2)

Notes:

- 1. 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.
- 2. These are core courses in the regular Geology Major (96 credits) curriculum.
- 3. 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.

Remarks:

Maior Title	Maior in Geology (Intensive	١

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

Paguirad courses (4EC	aradita)	
Required courses (150	•	
	urses (54 to 66 credits) (Note 1)	
	es: Science Foundation Courses (12 credits)	(44 / 0)
SCNC1111	Scientific method and reasoning (6)	(Note 2)
SCNC1112	Fundamentals of modern science (6)	(Note 2)
Disciplinary Core Cours	,	
EASC1401	Blue Planet (6)	(44 / 0)
EASC1402	Principles of geology (6)	(Note 2)
EASC2401	Fluid/solid interactions in earth processes (6)	(Note 2)
EASC2402	Field and laboratory methods (6)	(Note 2)
EASC2406	Geochemistry (6)	(Note 2)
EASC2407	Mineralogy (6)	(Note 2)
EASC2409	Regional field studies (6)	
	es (78 to 90 credits) (Note 1)	
Disciplinary Core Cours		(44
EASC3402	Petrology (6)	(Note 2)
EASC3403	Sedimentary environments (6)	(Note 2)
EASC3404	Structural geology (6)	(Note 2)
EASC3408	Geophysics (6)	(Note 2)
EASC3409	Igneous and metamorphic petrogenesis (6)	(Note 2)
EASC3417	Earth through time (6)	
EASC4406	Earth dynamics & global tectonics (6)	(Note 2)
EASC4407	Regional geology (6)	
EASC4999	Earth sciences project (12)	(Note 3)
Disciplinary Electives (3		
	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 2)

Notes:

- 1. 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.
- 2. These are core courses in the regular Geology Major (96 credits) curriculum.
- 3. 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.

Remarks:

Maior Title	Maior in Geology (Intensive	١

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

Paguirad courses (4EC	aradita)	
Required courses (150	•	
	urses (54 to 66 credits) (Note 1)	
	es: Science Foundation Courses (12 credits)	(44 / 0)
SCNC1111	Scientific method and reasoning (6)	(Note 2)
SCNC1112	Fundamentals of modern science (6)	(Note 2)
Disciplinary Core Cours	,	
EASC1401	Blue Planet (6)	(44 / 0)
EASC1402	Principles of geology (6)	(Note 2)
EASC2401	Fluid/solid interactions in earth processes (6)	(Note 2)
EASC2402	Field and laboratory methods (6)	(Note 2)
EASC2406	Geochemistry (6)	(Note 2)
EASC2407	Mineralogy (6)	(Note 2)
EASC2409	Regional field studies (6)	
	es (78 to 90 credits) (Note 1)	
Disciplinary Core Cours		(44
EASC3402	Petrology (6)	(Note 2)
EASC3403	Sedimentary environments (6)	(Note 2)
EASC3404	Structural geology (6)	(Note 2)
EASC3408	Geophysics (6)	(Note 2)
EASC3409	Igneous and metamorphic petrogenesis (6)	(Note 2)
EASC3417	Earth through time (6)	
EASC4406	Earth dynamics & global tectonics (6)	(Note 2)
EASC4407	Regional geology (6)	
EASC4999	Earth sciences project (12)	(Note 3)
Disciplinary Electives (3		
	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 2)

Notes:

- 1. 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.
- 2. These are core courses in the regular Geology Major (96 credits) curriculum.
- 3. 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.

Remarks:

Maior Title	Maior in Geology (Intensive	١

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

Paguirad courses (4EC	aradita)	
Required courses (150	•	
	urses (54 to 66 credits) (Note 1)	
	es: Science Foundation Courses (12 credits)	(44 / 0)
SCNC1111	Scientific method and reasoning (6)	(Note 2)
SCNC1112	Fundamentals of modern science (6)	(Note 2)
Disciplinary Core Cours	,	
EASC1401	Blue Planet (6)	(44 / 0)
EASC1402	Principles of geology (6)	(Note 2)
EASC2401	Fluid/solid interactions in earth processes (6)	(Note 2)
EASC2402	Field and laboratory methods (6)	(Note 2)
EASC2406	Geochemistry (6)	(Note 2)
EASC2407	Mineralogy (6)	(Note 2)
EASC2409	Regional field studies (6)	
	es (78 to 90 credits) (Note 1)	
Disciplinary Core Cours		(44
EASC3402	Petrology (6)	(Note 2)
EASC3403	Sedimentary environments (6)	(Note 2)
EASC3404	Structural geology (6)	(Note 2)
EASC3408	Geophysics (6)	(Note 2)
EASC3409	Igneous and metamorphic petrogenesis (6)	(Note 2)
EASC3417	Earth through time (6)	
EASC4406	Earth dynamics & global tectonics (6)	(Note 2)
EASC4407	Regional geology (6)	
EASC4999	Earth sciences project (12)	(Note 3)
Disciplinary Electives (3		
	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 2)

Notes:

- 1. 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.
- 2. These are core courses in the regular Geology Major (96 credits) curriculum.
- 3. 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.

Remarks:

Major Title	Major in Geology (Intensive)	
Maior Tille	Major III Geology (IIIIelisive)	

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

nor in Earth Sciences		
Required courses (150		
	rses (54 to 66 credits) (Note 1)	
	es: Science Foundation Courses (12 credits)	
SCNC1111	Scientific method and reasoning (6)	(Note 2)
SCNC1112	Fundamentals of modern science (6)	(Note 2)
Disciplinary Core Cours		
EASC1401	Blue Planet (6)	
EASC1402	Principles of geology (6)	(Note 2)
EASC2401	Fluid/solid interactions in earth processes (6)	(Note 2)
EASC2402	Field and laboratory methods (6)	(Note 2)
EASC2406	Geochemistry (6)	(Note 2)
EASC2407	Mineralogy (6)	(Note 2)
EASC2409	Regional field studies (6)	
	es (78 to 90 credits) (Note 1)	
Disciplinary Core Cours	es (60 credits)	
EASC3402	Petrology (6)	(Note 2)
EASC3403	Sedimentary environments (6)	(Note 2)
EASC3404	Structural geology (6)	(Note 2)
EASC3408	Geophysics (6)	(Note 2)
EASC3409	Igneous and metamorphic petrogenesis (6)	(Note 2)
EASC3417	Earth through time (6)	
EASC4406	Earth dynamics & global tectonics (6)	(Note 2)
EASC4407	Regional geology (6)	
EASC4999	Earth sciences project (12)	(Note 3)
Disciplinary Electives (3	0 credits)	
	cted from the following introductory and advanced level courses in Lis	st A and List B, among whic
at least 6 credits from L	ist 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 2)

Notes:

- 1. 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.
- 2. These are core courses in the regular Geology Major (96 credits) curriculum.
- 3. 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.

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:

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

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

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)

п.			
l	MATH4501	Geometry (6)	
ı	MATH4511	Introduction to differentiable manifolds (6)	
ı	MATH4602	Scientific computing (6)	
ı	MATH4902	Operations research II (6)	
ı	MATH4907	Numerical methods for financial calculus (6)	
ı	MATH7101	Intermediate complex analysis (6)	
ı	MATH7201	Topics in geometry (6)	
ı	MATH7202	Complex manifolds (6)	
ı	MATH7217	Topics in financial mathematics (6)	
ı	MATH7219	Topics in applied functional analysis (6)	
ı	MATH7224	Topics in advanced probability theory (6)	
ı	MATH7501	Topics in algebra (6)	
ı	MATH7502	Topics in applied discrete mathematics (6)	
ı	MATH7503	Topics in mathematical programming and optimization (6)	
ı	MATH7504	Geometric topology (6)	
ı	MATH7505	Real analysis (6)	
ı	3. Capstone requirement (6 credits)		
ı	At least 6 credits selected from the following courses:		
ı	MATH3999	Directed studies in mathematics (6)	
ı	MATH4910	Senior mathematics seminar (6)	
ı	MATH4911	Mathematics capstone project (6)	
ı	MATH4966	Mathematics internship (6)	
ı	MATH4999	Mathematics project (12)	
ı			

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:

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)
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 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)		
	MATH4999	Mathematics 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. 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/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) 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

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l	MATH4406	Introduction to partial differential equations (6)	
ı	MATH4501	Geometry (6)	
ı	MATH4511	Introduction to differentiable manifolds (6)	
ı	MATH4602	Scientific computing (6)	
ı	MATH4902	Operations research II (6)	
ı	MATH4907	Numerical methods for financial calculus (6)	
ı	MATH7101	Intermediate complex analysis (6)	
ı	MATH7201	Topics in geometry (6)	
ı	MATH7202	Complex manifolds (6)	
ı	MATH7217	Topics in financial mathematics (6)	
ı	MATH7219	Topics in applied functional analysis (6)	
ı	MATH7224	Topics in advanced probability theory (6)	
ı	MATH7501	Topics in algebra (6)	
ı	MATH7502	Topics in applied discrete mathematics (6)	
ı	MATH7503	Topics in mathematical programming and optimization (6)	
ı	MATH7504	Geometric topology (6)	
ı	MATH7505	Real analysis (6)	
ı	3. Capstone requirement (6	credits)	
ı	At least 6 credits selected	from the following courses:	
ı	MATH3999	Directed studies in mathematics (6)	
ı	MATH4910	Senior mathematics seminar (6)	
ı	MATH4911	Mathematics capstone project (6)	
ı	MATH4966	Mathematics internship (6)	
ı	MATH4999	Mathematics project (12)	
ш	II .		

- 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/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) 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**

MATH2241 Introduction to mathematical analysis (6)

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)

Network models in operations research (6) MATH3943

MATH4302 Algebra II (6) MATH4402 Analysis II (6) Functional analysis (6) MATH4404

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l	MATH4406	Introduction to partial differential equations (6)		
ı	MATH4501	Geometry (6)		
ı	MATH4511	Introduction to differentiable manifolds (6)		
ı	MATH4602	Scientific computing (6)		
ı	MATH4902	Operations research II (6)		
ı	MATH4907	Numerical methods for financial calculus (6)		
ı	MATH7101	Intermediate complex analysis (6)		
ı	MATH7201	Topics in geometry (6)		
ı	MATH7202	Complex manifolds (6)		
ı	MATH7217	Topics in financial mathematics (6)		
ı	MATH7219	Topics in applied functional analysis (6)		
ı	MATH7224	Topics in advanced probability theory (6)		
ı	MATH7501	Topics in algebra (6)		
ı	MATH7502	Topics in applied discrete mathematics (6)		
ı	MATH7503	Topics in mathematical programming and optimization (6)		
ı	MATH7504	Geometric topology (6)		
ı	MATH7505	Real analysis (6)		
ı	3. Capstone requirement (6 credits)			
ı	At least 6 credits selected	d from the following courses:		
ı	MATH3999	Directed studies in mathematics (6)		
ı	MATH4910	Senior mathematics seminar (6)		
ı	MATH4911	Mathematics capstone project (6)		
ı	MATH4966	Mathematics internship (6)		
ı	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 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) 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.

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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)

Network models in operations research (6) MATH3943

MATH4302 Algebra II (6) MATH4402 Analysis II (6) Functional analysis (6) MATH4404

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l	MATH4406	Introduction to partial differential equations (6)	
ı	MATH4501	Geometry (6)	
ı	MATH4511	Introduction to differentiable manifolds (6)	
ı	MATH4602	Scientific computing (6)	
ı	MATH4902	Operations research II (6)	
ı	MATH4907	Numerical methods for financial calculus (6)	
ı	MATH7101	Intermediate complex analysis (6)	
ı	MATH7201	Topics in geometry (6)	
ı	MATH7202	Complex manifolds (6)	
ı	MATH7217	Topics in financial mathematics (6)	
ı	MATH7219	Topics in applied functional analysis (6)	
ı	MATH7224	Topics in advanced probability theory (6)	
ı	MATH7501	Topics in algebra (6)	
ı	MATH7502	Topics in applied discrete mathematics (6)	
ı	MATH7503	Topics in mathematical programming and optimization (6)	
ı	MATH7504	Geometric topology (6)	
ı	MATH7505	Real analysis (6)	
ı	3. Capstone requirement (6	credits)	
ı	At least 6 credits selected	from the following courses:	
ı	MATH3999	Directed studies in mathematics (6)	
ı	MATH4910	Senior mathematics seminar (6)	
ı	MATH4911	Mathematics capstone project (6)	
ı	MATH4966	Mathematics internship (6)	
ı	MATH4999	Mathematics project (12)	
ш	II .		

- 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) 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 Courses (18 credits)**

MATH3301

Algebra I (6) Analysis I (6) MATH3401

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	
ΝΛΔ	TH	

MATH3001 Development of mathematical ideas (6)

MATH3002 Mathematics seminar (6)

MATH3303 Matrix theory and its applications (6) Introduction to number theory (6) MATH3304

Differential equations (6) MATH3405

Computational methods and differential equations with MATH3408

applications (6)

Introduction to topology (6) MATH3541 MATH3600 Discrete mathematics (6) MATH3601 Numerical analysis (6) MATH3603 Probability theory (6) Operations research I (6) MATH3901 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

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Ш	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 (
П	At least 6 credits selected	d 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)
Ш	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) 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 Courses (18 credits)**

MATH3301 Algebra I (6) Analysis I (6) MATH3401

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.

MATH3001 Development of mathematical ideas (6)

MATH3002 Mathematics seminar (6)

MATH3303 Matrix theory and its applications (6) Introduction to number theory (6) MATH3304

Differential equations (6) MATH3405

Computational methods and differential equations with MATH3408

applications (6)

Introduction to topology (6) MATH3541 MATH3600 Discrete mathematics (6) MATH3601 Numerical analysis (6) MATH3603 Probability theory (6) Operations research I (6) MATH3901 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

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 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 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 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)

MATH3405 Differential equations (6)
MATH3408 Computational methods and differential equations with

MATH3541 Computational methods and 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)

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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 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

Major in Mathematics/Physics

Minor in Computational & Financial Mathematics

Minor in Mathematics

Required courses (144	credits)	<u> </u>
I. Introductory level cou	rses (48 credits)	
	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	es (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	es (84 credits)	
Disciplinary Core Cours	e (60 credits)	
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	4 credits)	
Select Stream (A) or S	tream (B):	
(A) Pure Mathematics	(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 Mathematic	cs (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)
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

Major in Mathematics/Physics

Minor in Computational & Financial Mathematics

Minor in Mathematics

Minor in Operations Research & Mathematical Programming

Required courses (144 credits) 1. Introductory level courses (48 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 (36 credits)** MATH1013 University mathematics II (6) (Note 1) Fundamental concepts of mathematics (6) (Note 1) MATH2012 (Note 1) MATH2101 Linear algebra I (6) Linear algebra II (6) (Note 1) MATH2102 Multivariable calculus (6) MATH2211 (Note 1) Introduction to mathematical analysis (6) MATH2241 (Note 1) 2. Advanced level courses (84 credits) **Disciplinary Core Course (60 credits)** Mathematics seminar (6) MATH3002 Algebra I (6) MATH3301 MATH3401 Analysis I (6) (Note 1) MATH3403 Functions of a complex variable (6) Differential equations (6) MATH3405 MATH3600 Discrete mathematics (6) Probability theory (6) MATH3603 MATH3904 Introduction to optimization (6) MATH4404 Functional analysis (6) MATH4406 Introduction to partial differential equations (6) **Disciplinary Electives (24 credits)** Select Stream (A) or Stream (B): (A) Pure Mathematics (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) Geometry (6) MATH4501 Introduction to differentiable manifolds (6) MATH4511 Intermediate complex analysis (6) MATH7101 Topics in geometry (6) MATH7201 MATH7202 Complex manifolds (6) Topics in algebra (6) MATH7501 Real analysis (6) MATH7505 (B) Applied Mathematics (at least 24 credits with 12 credits from MATH4XXX or MATH7XXX level, subject to prerequisite requirement) MATH3601 Numerical analysis (6) MATH3901 Operations research I (6) Financial calculus (6) MATH3906 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:

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Remarks:

Major Title Major in Mathematics (Intensive)

Offered to students 2017

admitted to Year 1 in

Objectives:

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- 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

Minor in Operations Research & Mathematical Programming			
Required courses (144 credits)			
1. Introductory level courses (48 credits)			
	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)		
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 course	s (84 credits)		
Disciplinary Core Course	(60 credits)		
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 Stream (B):			
(A) Pure Mathematics (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)	I 0000	
' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' '	s (at least 24 credits with 12 credits from MATH4XXX or MATH	I/XXX level, subject to pre-	
requisite requirement)	Numerical analysis (C)		
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) Topics in financial mathematics (6) MATH7217 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 MATH4966 Mathematics internship (6) Mathematics project (12) MATH4999

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.

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- PLO 1: describe and present a variety of concepts and theories in mathematics (by means of coursework and learning activities in the curriculum)
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- PLO 3: communicate in mathematical language, and present mathematical ideas and scientific arguments (by means of coursework, seminars, guided studies and projects)
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- 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) Topics in financial mathematics (6) MATH7217 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)

SCNC11111 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)

I	
MATH3002	Mathematics seminar (6)
MATH3303	Matrix theory and its applications (6)
	Introduction to number theory (6)
MATH3304	, ,
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)
	1
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)
	. 5()
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)
	Geometric topology (6)
MATH7504	
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)
PHYS3750	Laser and spectroscopy (6)
PHYS3751	Physics of nanomaterials (6)
PHYS3850	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)
PHYS4651	Selected topics in astrophysics (6)
	Planetary science (6)
PHYS4652	
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 guantum 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 follow	wing 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 PHYS4966	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 2016

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Objectives:

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- 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)
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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)

SCNC11111 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

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)

Ш	MATH3002	Mathematics seminar (6)	
Ш	MATH3303	()	
Ш		Matrix theory and its applications (6)	
Ш	MATH3304	Introduction to number theory (6)	
Ш	MATH3403	Functions of a complex variable (6)	
Ш	MATH3405	Differential equations (6)	
Ш	MATH3408	Computational methods and differential equations with	
Ш	WATTIOTOO	applications (6)	
Ш	MATH3541	Introduction to topology (6)	
Ш			
Ш	MATH3600	Discrete mathematics (6)	
Ш	MATH3601	Numerical analysis (6)	
Ш	MATH3603	Probability theory (6)	
Ш	MATH3901	Operations research I (6)	
Ш			
Ш	MATH3904	Introduction to optimization (6)	
Ш	MATH3905	Queueing theory and simulation (6)	
Ш	MATH3906	Financial calculus (6)	
Ш	MATH3911	Game theory and strategy (6)	
Ш			
Ш	MATH3943	Network models in operations research (6)	
Ш	MATH4302	Algebra II (6)	
Ш	MATH4402	Analysis II (6)	
Ш	MATH4404	Functional analysis (6)	
Ш	MATH4406	Introduction to partial differential equations (6)	
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Ш	MATH4511	Introduction to differentiable manifolds (6)	
Ш	MATH4602	Scientific computing (6)	
	MATH4902	Operations research II (6)	
Ш	MATH4907	Numerical methods for financial calculus (6)	
Ш			
Ш	MATH7101	Intermediate complex analysis (6)	
	MATH7201	Topics in geometry (6)	
Ш	MATH7202	Complex manifolds (6)	
Ш	MATH7217	Topics in financial mathematics (6)	
Ш		Topics in applied functional analysis (6)	
Ш	MATH7219		
Ш	MATH7224	Topics in advanced probability theory (6)	
Ш	MATH7501	Topics in algebra (6)	
Ш	MATH7502	Topics in applied discrete mathematics (6)	
Ш	MATH7503	Topics in mathematical programming and optimization (6)	
Ш	MATH7504	Geometric topology (6)	
Ш			
Ш	MATH7505	Real analysis (6)	
Ш	PHYS3150	Theoretical physics (6)	
Ш	PHYS3151	Machine learning in physics (6)	
Ш	PHYS3450	Electromagnetism (6)	
Ш	PHYS3550	Statistical mechanics & thermodynamics (6)	
Ш		• , ,	
Ш	PHYS3551	Introductory solid state physics (6)	
Ш	PHYS3650	Observational astronomy (6)	
Ш	PHYS3651	The physical universe (6)	
Ш	PHYS3652	Principles of astronomy (6)	
Ш	PHYS3750	Laser and spectroscopy (6)	
Ш	PHYS3751	Physics of nanomaterials (6)	
Ш	DI IV (000E0		
Ш	PHYS3850	Waves and optics (6)	
Ш	PHYS3851	Atomic and nuclear physics (6)	
Ш	PHYS4150	Computational physics (6)	
Ш	PHYS4151	Data analysis and modeling in physics (6)	
Ш	PHYS4350	Advanced classical mechanics (6)	
Ш			
Ш	PHYS4450	Advanced electromagnetism (6)	
	PHYS4550	Advanced statistical mechanics (6)	
Ш	PHYS4551	Solid state physics (6)	
Ш	PHYS4650	Stellar physics (6)	
Ш	PHYS4651	Selected topics in astrophysics (6)	
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Ш	PHYS4652	Planetary science (6)	
Ш	PHYS4653	Cosmology (6)	
Ш	PHYS4654	General relativity (6)	
	PHYS4655	Interstellar medium (6)	
Ш	PHYS4750	Experimental physics (6)	
Ш		Particle physics (6)	
Ш	PHYS4850		
Ш	PHYS7350	Graduate classical mechanics (6)	
Ш	PHYS7351	Graduate quantum mechanics (6)	
Ш	PHYS7450	Graduate electromagnetism (6)	
Ш	PHYS7550	Graduate statistical mechanics (6)	
Ш	PHYS7551	Graduate solid state physics (6)	
Ш		Stellar atmospheres (6)	
Ш	PHYS7650	. , ,	
	PHYS7750	Nanophysics (6)	
	3. Capstone requirement (6 credits)		
Ш	At least 6 credits selected from the f	ollowing courses:	
Ш	MATH3999	Directed studies in mathematics (6)	
Ш	MATH4910	Senior mathematics seminar (6)	
Ш		Mathematics capstone project (6)	
Ш	MATH4911		
Ш	MATH4966	Mathematics internship (6)	
Ш	MATH4999	Mathematics project (12)	
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PHYS3999	Directed studies in physics (6)	
PHYS4966	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:

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)

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Disciplinary Core Courses (30 credits)

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PHYS2265 Introductory quantum physics (6)

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Disciplinary Core Courses (36 credits)

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List A

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MATH3002 Mathematics seminar (6)

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	applications (6)
MATH3541	Introduction to topology (6)
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MATH3603	Probability theory (6)
MATH3901	Operations research I (6)
MATH3904	Introduction to optimization (6)
	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	Analysis II (6)
MATH4404	Functional analysis (6)
MATH4406	Introduction to partial differential equations (6)
MATH4511	Introduction to differentiable manifolds (6)
	Scientific computing (6)
MATH4602	
MATH4902	Operations research II (6)
MATH4907	Numerical methods for financial calculus (6)
MATH7101	Intermediate complex analysis (6)
MATH7201	Topics in geometry (6)
	Complex manifolds (6)
MATH7202	. , ,
MATH7217	Topics in financial mathematics (6)
MATH7219	Topics in applied functional analysis (6)
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PHYS4966 PHYS4999 Physics internship (6) Physics project (12)

Notes:

- 1. Students are strongly advised to consult departmental course selection advisors for course and career planning before selecting the courses.
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- 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 2014

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)

MATHSEOS	Probability theory (6)
MATH3603	
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)
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)
PHYS3150	Theoretical physics (6)
PHYS3450	Electromagnetism (6)
	Statistical mechanics & thermodynamics (6)
PHYS3550	* ` '
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	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)
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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)
	Nanophysics (0)
3. Capstone requirement (6 credits)	
At least 6 credits selected from the follo	owing courses:
MATH3999	Directed studies in mathematics (6)
MATH4910	Senior mathematics seminar (6)
MATH4911	Mathematics capstone project (6)
	1 1 7 1 7
MATH4966	Mathematics internship (6)
MATH4999	Mathematics project (12)
PHYS3999	Directed studies in physics (6)
PHYS4966	Physics internship (6)
PHYS4999	Physics 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. 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)

University mathematics II (6) MATH1013 Linear algebra I (6) MATH2101 Multivariable calculus (6) MATH2211 PHYS1250 Fundamental physics (6) PHYS2250 Introductory mechanics (6) Introductory quantum physics (6) PHYS2265

2. Advanced level courses (42 credits)

Disciplinary Core Courses (36 credits)

MATH3301 Algebra I (6) MATH3401 Analysis I (6) Geometry (6) MATH4501 PHYS3350

Classical mechanics (6) PHYS3351 Quantum mechanics (6) Advanced quantum mechanics (6) PHYS4351

Disciplinary Electives (6 credits)

At least 6 credits of advanced level Mathematics or Physics courses (MATH3XXX or MATH4XXX or MATH7XXX or PHYS3XXX or PHYS4XXX 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

Development of mathematical ideas (6) MATH3001

MATH3002 Mathematics seminar (6)

MATH3303 Matrix theory and its applications (6) Introduction to number theory (6) MATH3304 Functions of a complex variable (6) MATH3403

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)

MATHSEOS	Probability theory (6)
MATH3603	
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)
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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)
PHYS3150	Theoretical physics (6)
PHYS3450	Electromagnetism (6)
	Statistical mechanics & thermodynamics (6)
PHYS3550	* ` '
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	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)
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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)
	Nanophysics (0)
3. Capstone requirement (6 credits)	
At least 6 credits selected from the follo	owing courses:
MATH3999	Directed studies in mathematics (6)
MATH4910	Senior mathematics seminar (6)
MATH4911	Mathematics capstone project (6)
	1 1 7 1 7
MATH4966	Mathematics internship (6)
MATH4999	Mathematics project (12)
PHYS3999	Directed studies in physics (6)
PHYS4966	Physics internship (6)
PHYS4999	Physics 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. 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) Scientific method and reasoning (6) SCNC1111 SCNC1112 Fundamentals of modern science (6)

Disciplinary Core Courses (36 credits)

MATH1013 University mathematics II (6) Linear algebra I (6) MATH2101 Multivariable calculus (6) MATH2211 Fundamental physics (6) PHYS1250 **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) Geometry (6) MATH4501 PHYS3350 Classical mechanics (6) PHYS3351 Quantum mechanics (6) 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 PHYS4XXX 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

PHYS4351

MATH3001 Development of mathematical ideas (6)

Mathematics seminar (6) MATH3002

MATH3303 Matrix theory and its applications (6) Introduction to number theory (6) MATH3304 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) MATH3601 Numerical analysis (6) Probability theory (6) **MATH3603**

MATH2004	Operations recognish L(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)
	Introduction to differentiable manifolds (6)
MATH4511	
MATH4602	Scientific computing (6)
MATH4902	Operations research II (6)
MATH4907	Numerical methods for financial calculus (6)
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)
	Topics in algebra (6)
MATH7501	
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	
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	Waves and optics (6)
PHYS3851	Atomic and nuclear physics (6)
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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)
	Solid state physics (6)
PHYS4551	. , , ,
PHYS4650	Stellar physics (6)
PHYS4651	Selected topics in astrophysics (6)
PHYS4652	Planetary science (6)
PHYS4653	Cosmology (6)
	General relativity (6)
PHYS4654	* ` '
PHYS4655	Interstellar medium (6)
PHYS4750	Experimental physics (6)
PHYS4850	Particle physics (6)
PHYS7350	Graduate classical mechanics (6)
PHYS7351	Graduate quantum mechanics (6)
	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)
	Nanophysios (c)
3. Capstone requirement (6 credits)	
At least 6 credits selected from the follo	
MATH3999	Directed studies in mathematics (6)
MATH4910	Senior mathematics seminar (6)
MATH4911	Mathematics capstone project (6)
	Mathematics capsione project (0) Mathematics internship (6)
MATH4966	,
MATH4999	Mathematics project (12)
PHYS3999	Directed studies in physics (6)
PHYS4966	Physics internship (6)
PHYS4999	Physics project (12)
11110-1000	· ··/ [////

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 & SCNC11112) 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 Molecular Biology & Biotechnology

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 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 variousessential 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)

From molecules to cells (6) BIOL1110

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 (24 credits) Molecular biology (6) **BIOL 3401**

Cell biology and cell technology (6) BIOL3402 Plant and food biotechnology (6) BIOL4411 Healthcare biotechnology (6)

Disciplinary Electives (24 credits)

BIOL4415

At least 24 credits selected from the following courses:

BIOL3403 Immunology (6)

BIOL3404 Protein structure and function (6)

Reproduction and reproductive biotechnology (6) **BIOI 3406**

BIOL3408 Genetics (6)

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

General virology (6) **BIOL4409**

Stem cells and regenerative biology (6) BIOL4416 **BIOL4417** 'Omics' and systems biology (6) ENVS4110 Environmental remediation (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

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.

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:

Major Title Major in Molecular Biology & Biotechnology

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-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 variousessential 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)

From molecules to cells (6) BIOL1110

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 (24 credits)

Molecular biology (6) Cell biology and cell technology (6) BIOL3402 Plant and food biotechnology (6) BIOL4411 Healthcare biotechnology (6) **BIOL4415**

Disciplinary Electives (24 credits)

BIOL 3401

At least 24 credits selected from the following courses:

BIOL3403 Immunology (6)

BIOL3404 Protein structure and function (6)

Reproduction and reproductive biotechnology (6) **BIOI 3406**

BIOL3408 Genetics (6)

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

General virology (6) **BIOL4409**

Stem cells and regenerative biology (6) BIOL4416 **BIOL4417** 'Omics' and systems biology (6) ENVS4110 Environmental remediation (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

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.

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:

Major Title Major in Molecular Biology & Biotechnology

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-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 variousessential 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:

Major Title Major in Molecular Biology & Biotechnology

Offered to students 2016

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 variousessential 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)

BIOL 3401 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

Major Title Major in Molecular Biology & Biotechnology

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-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 variousessential 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)

Basic biochemistry (6)

BIOL2220 Principles of biochemistry (6)

Disciplinary Electives (6 credits)

BIOC2600

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)

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

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)
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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:

Major Title Major in Molecular Biology & Biotechnology

Offered to students

2014 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 variousessential 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 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)

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 credit)

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

Take either BIOL2220 or BIOC2600 to fulfill this 24 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually

exclusive.

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:

Major Title Major in Molecular Biology & Biotechnology

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 variousessential 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)

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)

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.

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:

Major Title Major in Molecular Biology & Biotechnology

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 variousessential 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)

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)

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.

BIOL3406	Reproduction and reproductive biotechnolog	y (6)
BIOL3408	Genetics (6)	
BIOL3409	Business aspects of biotechnology (6)	
BIOL4401	Medical microbiology and applied immunology	gy (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:

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 Molecular Biology & Biotechnology

Minor in Molecular Biology & Biotechnology			
Required courses	s (144 credits)		
1. Introductory lev	rel 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 Electi			
	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.	

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 c	ourses (66 credits)		
Ш	Disciplinary Core C	ourses (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	es (36 credits)		
Ш	Plus at least 36 cr	edits 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)		
Ш	3. Capstone require	ment (12 credits)		
П	BIOL4993	Molecular biology & biotechnology project (12)		
Ш				

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 2018

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) 1. 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) **Disciplinary Core Courses (42 credits)**

From molecules to cells (6) BIOL1110 General chemistry I (6) CHFM1042 General chemistry II (6) CHEM1043 Biostatistics (6) BIOL2102

Biological sciences laboratory course (6) **BIOL2103**

BIOL2220 Principles of biochemistry (6)

BIOL2409 Biotechnology industry and entrepreneurship (6) Basic biochemistry (6) BIOC2600

Disciplinary Electives (12 credits)

Plus at least 12 credits selected from the following courses:

Evolutionary diversity (6) BIOL1309

BIOL2306 Ecology and evolution (6) (Note 1)

(Note 1)

(Note 1)

(Note 1)

Take either BIOL2220 or BIOC2600 to fulfill this 42 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive. (Note 1)

Take either BIOL2220 or BIOC2600 to fulfill this 42 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusive. (Note 1)

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.

BIOL 0400			1
BIOL2408	Green earth-plants and mankind (6)		
COMP1117	Computer programming (6)		
MATH1011	University mathematics I (6)		
MATH1013	University mathematics II (6)		
	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	ives (36 credits)		
Plus at least 36	credits selected from the following courses:		
BIOL3107	Plant physiology (6)		
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)		
BIOL4401	Medical microbiology and applied immunology (6)		
BIOL4409	General virology (6)		
BIOL4416	Stem cells and regenerative biology (6)		
ENVS4110	Environmental remediation (6)		
3. Capstone requi	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.

Remarks:

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.

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) 1. 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)** From molecules to cells (6) (Note 1) BIOL1110 General chemistry I (6) CHFM1042 General chemistry II (6) CHEM1043 Biostatistics (6) BIOL2102 (Note 1) Biological sciences laboratory course (6) (Note 1) **BIOL2103 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) Take either BIOL2220 or BIOC2600 to fulfill BIOC2600 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. May take either BIOL1309 or BIOL2306 to **BIOL2306** Ecology and evolution (6)

fulfill this 12 credits requirement, but not both.

II			I.
BIOL2408	Green earth-plants and mankind (6)		
COMP1117	Computer programming (6)		
MATH1011	University mathematics I (6)		
MATH1013	University mathematics II (6)		
2. Advanced level	courses (66 credits)		
Disciplinary Core	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	ives (36 credits)		
Plus at least 36	credits selected from the following courses:		
BIOL3107	Plant physiology (6)		
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)		
BIOL4401	Medical microbiology and applied immunology (6)		
BIOL4409	General virology (6)		
BIOL4416	Stem cells and regenerative biology (6)		
ENVS4110	Environmental remediation (6)		
3. Capstone requi	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)

Offered to students 2016

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) 1. 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)** From molecules to cells (6) (Note 1) BIOL1110 General chemistry I (6) CHFM1042 General chemistry II (6) CHEM1043 Biostatistics (6) BIOL2102 (Note 1) Biological sciences laboratory course (6) (Note 1) **BIOL2103 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) Take either BIOL2220 or BIOC2600 to fulfill BIOC2600 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. May take either BIOL1309 or BIOL2306 to **BIOL2306** Ecology and evolution (6)

fulfill this 12 credits requirement, but not both.

II			I.
BIOL2408	Green earth-plants and mankind (6)		
COMP1117	Computer programming (6)		
MATH1011	University mathematics I (6)		
MATH1013	University mathematics II (6)		
2. Advanced level	courses (66 credits)		
Disciplinary Core	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	ives (36 credits)		
Plus at least 36	credits selected from the following courses:		
BIOL3107	Plant physiology (6)		
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)		
BIOL4401	Medical microbiology and applied immunology (6)		
BIOL4409	General virology (6)		
BIOL4416	Stem cells and regenerative biology (6)		
ENVS4110	Environmental remediation (6)		
3. Capstone requi	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)

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	s (144 credits)		
1. Introductory lev	rel 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 Electi			
	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.	

II			
BIOL2408	Green earth-plants and mankind (6)		
COMP1117	Computer programming (6)		
MATH1011	University mathematics I (6)		
MATH1013	University mathematics II (6)		
2. Advanced level	courses (66 credits)		
Disciplinary Core	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	ives (36 credits)		
Plus at least 36	credits selected from the following courses:		
BIOL3107	Plant physiology (6)		
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)		
BIOL4401	Medical microbiology and applied immunology (6)		
BIOL4409	General virology (6)		
BIOL4416	Stem cells and regenerative biology (6)		
ENVS4110	Environmental remediation (6)		
3. Capstone requi	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 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-word 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 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 SCNC1112 Fundamentals of modern science (6)

Disciplinary Core Courses (24 credits)

Introductory mechanics (6) PHYS2250

PHYS2255 Introductory electricity and magnetism (6) **PHYS2261** Introductory heat and thermodynamics (6) 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) Methods in physics I (6) PHYS2150 Methods in physics II (6) **PHYS2155**

Introductory computational physics (6) PHYS2160

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) Quantum mechanics (6) PHYS3351 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.

PHYS3151 Machine learning in physics (6) Observational astronomy (6) **PHYS3650**

Astrophysics (6) **PHYS3653** Astronomy laboratory (6) PHYS3660 PHYS3750 Laser and spectroscopy (6) **PHYS3850** Waves and optics (6) Atomic and nuclear physics (6) PHYS3851 Computational physics (6) PHYS4150

Data analysis and modeling in physics (6) PHYS4151 PHYS4351 Advanced quantum mechanics (6) **PHYS4450** Advanced electromagnetism (6)

Solid state physics (6) PHYS4551 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)

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. 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, 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.
- 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)
- 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-word 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 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 Scientific method and reasoning (6) 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

YS2150 Methods in physics I (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 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)
PHYS4551 Solid state 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)

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. 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, 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.
- 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 2017

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-word 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]]

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) Observational astronomy (6) PHYS3650 PHYS3651 The physical universe (6) Principles of astronomy (6) **PHYS3652** Laser and spectroscopy (6) PHYS3750 PHYS3751 Physics of nanomaterials (6) **PHYS3850** 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)
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. 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
- 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:

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-word 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]]

PHYS2150 Methods in physics I (6)

PHYS2155 Methods in physics II (6)
2. Advanced level courses (42 credits)

Disciplinary Core Courses (42 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) Machine learning in physics (6) PHYS3151 PHYS3551 Introductory solid state physics (6) Observational astronomy (6) PHYS3650 PHYS3651 The physical universe (6) Principles of astronomy (6) **PHYS3652** Laser and spectroscopy (6) PHYS3750 PHYS3751 Physics of nanomaterials (6) **PHYS3850** 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)
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. 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
- 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-word 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)

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)

PHYS2255 Introductory electricity and magnetism (6)

Heat and waves (6) PHYS2260

Introductory quantum physics (6) **PHYS2265** [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)1

PHYS2150 Methods in physics I (6) Methods in physics II (6) PHYS2155

2. Advanced level courses (42 credits) **Disciplinary Core Courses (24 credits)**

Classical mechanics (6) PHYS3350 PHYS3351 Quantum mechanics (6) 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 A

PHYS3150 Theoretical physics (6) Machine learning in physics (6) PHYS3151 PHYS3551 Introductory solid state physics (6) Observational astronomy (6) PHYS3650 PHYS3651 The physical universe (6) Principles of astronomy (6) **PHYS3652** Laser and spectroscopy (6) PHYS3750 PHYS3751 Physics of nanomaterials (6) **PHYS3850** Waves and optics (6) Atomic and nuclear physics (6) PHYS3851 PHYS4150 Computational physics (6)

Data analysis and modeling in physics (6) **PHYS4151** PHYS4350 Advanced classical mechanics (6) PHYS4351 Advanced quantum mechanics (6) Advanced electromagnetism (6) **PHYS4450**

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)

- 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
- 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-word 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)

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)

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

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 aredite coloct	and from the following courses:	

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.
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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 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-word 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)

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)

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

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) Physics internship (6) **PHYS4966** Physics project (12) PHYS4999

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
- 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.

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-word 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)

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)

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

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) Physics internship (6) **PHYS4966** Physics project (12) PHYS4999

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
- 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.

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)
- PLO 5: apply scientific and quantitative methods in tackling problems in research or real-word 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)
1. Introductory level	courses (72 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)
PHYS1150 Problem solving in physics (6)

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

PHYS3151 Machine learning in physics (6)
PHYS3650 Observational astronomy (6)
PHYS3653 Astrophysics (6)
PHYS3660 Astronomy laboratory (6)
PHYS3750 Laser and spectroscopy (6)

PHYS3850	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)
PHYS4551	Solid state 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 cre-	dits)
At least 12 credits selected from	n the following courses:
PHYS3999	Directed studies in physics (6)
PHYS4966	Physics internship (6)
PHYS4999	Physics project (12)

- 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, PHYS3550 Statistical mechanics & thermodynamics, PHYS451 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 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)
- 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-word 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

Ι.	•		
l	Required courses (144	credits)	
П	1. Introductory level courses (72 credits)		
П	Disciplinary Core Courses: Science Foundation Courses (12 credits)		
П	SCNC1111	Scientific method and reasoning (6)	(Note 1)
П	SCNC1112	Fundamentals of modern science (6)	(Note 1)
П	Disciplinary Core Courses (48 credits)		
П	PHYS1150	Problem solving in physics (6)	
П	PHYS2055	Introductory relativity (6)	

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

PHYS3151 Machine learning in physics (6)
PHYS3650 Observational astronomy (6)
PHYS3653 Astrophysics (6)
PHYS3660 Astronomy laboratory (6)
PHYS3750 Laser and spectroscopy (6)

PHYS3850	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)	
PHYS4551	Solid state 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 requireme	nt (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)	

- 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, PHYS3550 Statistical mechanics & thermodynamics, PHYS451 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 2017

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-word 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

> PHYS3660 PHYS3750

WIIIOI III FIIYSICS		
Required courses (144 c	redits)	
1. Introductory level courses (72 credits)		
Disciplinary Core Courses	s: Science Foundation Courses (12 credits)	
SCNC1111	Scientific method and reasoning (6)	(Note 1)
SCNC1112	Fundamentals of modern science (6)	(Note 1)
Disciplinary Core Courses	s (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)	(Note 1)
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 select	ed 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	s (60 credits)	
Disciplinary Core Courses		
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	,	
	advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHY	
prerequisite requirements	s. The current list includes courses in List A and those courses not s	selected to fulfill the
capstone requirements.		
List A		
PHYS3151	Machine learning in physics (6)	
PHYS3650	Observational astronomy (6)	
PHYS3653	Astrophysics (6)	

Astronomy laboratory (6)

Laser and spectroscopy (6)

PHYS3850	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)
PHYS4551	Solid state 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	e following courses:
PHYS3999	Directed studies in physics (6)
PHYS4966	Physics internship (6)
PHYS4999	Physics project (12)

- 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, PHYS3550 Statistical mechanics & thermodynamics, PHYS451 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-word 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

> PHYS3650 PHYS3653

> PHYS3660

PHYS3750

L''	Willion III I Hysics		
	Required courses (144 credits)		
	1. Introductory level courses (72 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 cred	its)	
Ш	PHYS1150	Problem solving in physics (6)	
	PHYS2055	Introductory relativity (6)	
Ш	PHYS2150	Methods in physics I (6)	
	PHYS2155	Methods in physics II (6)	
Ш	PHYS2250	Introductory mechanics (6)	(Note 1)
Ш	PHYS2255	Introductory electricity and magnetism (6)	(Note 1)
Ш	PHYS2261	Introductory heat and thermodynamics (6)	
	PHYS2265	Introductory quantum physics (6)	(Note 1)
	Disciplinary Electives (12 credits)		
	At least 12 credits selected from the		
	COMP1117	Computer programming (6)	
Ш	MATH1013	University mathematics II (6)	
	PHYS1650	Nature of the universe (6)	
Ш	PHYS2160	Introductory computational physics (6)	
	PHYS2650	Modern astronomy (6)	
Ш	STAT1603	Introductory statistics (6)	
	2. Advanced level courses (60 cred		
	Disciplinary Core Courses (36 cred		
Ш	PHYS3150	Theoretical physics (6)	
Ш	PHYS3350	Classical mechanics (6)	(Note 1)
Ш	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)	(DUNGONO) - DUNGONO - DUNG	
		evel Physics courses (PHYS3XXX or PHYS4XXX or PHYS7XXX level),	
		rent list includes courses in List A and those courses not selected to fulf	III the
	capstone requirements.		
	List A	Mashina lasmina in physics (C)	
Ш	PHYS3151	Machine learning in physics (6)	

Observational astronomy (6)

Astronomy laboratory (6)

Laser and spectroscopy (6)

Astrophysics (6)

	PHYS3850	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)	
	PHYS4551	Solid state 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 c	credits)	
	At least 12 credits selected fr	om 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, PHYS3550 Statistical mechanics & thermodynamics, PHYS451 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 Risk Management

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 (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)
STAT3610 Risk management and insurance (6)

STAT3612 Statistical machine learning (6)
STAT3618 Derivatives and risk management (6)
STAT3911 Financial economics II (6)

STAT4603 Financial economics if (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) [previous title: Probability modelling (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. 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 http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

Remarks:

Major Title Major in Risk Management

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 (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.
- 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 http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

Remarks:

Major Title Major in Risk Management

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 (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.
- 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.
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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 http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

Remarks:

Major Title Major in Risk Management

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)
- 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 (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

(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 http://www.scifac.hku.hk/ug/current/bsc/curricullum/overlapping-course-req.

Remarks:

Major Title Major in Risk Management

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)
- 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 (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.
- 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 http://www.scifac.hku.hk/ug/current/bsc/curricullum/overlapping-course-req.

Remarks:

Major Title Major in Risk Management

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)
- 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
- 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) Statistics: ideas and concepts (6) STAT1600

MATH2014 Multivariable calculus and linear algebra (6)

Probability and statistics I (6) STAT2601 STAT2602 Probability and statistics II (6)

2. Advanced level courses (48 credits)

Disciplinary Core Courses (24 credits)

STAT3600 Linear statistical analysis (6) The statistics of investment risk (6) STAT3609 Practical mathematics for investment (6) STAT3615

STAT4601 Time-series analysis (6)

Disciplinary Electives (24 credits)

At least 24 credits selected from the following courses:

Stochastic processes (6) STAT3603 [previous title: Probability modelling (6)] Risk management and insurance (6) STAT3610

[previous title: Data mining (6)]

STAT3612 Statistical machine learning (6) Derivatives and risk management (6) STAT3618

Financial economics II (6) STAT3911 Current topics in risk management (6) STAT4603

Risk management and Basel Accords in banking and finance STAT4606

Credit risk analysis (6) STAT4607 STAT4608 Market risk 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) 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 http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

Remarks:

Major Title Major in Risk Management

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 http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

Remarks:

Major Title Major in Risk Management

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 http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

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 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) Fundamentals of modern science (6) SCNC1112

Disciplinary Core Courses (30 credits)

University mathematics II (6) MATH1013 STAT1600 Statistics: ideas and concepts (6)

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 (24 credits)

STAT3600 Linear statistical analysis (6) 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:

I ist A Statistical inference (6) STAT3602 STAT3604 Design and analysis of experiments (6) Modern nonparametric statistics (6) STAT3620

STAT3621 Statistical data analysis (6) List B

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 Marketing analytics (6) STAT3613 STAT3617 Sample survey methods (6)

STAT3955 Survival 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. 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 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 http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

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 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
STAT3604
STAT3620
STAT3620
STAT3620
STAT3621
Statistical inference (6)
Design and analysis of experiments (6)
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)

STAT3612 Statistical machine learning (6) [previous title: Data mining (6)]
STAT3613 Marketing analytics (6) [previous title: Marketing engineering (6)]
STAT3617 Sample survey methods (6)

STAT3955 Survival 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. 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 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 http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

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 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:

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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) STAT3955 Survival 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. 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.

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- 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 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 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
STAT3604
STAT3620
STAT3620
STAT3620
STAT3621
Statistical inference (6)
Design and analysis of experiments (6)
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)

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) STAT3955 Survival 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. 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.

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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)
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- 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)
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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) STAT3616 Advanced SAS programming (6) [previous title: Marketing engineering (6)]

STAT3617 Sample survey methods (6) STAT3955 Survival 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. 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.

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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)
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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 Courses (30 credits)

University mathematics II (6) MATH1013 STAT1600 Statistics: ideas and concepts (6)

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 (24 credits)

STAT3600 Linear statistical analysis (6) STAT3603 Stochastic processes (6) [previous title: Probability modelling (6)]

STAT4601 Time-series analysis (6) Multivariate data analysis (6) STAT4602

Disciplinary Electives (24 credit)

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List B

Quality control and management (6) STAT3605

Business logistics (6) STAT3606

Statistics in clinical medicine and bio-medical research (6) STAT3607

STAT3608 Statistical genetics (6) Statistical machine learning (6) STAT3612 [previous title: Data mining (6)]

STAT3613 STAT3616 Advanced SAS programming (6)

Marketing analytics (6)

[previous title: Marketing engineering (6)]

STAT3617 Sample survey methods (6) STAT3955 Survival analysis (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

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Notes:

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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.

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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)

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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
STAT3604
STAT3620
STAT3620
STAT3621
List B
Statistical inference (6)
Design and analysis of experiments (6)
Modern nonparametric statistics (6)
Statistical data analysis (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)

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) STAT3955 Survival 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. 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 http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

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) 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:

STAT3602 Statistical inference (6) Design and analysis of experiments (6) STAT3604 Modern nonparametric statistics (6) STAT3620 Statistical data analysis (6) STAT3621

List B

STAT3608

List A

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) STAT3613 Marketing analytics (6)

Advanced SAS programming (6) STAT3616 STAT3617 Sample survey methods (6)

[previous title: Data mining (6)] [previous title: Marketing engineering (6)] STAT3955 Survival 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. 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 http://www.scifac.hku.hk/ug/current/bsc/curriculum/overlapping-course-req.

Remarks:

Science Minors 2019-2020

SCIENCE

SECTION VII Science Minors on offer in 2019/2020

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 2017 cohort and thereafter)

Statistics

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)

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 2018

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)

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 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)

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 2016

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)

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 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)

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 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)

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 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)

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)

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:

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:

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)
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:

[previous title: Introduction to relativity (6)]

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:

NIL

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)

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)
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 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)

Fundamental physics (6) PHYS1250 Nature of the universe (6) PHYS1650 **PHYS2265** Introductory quantum 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)

PHYS4650 Stellar physics (6)

Selected topics in astrophysics (6) PHYS4651

Planetary science (6) PHYS4652 PHYS4653 Cosmology (6) **PHYS4654** General relativity (6) Interstellar medium (6) **PHYS4655 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.

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)

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 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)

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 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)

[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)

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)

Fundamental physics (6) PHYS1250 Nature of the universe (6) PHYS1650 **PHYS2265** Introductory quantum 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) Stellar physics (6)

PHYS4650

Selected topics in astrophysics (6) PHYS4651

Planetary science (6) PHYS4652 PHYS4653 Cosmology (6) **PHYS4654** General relativity (6) Interstellar medium (6) **PHYS4655 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.

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:

Minor Title Minor in Biochemistry

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:

Minor Title Minor in Biochemistry

2018

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

BIOL2220

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 From molecules to cells (6)
BIOC2600 Basic biochemistry (6)

this 12 credits requirement, but not both. BIOC2600 and BIOL2220 are mutually exclusive.

Take either BIOC2600 or BIOL2220 to fulfill

Principles of biochemistry (6)

Take either BIOC2600 or BIOL2220 to fulfill
this 12 credits requirement, but not both

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:

Minor Title Minor in Biochemistry

Offered to students 2017

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 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:

Minor Title Minor in Biochemistry

2016

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:

Minor Title Minor in Biochemistry

2015

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 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:

Minor Title Minor in Biochemistry

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

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)

BIOC3601 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:

Minor Title Minor in Biochemistry

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:

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 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:

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 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:
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

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 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) General chemistry II (6) CHEM1043

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. 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)

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) CHFM3341 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 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)

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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

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)

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: Principles of chemistry (6) CHEM2041 CHEM2241 Analytical chemistry I (6) CHEM2341 Inorganic chemistry I (6) Organic chemistry I (6) CHEM2441

CHEM2441 and CHEM2442 are mutually

exclusive.

CHEM2441 and CHEM2442 are mutually CHEM2442 Fundamentals of organic chemistry (6)

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) 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

Introductory instrumental chemical analysis (6) CHEM3243 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

Objectives:

admitted to Year 1 in

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:

2014

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:

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)

Analytical chemistry II: chemical instrumentation 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) 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) CHEM4145 Medicinal chemistry (6) 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 CHEM4443 Integrated organic synthesis (6)

CHEM4444 Chemical biology (6) CHEM4542 Computational chemistry (6) Advanced physical chemistry (6) CHEM4543

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

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:

2013

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)

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 CHEM4910	Advanced physical chemistry (6) Electrochemical science and technology (6) Chemistry literacy and research (6)
CHEM4911	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:

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 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:

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

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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and kinetics theory (6)

quantum chemistry (6)]

[previous title: Physical chemistry II: Introduction to

CHEM4543 CHEM4544 CHEM4910	Advanced physical chemistry (6) Electrochemical science and technology (6) Chemistry literacy and research (6)
CHEM4911	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 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 optimize

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 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 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:

I ist 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 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)

MATH 3603 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 optimize

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 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

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) Multivariable calculus (6) MATH2211

2. Advanced level courses (24 credits) **Disciplinary Core Courses (12 credits)**

MATH3601

Numerical analysis (6) Financial calculus (6) MATH3906

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) Game theory and strategy (6) MATH3911 Scientific computing (6) MATH4602

MATH4907 Numerical methods for financial calculus (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. 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

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 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)
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- 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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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)

Advanced geochemistry and geochronology (6) EASC3416

Meteorology (6)

EASC3417 Earth through time (6)

EASC3999 Directed studies in earth sciences (6) Biogeochemical cycles (6) EASC4403

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:

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:

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Impermissible Combinations:

Major in Earth System Science

Major in Geology

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Required courses (36 credits)

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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:

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- 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)

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Disciplinary Electives (24 credits)

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EASC4955 Integrated field studies (6)
EASC4966 Earth sciences internship (6)
EASC4999 Earth sciences project (12)

Notes:

EASC3415

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Remarks

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:

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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)

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EASC2401 Fluid/solid interactions in earth processes (6)

2. Advanced level courses (24 credits)

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EASC3999 Directed studies in earth sciences (6)

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EASC4911 Earth system: contemporary issues (6)

EASC4955 Integrated field studies (6)
EASC4966 Earth sciences internship (6)
EASC4999 Earth sciences project (12)

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Remarks

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)
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Impermissible Combinations:

Major in Earth System Science

Major in Geology

Major in Geology (Intensive)

Required courses (36 credits)

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Disciplinary Electives (12 credits)

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Offered to students 2014

admitted to Year 1 in

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Offered to students 2013

admitted to Year 1 in

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Offered to students 2012

admitted to Year 1 in

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- 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)

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Disciplinary Electives (12 credits)

At least 12 credits selected from the following courses:

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Remarks

Minor Title Minor in Ecology & Biodiversity

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) **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:

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Minor Title Minor in Ecology & Biodiversity

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.

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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)

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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:

^{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 Ecology & Biodiversity

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 laboratory-based 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)

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)

Notes

. Remarks:

^{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 Ecology & Biodiversity

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:

Remarks:

^{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 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

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)

2. Advanced level courses (24 credits) Disciplinary Electives (24 credits)

	Animal habariarum (C)	Taka aithan DIOLO404 an DIOL4000 ta fulfill
BIOL3101	Animal behaviour (6)	Take either BIOL3101 or BIOL4303 to fulfill 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.

exclusive.

Remarks:

Take either BIOL3101 or BIOL4303 to fulfill

this 24 credits requirement, but not both.

BIOL3101 and BIOL4303 are mutually

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

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)

2. Advanced level courses (24 credits) Disciplinary Flectives (24 credits)

Disciplinary Elective	s (24 credits)
BIOL3101	Animal behaviour (6)

		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.

Notes:

Remarks:

^{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.

Take either BIOL3101 or BIOL4303 to fulfill

BIOL3101 and BIOL4303 are mutually

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 cred	ITS)	
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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.

Notes:

Remarks:

^{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.

Take either BIOL3101 or BIOL4303 to fulfill

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)

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:

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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)

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)

ENVS3020 Global change ecology (0

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)
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- 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 (6)
EASC3405 Environmental remote sensing (6)
ENVS3007 Natural hazards and mitigation (6)
ENVS3010 Sustainable energy and environment (6)

ENVS3010 Sustainable energy and 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 2017

admitted to Year 1 in

Objectives:

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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:

^{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 2016

admitted to Year 1 in

Objectives:

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- 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:

^{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 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:

^{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 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 (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:

^{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 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)

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 CHEM2041 Principles of chemistry (6) Analytical chemistry I (6) CHEM2241

CHEM2442 Fundamentals of organic chemistry (6) EASC1020 Introduction to climate science (6)

Blue Planet (6) EASC1401

EASC2404 Introduction to atmosphere and hydrosphere (6)

Environmental life science (6) ENVS1301 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) ENVS3004

Disciplinary Electives (18 credits)

At least 18 credits selected from the following courses:

Environmental toxicology (6) BIOL3110 **BIOL3303** Conservation biology (6)

Environmental impact assessment (6) **BIOI 4302**

Environmental chemistry (6) CHEM3141

Analytical chemistry II: chemical instrumentation (6) CHEM3241

Food and water analysis (6) CHEM3242

EASC3020 Global change: anthropogenic impacts (6) Environmental remote sensing (6) FASC3405 ENVS3006 Environmental radiation (6)

Natural hazards and mitigation (6) ENVS3007 ENVS3010 Sustainable energy and environment (6)

ENVS3019 Urban ecology (6) ENVS3020 Global change ecology (6)

ENVS3042 Pollution (6)

ENVS3313 Environmental oceanography (6) Environmental remediation (6) ENVS4110

Notes:

Remarks:

^{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 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)

ENVS1401 Introduction to environmental science (6)

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)
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)

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:

^{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 admitted to Year 1 in

2019

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 courses	s (36 credits)	
	1. Introductory level courses (12 credits)		
П	Disciplinary Electives (12 credits)		
П	At least 12 credits selected from the following courses:		
П	BIOL1110	From molecules to cells (6)	
П	BIOL1201	Introduction to food and nutrition (6)	
П	BIOL2101	Principles of food chemistry (6)	
	BIOL2220	Principles of biochemistry (6)	Take either BIOL2220 or BIOC2600 o fulfill
П			this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually
П			exclusive.
П	BIOC2600	Basic biochemistry (6)	Take either BIOL2220 or BIOC2600 o fulfill
П	2.00200	, (-)	this 12 credits requirement, but not both.
Ш			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)	[previous title: Food and nutritional toxicology
DIOI 0000	Food and matricet analysis (0)	(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)	
BIOL4204	Diet, brain function and behavior (6)	
BIOL4205	Food technology (6)	[previous title: Food processing and engineering (6)]
BIOL4209	Functional foods (6)	3 3 () 3
BIOL4411	Plant and food biotechnology (6)	

Notes:

Remarks

^{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 admitted to Year 1 in

2018

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 & Nutritional Science				
Required courses (36 credits)				
•	vel 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		
	D	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)	0.00180.1101		
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		
DIOL 2207	Principles of toxicology (6)	exclusive. [previous title: Food and nutritional toxicology		
BIOL3207	Fillidiples of toxicology (6)	(6)]		
BIOL3209	Food and nutrient analysis (6)	(0)]		
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		
DIOLSOUG	rood 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		
DIOI 4000	Mant daims and avair anionance (6)	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.		
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.

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

viajor in Food & Nutritional Science			
Required courses (36 credits)			
· •	vel courses (12 credits)		
Disciplinary Electi			
	ts 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	
DIOCOCC	Desir bis de ancietas (0)	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 Electi			
	ts 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	
DIOI 2207	Principles of toxicology (6)	exclusive. [previous title: Food and nutritional toxicology	
BIOL3207	Filliciples of toxicology (0)	(6)]	
BIOL3209	Food and nutrient analysis (6)	(0) 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)	Take either BIOL3206 or BIOL3606 to fulfill	
	. ,	this 24 credits requirement, but not both.	
		BIOL3206 and BIOL3606 are mutually	
DIOLOGOO	Food commodition (C)	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	
		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.	
BIOL4209	Functional foods (6)	oxoladivo.	
BIOL4411	Plant and food biotechnology (6)		
	07 ()		

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

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

Required courses	(36 credits)
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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 cred	lits 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 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

Required courses	(36 credits)
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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 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 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) 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)

Food and nutrient analysis (6) BIOL3209 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 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 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 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 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

Required courses	(36	credits)
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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**

this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusvie.

BIOC2600 Basic biochemistry (6)

Take either BIOL2220 or BIOC2600 to fulfill this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually exclusvie.

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

2. Advanced level courses (24 credits)

Disciplinary Electives (24 credits)

At least 24 credits selected from the following courses:			
BIOL3201	Food chemistry (6)		
BIOI 3202	Nutritional biochemistry (6)		

BIOL3203 Food microbiology (6) Nutrition and the life cycle (6) BIOL3204 BIOL3205 Human physiology (6) Clinical nutrition (6) **BIOL3206**

BIOL3207 Principles of toxicology (6)

BIOL3208 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 BIOL3210 or BIOL4208 or BIOL3608 to fulfill this 24 credits requirement, but not both. BIOL3210 and BIOL4208 or BIOL3608 are mutually

exclusive.

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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)	

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

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

Required	courses	(36 credits)	١
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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**

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 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 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)	

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

2012

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

Required cours	es (36 credits)
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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) 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)

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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 Marine Biology

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:

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 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:

Minor Title Minor in Marine Biology

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 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:

Minor Title Minor in Marine Biology

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)

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:

Minor Title Minor in Marine Biology

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:

Minor Title Minor in Marine Biology

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)
- 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:

Minor Title Minor in Marine Biology

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)
- 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:

Minor Title Minor in Marine Biology

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 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:

Minor Title Minor in Marine Biology

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:

Minor Title Minor in Mathematics

Offered to students 2019

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) 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)
MATH3999 Directed studies in mathematics (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)

MATH4910 Senior mathematics seminar (6)
MATH4911 Mathematics capstone project (6)
MATH4966 Mathematics internship (6)

MATH4999	Mathematics project (12)	
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)	

- 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

Minor Title Minor in Mathematics

Offered to students 2018

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) 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)
MATH3999 Directed studies in mathematics (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)

MATH4910 Senior mathematics seminar (6)
MATH4911 Mathematics capstone project (6)
MATH4966 Mathematics internship (6)

MATH4999	Mathematics project (12)	
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)	

- 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

Minor Title Minor in Mathematics

Offered to students 2017

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 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)

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:

List A

MATH3001 Development of mathematical ideas (6)

MATH3002 Mathematics seminar (6)

MATH3301 Algebra I (6)

Matrix theory and its applications (6) MATH3303 **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)

MATH3906 Financial calculus (6) Game theory and strategy (6) MATH3911

Network models in operations research (6) MATH3943 MATH3999 Directed studies in mathematics (6)

MATH4302 Algebra II (6) Analysis II (6) MATH4402 Functional analysis (6) **MATH4404**

MATH4406 Introduction to partial differential equations (6)

Geometry (6) MATH4501

Introduction to differentiable manifolds (6) MATH4511

Scientific computing (6) MATH4602 MATH4902 Operations research II (6)

Numerical methods for financial calculus (6) MATH4907

Senior mathematics seminar (6) MATH4910 MATH4911 Mathematics capstone project (6)

MATH4966	Mathematics internship (6)	
MATH4999	Mathematics project (12)	
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)	

- 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:

Minor Title Minor in Mathematics

Offered to students 2016

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)

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

MATH2012 Fundamental concepts of mathematics (6)
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:

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)

MATH 10402 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)
MATH3999 Directed studies in mathematics (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)

MATH4910 Senior mathematics seminar (6)
MATH4911 Mathematics capstone project (6)

MATH4966	Mathematics internship (6)	
MATH4999	Mathematics project (12)	
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)	

- 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:

Minor Title Minor in Mathematics

Offered to students 2015

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 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) 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)
MATH3999 Directed studies in mathematics (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)

MATH4910 Senior mathematics seminar (6)
MATH4911 Mathematics capstone project (6)
MATH4966 Mathematics internship (6)

MATH4999	Mathematics project (12)	
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)	

- 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

Minor Title Minor in Mathematics

Offered to students 2014

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

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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)

MATH3905 Queueing theory and simulation (6)
MATH3906 Financial calculus (6)

MATH3911 Game theory and strategy (6)
MATH3943 Network models in operations research (6)

MATH3949 Directed studies in mathematics (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)

MATH4910 Senior mathematics seminar (6)
MATH4911 Mathematics capstone project (6)
MATH4966 Mathematics internship (6)
MATH4999 Mathematics project (12)
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)

MATH7503 Topics in applied absolute mathematics (6) MATH7503 Topics in mathematical programming and optimization (6) MATH7504 Geometric topology (6) MATH7505 Real analysis (6)	MATH7505 Real analysis (6)		MATH7504	Geometric topology (6)
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- 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:

Minor Title Minor in Mathematics

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

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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)

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) MATH3999 Directed studies in mathematics (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)

MATH4910 Senior mathematics seminar (6)
MATH4911 Mathematics capstone project (6)
MATH4966 Mathematics internship (6)
MATH4999 Mathematics project (12)
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)

- 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:

Minor Title Minor in Mathematics

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

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)
MATH3999 Directed studies in mathematics (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)

MATH4910 Senior mathematics seminar (6)
MATH4911 Mathematics capstone project (6)
MATH4966 Mathematics internship (6)
MATH4999 Mathematics project (12)
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 MATH7502 MATH7503 MATH7504	Topics in algebra (6) Topics in applied discrete mathematics (6) Topics in mathematical programming and optimization (6) Geometric topology (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.
- 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

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)

fulfill this 12 credits requirement, but not both. BIOL2220 and BIOC2600 are mutually

exclusive.

May take either BIOL2220 or BIOC2600 to

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

Environmental remediation (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**

Notes:

ENVS4110

Remarks:

^{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 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:

2017

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 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:

Remarks:

^{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 admitted to Year 1 in 2016

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 BIOL2220 or BIOC2600 to

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)

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 Electives (18 credits)

At least 18 credits selected from the following courses: Cell biology and cell technology (6)

BIOL3402 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:

Remarks:

^{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.

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	ogy & Biotechnology (Intensive)		
Required courses	(36 credits)		
	el courses (12 credits)		
Disciplinary Electiv			
	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 C	courses (6 credits)		
BIOL3401	Molecular biology (6)		
Disciplinary Electiv	res (18 credits)		
At least 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:

2014

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 Bio	ology & Biotechnology (Intensive)			
Required courses (36 credits)				
1. Introductory lev	rel courses (12 credits)			
Disciplinary Electi	ves (12 credits)			
	ts 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)				
	Courses (6 credits)			
BiOL3401	Molecular biology (6)			
Disciplinary Electi	ves (18 credits)			
	ts 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

2013

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	ogy & Biotechnology (Intensive)		
Required courses	(36 credits)		
	el courses (12 credits)		
Disciplinary Electiv			
	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 C	courses (6 credits)		
BIOL3401	Molecular biology (6)		
Disciplinary Electiv	res (18 credits)		
At least 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 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 Bio	ology & Biotechnology (Intensive)	
Required courses	s (36 credits)	
1. Introductory lev	el courses (12 credits)	
Disciplinary Elective	ves (12 credits)	
	ts 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 .	ts selected from the following courses:	
BIOL3402	Cell biology and cell technology (6)	
BIOL3403	Immunology (6)	
BIOL3409	Business aspects of biotechnology (6)	T '' DIOLOGO DIOL
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 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)

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 2018

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 Fundamental concepts of mathematics (6)

MATH2012

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 2017

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)

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:

List A

MATH2101 Linear algebra I (6) Multivariable calculus (6) MATH2211

List B

MATH2012 Fundamental concepts of mathematics (6) Multivariable calculus and linear algebra (6) MATH2014 2. Advanced level courses (24 credits)

Disciplinary Core Courses (12 credits)

MATH3901 Operations research I (6) Introduction to optimization (6) MATH3904

Disciplinary Electives (12 credits)

At least 12 credits selected from the following courses:

Differential equations (6) MATH3405 Discrete mathematics (6) MATH3600

MATH3905 Queueing theory and simulation (6)

MATH3906 Financial calculus (6)

MATH3911 Game theory and strategy (6)

Network models in operations research (6) MATH3943

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.

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 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)

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:

List A

MATH2101 Linear algebra I (6) Multivariable calculus (6) MATH2211

List B

MATH2012 Fundamental concepts of mathematics (6) Multivariable calculus and linear algebra (6) MATH2014

2. Advanced level courses (24 credits)

Disciplinary Core Courses (12 credits) MATH3901 Operations research I (6)

Introduction to optimization (6) MATH3904

Disciplinary Electives (12 credits)

At least 12 credits selected from the following courses:

Differential equations (6) MATH3405 Discrete mathematics (6) MATH3600

MATH3905 Queueing theory and simulation (6)

MATH3906 Financial calculus (6)

MATH3911 Game theory and strategy (6)

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 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.

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 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 Course (6 credits)

MATH1013 University mathematics II (6)

Disciplinary Electives (12 credits)

Select either List A or List B:

I ist 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

2014

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:

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:

2013

- 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 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

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 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)
PHYS4551 Solid state 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:

^{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 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)		
Required courses	s (42 credits)	
	vel courses (24 credits)	
Disciplinary Core 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)	
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)	[previous title: Modern physics (6)]
2. Advanced level	courses (18 credits)	
Disciplinary Electi		
At least 18 credi	ts selected from the following courses:	
List A	G	
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	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)	
PHYS4551	Solid state 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 PHYS7750	Graduate statistical mechanics (6)	
PD10//00	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.

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)

[previous title: Modern 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)
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 Waves and optics (6)
PHYS3851 Atomic and nuclear physics (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)

PHYS4652 Planetary science (6)
PHYS4653 Cosmology (6)
PHYS4654 General relativity (6)
PHYS4655 Interstellar medium (6)
PHYS4750 Experimental physics (6)
PHYS4850 Particle physics (6)
PHYS4966 Physics internship (6)
PHYS4999 Physics project (12)

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:

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)

[previous title: Modern 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)
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)
PHYS3750 Laser and spectroscopy (6)
PHYS3751 Physics of nanomaterials (6)
PHYS3850 Waves and optics (6)
PHYS3851 Atomic and nuclear physics (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)

PHYS4652 Planetary science (6)
PHYS4653 Cosmology (6)
PHYS4654 General relativity (6)
PHYS4655 Interstellar medium (6)
PHYS4750 Experimental physics (6)
PHYS4850 Particle physics (6)
PHYS4966 Physics internship (6)
PHYS4999 Physics project (12)

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)
PHYS7660 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:

PHYS3150 Theoretical physics (6)
PHYS3350 Classical mechanics (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 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 **PHYS4653** Cosmology (6) 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:

 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 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)

[previous title: Modern 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)
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 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)

PHYS4151 Data analysis and modeling in physic 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 **PHYS4653** Cosmology (6) 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:

 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 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)

[previous title: Modern 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:

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PHYS3652 Principles of astronomy (6)
PHYS3750 Laser and spectroscopy (6)
PHYS3751 Physics of nanomaterials (6)
PHYS3850 Waves and optics (6)

PHYS3851 Atomic and nuclear physics (6)
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PHYS7550 Graduate statistical mechanics (6)
PHYS7551 Graduate solid state physics (6)
PHYS7650 Stellar atmospheres (6)
PHYS7750 Nanophysics (6)

Notes:

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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 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)

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[previous title: Modern 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

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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 Waves and optics (6)

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

PHYS4151 Data analysis and modeling in physics (6)
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Planetary science (6) PHYS4652 **PHYS4653** Cosmology (6) General relativity (6) **PHYS4654 PHYS4655** Interstellar medium (6) PHYS4750 Experimental physics (6) PHYS4850 Particle physics (6) PHYS4966 Physics internship (6) Physics project (12) PHYS4999

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PHYS7450 Graduate electromagnetism (6)
PHYS7550 Graduate statistical mechanics (6)
PHYS7551 Graduate solid state physics (6)
PHYS7650 Stellar atmospheres (6)
PHYS7750 Nanophysics (6)

Notes:

 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 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:

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 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:

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 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)
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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:

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BIOL3314 Plant structure and evolution (6)

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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)
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Impermissible Combinations:

NII

Required courses (36 credits)

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Disciplinary Electives (12 credits)

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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)
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Impermissible Combinations:

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BIOL4411 Plant and food biotechnology (6)

Notes:

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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)
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Impermissible Combinations:

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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:

Minor Title Minor in Risk Management

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)

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:

Minor Title Minor in Risk Management

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) Introductory statistics (6) STAT1603 STAT2601 Probability and statistics I (6)

List B

STAT3609

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:

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)	
017117000	Gan on topico in non managoment (o)	

The statistics of investment risk (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:

Minor Title Minor in Risk Management

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)
STAT3615 Practical mathematics for investment (6)

STAT3615 Practical mathematics for investment (6) STAT3618 Practical mathematics for investment (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 Risk Management

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) Introductory statistics (6) STAT1603 STAT2601 Probability and statistics I (6)

List B

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

[previous title: Data mining (6)]

STAT3615

Practical mathematics for investment (6) 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

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.

Remarks:

Minor Title Minor in Risk Management

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)
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 Risk Management

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) Introductory statistics (6) STAT1603 STAT2601 Probability and statistics I (6)

List B

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 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) Time-series analysis (6) STAT4601

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:

Minor Title Minor in Risk Management

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)

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 Risk Management

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

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 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 2018

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

Offered to students 2017

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 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:

2019

- 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)

STAT2604 Introduction to R programming and elementary data analysis

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) STAT3604 Design and analysis of experiments (6)

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 Sample survey methods (6) STAT3617 Modern nonparametric statistics (6) STAT3620 STAT3621 Statistical data analysis (6) STAT3955 Survival analysis (6) STAT4601 Time-series analysis (6) STAT4602 Multivariate data 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:

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)
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) [previous title: Data mining (6)]
STAT3613 Marketing analytics (6) [previous title: Marketing engineering (6)]

STAT3614 Business forecasting (6)
STAT3617 Sample survey methods (6)
STAT3620 Modern nonparametric statistics (6)
STAT3621 Statistical data analysis (6)
STAT3955 Survival analysis (6)
STAT4601 Time-series analysis (6)
STAT4602 Multivariate data 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:

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:

2017

- 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

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) [previous title: Data mining (6)]
STAT3613 Marketing analytics (6) [previous title: Marketing engineering (6)]

Business forecasting (6) STAT3614 STAT3616 Advanced SAS programming (6) Sample survey methods (6) STAT3617 Modern nonparametric statistics (6) STAT3620 Statistical data analysis (6) STAT3621 STAT3955 Survival analysis (6) STAT4601 Time-series analysis (6) Multivariate data analysis (6) STAT4602

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 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:

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) 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 [previous title: Data mining (6)] Marketing analytics (6) STAT3613 [previous title: Marketing engineering (6)]

Business forecasting (6) STAT3614 STAT3616 Advanced SAS programming (6) Sample survey methods (6) STAT3617 Modern nonparametric statistics (6) STAT3620 Statistical data analysis (6) STAT3621 STAT3955 Survival analysis (6) STAT4601 Time-series analysis (6) Multivariate data analysis (6) STAT4602

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:

2015

- 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 Position and applying of cyric

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) [previous title: Data mining (6)]
STAT3613 Marketing analytics (6) [previous title: Marketing engineering (6)]

Business forecasting (6) STAT3614 STAT3616 Advanced SAS programming (6) Sample survey methods (6) STAT3617 Modern nonparametric statistics (6) STAT3620 Statistical data analysis (6) STAT3621 STAT3955 Survival analysis (6) STAT4601 Time-series analysis (6) Multivariate data analysis (6) STAT4602

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:

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.

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:

2014

- 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:

STAT1601 Elementary statistical methods (6) STAT1602 Business statistics (6) STAT1603 Introductory statistics (6) Probability and statistics I (6) STAT2601 List B

List A

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: 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 [previous title: Data mining (6)] Marketing analytics (6) STAT3613 [previous title: Marketing engineering (6)]

Business forecasting (6) STAT3614 STAT3616 Advanced SAS programming (6) Sample survey methods (6) STAT3617 Modern nonparametric statistics (6) STAT3620 Statistical data analysis (6) STAT3621 STAT3955 Survival analysis (6) STAT4601 Time-series analysis (6) Multivariate data analysis (6)

STAT4602

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:

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

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:

2013

- 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 Quality control and management (6) STAT3605

STAT3606 Business logistics (6)

Statistics in clinical medicine and bio-medical research (6) STAT3607

Statistical genetics (6) STAT3608

STAT3611 Computer-aided data analysis (6) Statistical machine learning (6) STAT3612 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) STAT3955 Survival analysis (6) STAT4601 Time-series analysis (6) STAT4602 Multivariate data 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)]

[previous title: Marketing engineering (6)]

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.

Minor Title Minor in Statistics

Offered to students 2012

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)

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) [previous title: Data mining (6)]
STAT3613 Marketing analytics (6) [previous title: Marketing engineering (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)
STAT3955 Survival analysis (6)

STAT3955 Survival analysis (6)
STAT4601 Time-series analysis (6)
STAT4602 Multivariate data 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:

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.

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 nd major ('Major 2')
Major in Astronomy Major in Mathematics/Physics	2014	5 (30 credits)	1 (6 credits)
Major in Astronomy	2014	6 (36 credits)	2 (12 credits)
Major in Physics	2015, 2016, 2017	5 (30 credits)	1 (6 credits)
Major in Biochemistry Major in Chemistry	2015, 2016, 2017, 2018, 2019	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	2014, 2017, 2018, 2019	6 (36 credits)	2 (12 credits)
Major in Food & Nutritional Science	2015, 2016	7 (42 credits)	3 (18 credits)
Major in Biological Sciences	2014	5 (30 credits)	1 (6 credits)
Major in Molecular Biology & Biotechnology	2015, 2016, 2017, 2018-2019	6 (36 credits)	2 (12 credits)
Major in Earth System Science Major in Geology	2014, 2015, 2016	5 (30 credits)	1 (6 credits)
Major in Ecology & Biodiversity	2017, 2018, 2019	5 (30 credits)	1 (6 credits)
Major in Food & Nutritional Science	2014, 2015, 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 2nd 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 2nd major in Molecular Biology & Biotechnology to make up for BIOL2102 or BIOL2103.

- 3. 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.
- 4. 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
MATH1013 University mathematics II	For students taking Minor with an overlap of Disciplinary Core Course: MATH1013 For students taking Programme / Major / Minor with Disciplinary Core Courses: MATH1851 and MATH1853 (which are together deemed equivalent to MATH1013) For students taking Professional Core in Bachelor of Science in Actuarial Science with Disciplinary Core Course: MATH1821 (which is equivalent to MATH1013)	Select 6 credits from the following to replace MATH1013: 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 MATH2012 Fundamental concepts of mathematics (6) (if not the disciplinary core course in the structure) MATH2241 Introduction to mathematical analysis (6) (if not the disciplinary core course in the structure)
MATH2014 Multivariable calculus and linear algebra	For students taking Programme/Major with Disciplinary Core Course: MATH2101 and MATH2211 (which are together deemed equivalent to MATH2014) For students taking Professional Core in Bachelor of Science in Actuarial Science with Disciplinary Core Course: MATH2822 (which is equivalent to MATH2014)	Select 6 credits from the following to replace MATH2014: • Any 6-credit level 2 or above Mathematics Disciplinary Elective chosen from the Programme/Major/Minor structure in which MATH2014 is the disciplinary core course • MATH2012 Fundamental concepts of mathematics (6) (if not the disciplinary core course in the structure) • MATH2241 Introduction to mathematical analysis (6) (if not the disciplinary core course in the structure)

5. For the situations of 2, 3 and 4 above, students have to complete the application form, seek the written endorsement from the Course Selection Adviser of the second major ('Major 2') / minor and then return it to the Faculty Office by the closing dates of course selection or add/drop periods.

Course Descriptions

SCIENCE

SECTION IX Course Descriptions

BIOC1600			emistry (6 credits)	Academic Ye	ar 2019			
Offering Department		al Sciences		Quota				
ourse Co-ordinator			iences (jatanner@hku.hk)					
eachers Involved		Coon,Biomedical Sc						
		V Wong,Biomedica						
	`	ner,Biomedical Sc	,					
		Y Ho,Biomedical S						
		Y Huen,Biomedica						
	(Dr. YSC	Chan,Department o	of Paediatrics and Adolescent Medicine)					
ourse Objectives	- Teach s	students a biochen	nical perspective on each of the Basic S	Sciences focusing on conc	epts fundamental t			
	- Promote - Inspire s - Help stu	the learning of Biochemistry. Promote deep learning of course material through an integrated programme of practical and collaborative tasks. Inspire students with a view of the great discoveries and future challenges for Biochemistry. Help students make the transition from school to university by developing their teamwork, independent study skills and confidence to communicate within a Biochemistry learning environment.						
ourse Contents	A Biocher	mical Perspective	on the Basic Sciences					
Topics		•						
•	A. Chemis	stry for Biochemist	ry					
	The elem-	ents and bonding	(from carbon to Coenzyme A); Resonand	ce and orbital theory (a foo	cus on the electron			
			n (thinking in 3 dimensions); Isomerism nt) & buffer; Quantitation in chemistry (wh					
	B Biology	y for Biochemistry						
	The basic	building blocks of	of life (proteins, DNA, lipids, carbohydraticular evolution); Origins of life (the chicke					
	C Dhysis	s and Mathematic	s for Riochemistry					
				coular recognition and him	dina (DNA moltina			
	,	•	ological Perspective; Introduction to mol	· ·	J 1			
		, ,	applied statistics for what you really nee	ed to know); Ininking num	ibers (exponential			
	logs and t	the limits of life).						
	D Inonirin							
		ng Biochemistry			-l			
	The protein; The gene; Vitamins and disease; Synthetic biology; The challenges of modern-day genetics Drugs							
		s and failures.						
ourse Learning	On successful completion of this course, students should be able to:							
utcomes			of biomolecular structure from a chemi		itegrating the basi			
	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							
	molecular biology							
	CLO 3 interpret scientific data and discuss major issues in biochemistry using the scientific literature							
	CLO 4 demonstrate skills in working and collaborating together with colleagues in practicals and in presentation of							
		scientific ideas						
	CLO 5 re	relate how biochemistry intersects with the three basic sciences of biology, chemistry and physics, ar						
			tion from school to university level study		, ,,,			
re-requisites			E Biology, Chemistry, or Combined Scie	ance with Riology or Chem	istry component o			
and Co-requisites and Impermissible ambinations)	equivalen		_ bloogy, chemistry, or combined ocie	ince with blology of offeri	istry component, c			
ffer in 2019 - 2020	Y 1st	sem Offer in 20	20 - 2021 · Y	Examination	Dec			
rade Descriptors	A		performance demonstrating comprehensive under					
(A+ to F)	\		ne scientific literature; superior presentation and gro		miliour morgine milio doc c			
(A. 101)	В	Good performance	demonstrating full understanding of the subject m	atter; coherent insight into use of	of scientific data and th			
			good presentation and group collaboration skills.					
	С		ance demonstrating adequate understanding of the		nto use of scientific dat			
	D		rature; some presentation and group collaboration e demonstrating some understanding of basic sul		scientific data and the			
	U		mited presentation and group collaboration skills.	bject matter, some ability to use	Solchino data and the			
	Fail		of subject matter; with little to no insight into use of	scientific data; no understanding	of the scientific literatur			
		and unable to prese	nt or collaborate.					
ourse Type	Lecture-b	ased course						
ourse Teaching	Activities	s	Details		No. of Hours			
Learning Activities	Lectures		or workshops		36			
· ·	Group wo		·	·				
			i ractical classess	Practical classess				
		/ Self study	Tooks and presention		50			
	Assessm		Tasks and preparation		30			
Assessment Methods and Weighting	Methods	3	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin			
	Assignme	ente	including practical writeups	20	CLO 1,2,3,4,5			
	∥∧əəiyiiiilt		including practical writeups		CLO 1,2,3,4,5			
	Evan:			50				
	Examinat							
	Project re		group communication project	30	CLO 2,3,4,5			
equired/recommended eading and	Project re		group communication project					

BIOC2600	Basic biochemistry (6 credits)	Academic Year	2019
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) (Dr C M Qian,Biomedical Sciences) (Dr C W Lee,Biomedical Sciences)		

	(Dr. M Ko	otaka,Biomedical Science	es)			
Course Objectives	aim to d students	This course is designed to present an overview of biochemistry of fundamental importance to the life process. We aim to develop appreciation of the basics in biochemistry as a common ground for science and non-science students to progress into their areas of specialization. Students intending to pursue further studies in Biochemistry and Molecular Biology will find this course particularly helpful.				
Course Contents & Topics	enzymes	Structure and functions of carbohydrates, lipids, nucleic acids, amino acids and proteins; enzymes and co enzymes; basic bioenergetics; key metabolic processes in a living cell; signaling across cell membranes; flow of enetic information				
Course Learning		essful completion of this	· · · · · · · · · · · · · · · · · · ·			
Outcomes	CLO 1		unctions of biomolecule			
	CLO 2		s of key metabolic proce			
	CLO 3		nce of signaling across	cell membranes		
	CLO 4	explain the flow of g				
Pre-requisites (and Co-requisites and Impermissible combinations)		ss in BIOC1600 or BIOL1110 or ENGG1207; and for students who have passed in BIOL2220 or MEDE2301 or BMED2301, or have already enrolled in the press.				
Offer in 2019 - 2020	Y 1s	t sem Offer in 2020 - 2	021 : Y	Examination	Dec	
Grade Descriptors (A+ to F)	A Demonstrates thorough and complete mastery of the entire range of knowledge and analytical skills as required for maximal attainment in all the course learning outcomes; excellence in critical thinking towards application of the knowledge in a range of contexts.					
	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.					
	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.					
	D Fail	D Demonstrates partial but limited command of knowledge and analytical skills as required for attainment of some of the course learning outcomes; limited evidence of critical thinking towards application of the knowledge in a range of contexts. Demonstrates little or no evidence of command of knowledge and analytical skills as required for attainment of the course learning outcomes; lacking in critical thinking towards application of the knowledge in a range of contexts.				
Course Type	Lecture h	pased course	in critical thinking towards ap	plication of the knowledge in a range of contex	is.	
Course Teaching	Activitie		Details		No. of Hours	
& Learning Activities	Lectures		Details		36	
	Tutorials				12	
		/ 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	
	Examina	tion		60	CLO 1,2,3,4	
	Test			20	CLO 1,2,3,4	
Required/recommended reading and online materials	Any othe	elson DL, Cox MM (2017) Lehninger Principles of Biochemistry, 7th ed. W.H. Freeman, New York. ly other Biochemistry textbooks, e.g. Berg JM, Tymoczko JL, GJ Gatto Jr, Stryer L (2019) Biochemistry, 9th ed. l.H. Freeman, New York.				
Additional Course Information				stry)" to students of the Faculty of E DE2301) is considered to have passed		

BIOC3601	Basic me	tabolism (6 credits)		Academic Ye	ar 2019			
Offering Department	Biomedica	Sciences		Quota	80			
Course Co-ordinator	Dr N S Wo	Dr N S Wong, Biomedical Sciences (nswong@hku.hk)						
Teachers Involved	(Dr N S W (Dr. L W L	heng,Biomedical Sciences) ong,Biomedical Sciences) m,Biomedical Sciences) val,Biomedical Sciences)						
Course Objectives	some of the applied to energy. The	e aims to provide foundation of e basic concepts in biochem explain one of the most imple course will lay the foundation we as a useful complement to	istry (specifically those ortant and cardinal issu on for the more advance	learned in BIOC1600 and E es of biological life: the acqued courses offered in the Bioc	IOC2600) could be uisition of metabolic			
Course Contents & Topics	organisms breakdowr also be co	This course focuses on the central metabolic pathways involved in the provision of energy needed by living organisms. Major metabolic pathways covered in this course include those that are involved in the synthesis and breakdown of glucose, glycogen, triacylglycerol, and amino acids. The metabolism of purines and pyrimidines will also be considered. Emphasis is on the understanding of the metabolic reactions involved and how they are regulated in relation to environmental cues. Metabolic derangements as a basis of diseases will also be discussed.						
Course Learning Outcomes	CLO 1 ex CLO 2 red CLO 3 dis	sful completion of this course, plain the significance of individ ognize the importance and the cuss the roles of enzymes in t scribe how metabolic process	ual steps in a metabolic e need for regulation of n he regulation of metabol	pathway netabolic pathways ic pathways	ogical conditions			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Bl	DC2600 or BIOL2220 or MEDE	2301	. , , , , ,	J			
Offer in 2019 - 2020	Y 1st	em Offer in 2020 - 2021 : Y		Examination	Dec			
Grade Descriptors (A+ to F)	A Demonstrates thorough and extensive knowledge and skills required for attaining all the course learning outcomes. Displays a strong analytical ability and logical thinking and is able to apply knowledge to a wide range of complex situations. Consistently able to communicate sophisticated ideas confidently and clearly.							
	В	Demonstrates substantial knowledge analytical ability and logical thinking complex ideas clearly.	and skills required for attaining and is sometimes able to a	pply knowledge to complex situation	ns. Often communicates			
	С	Demonstrates general but incomplet evidence of some analytical ability a situations. Sometimes communicates	nd logical thinking and is som					
	D	Demonstrates limited knowledge and	skills required for attaining s	ome of the course learning outcome	s. Shows poor analytical			

	ability and logical thinking and is rarely able to apply knowledge to solve problems. Has difficulty in expressing ideas coherently. Pail Demonstrates little or no evidence of knowledge and skills required for attaining the course learning outcomes. Lacks analytica ability and logical thinking and is unable to apply knowledge to solve problems. Ineffective at communicating ideas.					
Course Type	Lecture-base	Lecture-based course				
Course Teaching	Activities	Details		No. of Hours		
& Learning Activities	Lectures	glycogen meta	oneogenesis; pentose phosphate pathway bolis; lipid metabolis; purine and pyrimidine egulation and integration of metabolic	36		
	Tutorials	working on pro	working on problems relating to the lecture topics			
	Reading / Se	If 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	3 hrs examinat	ion 70	CLO 1,2,3,4		
Required/recommended reading and online materials	Devlin TM (20	Berg JM, Tymoczko JL, GJ Gatto Jr, Stryer L (2015) Biochemistry, 8th ed. W.H. Freeman, New York. Devlin TM (2011) Textbook of Biochemistry: with Clinical Correlations, 7th ed. John Wiley & Sons Inc, New York. Nelson DL, Cox MM (2017) Lehninger Principles of Biochemistry, 7th ed. W.H. Freeman, New York.				

BIOC3604	Essentia (6 credit	•	biochemistry and molecular biolo	gy Academic Yea	2019		
Offering Department	Biomedica	al Sciences		Quota	70		
Course Co-ordinator	Dr K M Ya	o, Biomedical Scier	nces (kmyao@hku.hk)				
Teachers Involved	(Dr K M Ya (Dr N S W (Dr. R C C (Prof D K	Wong,Biomedical Scier ao,Biomedical Scier ong,Biomedical Scie Chang,Biomedical Y Shum,Biomedical Zhou,Biomedical Sc	nces) ences) Sciences) Sciences)				
Course Objectives		· ·	overview of different experimental appro- ience in basic biochemical and molecular		ms, and to provide		
Course Contents & Topics	molecular, acids; sub	Basic concepts in experimental science; writing of lab notebooks; experimental approaches - genetic, biochemical, molecular, genomic and others; methods for isolation and analysis of carbohydrates, proteins, lipids and nucleic acids; subcellular fractionation; enzyme assays and spectrophotometry; basic nucleic acid manipulation - PCR, sitedirected mutagenesis, blotting and hybridization, cloning strategies, restriction mapping.					
Course Learning			his course, students should be able to:	,, 3			
Outcomes			nciples of various biochemical and moleci	ular techniques			
		<u> </u>	perimental approaches for achieving defin				
			iques to biochemical and molecular analy	•			
			rtance of maintaining a scientific laborator				
Pre-requisites		OC2600 or BIOL22		,			
(and Co-requisites and Impermissible combinations)							
Offer in 2019 - 2020	Y 2nd	sem Offer in 202	0 - 2021 : Y	Examination	May		
(A+ to F)	B C D	techniques with confide Demonstrates substan critical thinking and an appropriate conclusion Demonstrates general some evidence of crit competence and can s Demonstrates partial b critical thinking and a appropriate conclusion Demonstrates little or	but incomplete knowledge and skills required for a ical thinking and analytical skills. Conducts labour ometimes correctly appraise data and draw approprut limited knowledge and skills required for attaining nalytical skills. Displays poor laboratory skills and s. no evidence of knowledge and skills required for attaining no evidence of knowledge and skills required for attaining the conduction of the conduction of	riate and insightful conclusions to fithe course learning outcor iques with confidence and car ttaining most of the course lea atory skills and techniques to iate conclusions. I some of the course learning of techniques and is rarely abitaining the course learning out	is. nes. Shows evidence of appraise data to draw rring outcomes. Shows a satisfactory level of outcomes. Shows limited to use data to draw comes. Lacks analytica		
	ability and logical thinking. Displays ineffective lab skills and techniques and is unable to use data to draw appropr conclusions.						
Course Type	Lecture wi	th laboratory compo	onent course				
Course Teaching	Activities	•	Details		No. of Hours		
& Learning Activities	Lectures				12		
	Laborator	У			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		
				50	CLO 1,2,3		
Required/recommended reading and online materials	Cox MM, I Scopes R Springer-V Wilson K,	Examination 50 CLO 1,2,3 Cox MM, Doudna JA and O'Donnell M (2015) Molecular Biology: Principles and Practice, 2nd ed. Macmillan. Scopes RK (1994) Protein Purification: Principles and Practice. 3rd ed, Springer Advanced Texts in Chemistry, Springer-Verlag, New York. Wilson K, Walker KM (2010) Principles and Techniques of Biochemistry and Molecular Biology. 7th ed. Cambridge University Press, Cambridge.					

BIOC3605	Sequence bioinformatics (6 credits)	Academic Year	2019
Offering Department	Biomedical Sciences	Quota	50
Course Co-ordinator	Dr B C W Wong, Biomedical Sciences (bcwwong@hku.hk)		

Teachers Involved		(Dr B C W Wong,Biomedical Sciences) (Dr. T T Y Lam,Publich Health)				
Course Objectives	This course will examine existing bioinformatics tools for DNA and protein sequence analysis. The underlying principles of these analysis programs and services will be presented. Students will learn how to retrieve, analyze, and compare protein and DNA sequences using bioinformatics tools available on the World Wide Web.					
Course Contents & Topics			and discuss the following topics:			
	DNA and protein sequence database, protein family databases; information searching and retrieval - E SRS; Simple sequence analysis; sequence alignment: pair-wise alignment, multiple sequence a substitution matrices; sequence database searching: algorithm and parameters; sequence patterns and n profiles; phylogenetic analysis; gene prediction.					
Course Learning	On succes	ssful completion	of this course, students should b	e able to:		
Outcomes	CLO 1 se	earch and retrieve	e sequence information from biol	ogical databases		
		escribe the algo enstruction	rithms for pairwise and multiple	e alignments, BLAST search, and	phylogenetic trees	
	CLO 3 pe	erform sequence	analysis using EMBOSS packag	ge and other web-based analysis to	ols	
			om sequence alignments and BL			
	CLO 5 use results from various sequence analysis tools to annotate a biological sequence					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Bl	Pass in BIOC2600 or BIOL2220 or BBMS2003 or BBMS2007 or MEDE2301				
Offer in 2019 - 2020	Y 2nd	sem Offer in 2	2020 - 2021 : Y	Examination	May	
Grade Descriptors	Demonstrates thorough and complete mastery at an advanced level of extensive knowledge and skills required for attaining					
(A+ to F)	_			llent ability to apply bioinformatics skills in a		
	В	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.				
	С	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.					
Course Type	Lecture-ha	ased course	indic of no ability to apply biolinormatics t	skills in a range of context.		
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures	•	Details		36	
g	Tutorials				12	
		Self study			100	
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents		30	CLO 1,2,3,4,5	
	Examinat			70	CLO 2,4	
Required/recommended reading and		AD, Ouellette E Hoboken, N.J.	BFF (2005) Bioinformatics: A Pra	actical Guide to the Analysis of Ger	nes and Proteins, 3rd	

BIOC3606	Molecula	medicine (6 credits)		Academic Year	2019
Offering Department	Biomedical	Sciences		Quota	50
Course Co-ordinator	Prof D Y Ji	Biomedical Sciences (dyjin@hku.hk			
Teachers Involved	(Dr. S K Y (Dr. YQ So (Prof D Y J (Prof K S E	omedical Sciences) a,Biomedical Sciences) g,Biomedical Sciences) ,Biomedical Sciences) Cheah,Biomedical Sciences) am,Biomedical Sciences)			
Course Objectives	and infect	p-to-date knowledge of the moleculan with HIV and influenza viruses, ical, pharmaceutical and genomic re-	thereby preparing the stude		
Course Contents & Topics	molecular and tumou molecular gene thera	covers cell signaling in relation to hu erapeutics. Specific topics may inclusuppressor genes, genome instabilitopproaches to vaccine development, by, and nucleic acid therapeutics. E students taking this course.	de cell signaling, mouse mod y, HIV science, genetics and immune checkpoint therapy,	el of human dise pathogenesis of i stem cells and st	ases, oncogenes nfluenza viruses em cell therapy
Course Learning Outcomes	On success CLO 1 exp CLO 2 illus CLO 3 inte	ul completion of this course, students ain the molecular mechanisms under rate the application of molecular biolo rate and translate knowledge in mo vention	ying selected human diseases gy in medicine with examples		prevention and
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BIO	C2600 or BIOL2220 or MEDE2301			
Offer in 2019 - 2020	Y 2nd	em Offer in 2020 - 2021 : Y		Examination	May
Grade Descriptors (A+ to F)	A	isplays a comprehensive grasp of the key co rrors. Able to articulate clearly with example revention and intervention. Evidence of strong vidence for additional information beyond wha	s how knowledge in molecular biolo ganalytical and critical thinking when	gy can lead to new s	trategies in disease
	В	isplays a substantial and near-complete gra			

		relate knowledge in molecular biology to new strategies in disease prevention and intervention. Able to apply analytical a critical thinking skills when dealing with scientific data. Displays a general understanding of the key concepts underlying the molecular basis of human disease and is sometimes able 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.					
	С						
	D	Displays a limited understanding of the key concepts underlying the molecular basis of human disease and knowledge in molecular biology to new strategies in disease prevention and intervention. Evidence of weak thinking skills when dealing with scientific data.					
	Fail			e key concepts underlying the molecular basis rategies. No evidence of analytical or critical thi			
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		
	Examinati	on		80	CLO 1,2,3		
	Test			20	CLO 1,2,3		
Required/recommended reading and online materials	Alberts et		the Cell 6th ed., 2015	. is available at NCBI Books) (4th ed. is available at NCBI Books)			

BIOC3999	Directed	d studies in bioche	emistry (6 credits)	Academic Yea	ar 2019	
Offering Department		al Sciences		Quota	36	
Course Co-ordinator	Prof J D F	Huang, Biomedical Sci	ences (jdhuang @hku.hk)			
Teachers Involved	(All academic staff in Biochemistry Major,Biomedical Sciences) (Prof J D Huang,Biomedical Sciences)					
Course Objectives	To enhance students knowledge of a particular topic and the students self-directed learning and critical thinking skills.					
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	On successful completion of this course, students should be able to:					
Outcomes	CLO 1	critically appraise resea	arch literature in a specific area of bi	ochemistry and molecular b	iology	
	CLO 2	examine the theoretica	I or experimental basis for existing of	oncepts		
	CLO 3	dentify questions and	evaluate issues for further research	development		
Pre-requisites (and Co-requisites and Impermissible combinations)	including This caps	BIOC2600 and BIOL34 tone course is for Bioc	Ivanced level (level 3 or 4) disciplina 401. Phemistry Major students only. Towed to take this capstone course is	•	Biochemistry Major	
Offer in 2019 - 2020			nmer Offer in 2020 - 2021 : Y	Examination	No Exam	
Grade Descriptors (A+ to F)	B C D	understanding of the sele relevant issues emerging skills. Communicates the time-management skills a Produces a coherent app contextualize many of the study. Works constructive findings to a broader auche's own learning. Produces a reasonable a to contextualize a few of issues emerging from the skills. Communicates the time-management and se Produces a superficial apcontextualize a few of the from the study. Works re Displays weak communi reflection skills. Fails to appraise the bid contextualize the ideas we in isolation, thus failing to	ed and detailed appraisal of the biochem cated topic. Able to contextualize all the idea of from the study. Works proactively with a significant of the biochemical from the study. Works proactively with a significant of the biochemical literature, display to deas within a personal framework of knowled with a supervisor to enhance understance tience and responds knowledgeably to most praisal of the biochemical literature, display the ideas within a personal framework of knowledgeably to most praisal of the biochemical literature, display the ideas within a personal framework of knowledgeably to most of from the control of the study. Works with a supervisor and other of findings to a broader audience with reason of freelection skills. Operaisal of the biochemical literature, display the ideas within a personal framework of knowledge of its open of the propersion of the supervisor and other co-work cation skills when presenting the findings occurred the progress in understanding and scient a broader audience. No time-managements	s within a personal framework of I upervisor to enhance understandine way and responds knowledgeablyning. Ing a sound understanding of the edge and identify some relevant is ling and scientific writing skills. Claquestions. Able to time-manage eving an adequate understanding of wledge and makes some attempt too-workers to improve understandinable clarity and responds to most ving a limited understanding of the ledge but unable to identify any rekers to develop understanding and to a broader audience. Poor time older the properties of the second properties of the s	mowledge and evaluate and scientific writing y to questions. Excellent selected topic. Able to sues emerging from the early communicates the ffectively and reflect on the selected topic. Able to identify some relevant and scientific writing t questions. Acceptable selected topic. Able to elevant issues emerging d scientific writing skills. e-management and self-	
Course Type	Project-ha	ased course	a broader audience. No time-management s	kills of ability to self-reflect.		
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities		Self study	at least 120 hours on the project		120	
Assessment Methods	Methods	•	Details	Weighting in final	Assessment	
and Weighting	Wethous		Details	course grade (%)	Methods to CLO Mapping	
	Dissertati	ion	including mind map (10%)	60	CLO 1,2,3	
	Oral pres	entation		25	CLO 1,2,3	
	Research	report	Supervisor comments	15	CLO 1,2,3	
Required/recommended reading and online materials	as sugges	sted by project supervi	sors			

BIOC4610	Advanced biochemistry (6 credits)	Academic Year	2019
Offering Department	Biomedical Sciences	Quota	50

Course Co-ordinator			, , , , ,	Dr K M Yao, Biomedical Sciences (<i>kmyao</i> @ <i>hku.hk)</i> Dr K M Yao,Biomedical Sciences)				
Teachers Involved								
		nan,Biomedical Scie Y Shum,Biomedical						
		Huang,Biomedical S						
Course Objectives				nding of molecular and cellular sig	naling in multicellula			
	organisms	organisms. This course is particularly useful for students interested in research or intending to develop a care biomedical sciences.						
Course Contents			I transduction mechanisms					
& Topics	signaling	pathways that contr	ol gene expression: receptors	Protein-coupled receptors: struct s that activate protein tyrosine kin eceptor serine kinases that activate	nases, the Ras/MAF			
	The micro		•	e actin cytoskeleton; myosin; the i	ntermediate filament			
	Cytoskelei	ion and cell benavio	r, cytoskeletori and intracellula	ii iiansport iii neuron				
		trafficking and sorting						
				major protein sorting pathways; of vesicular traffic; protein sorting a				
	D. Cell-ce	ll and cell-matrix adh	nesion					
				I their adhesion molecules; cadh				
				gulation of signaling molecules by	ECM			
Course Learning		•	nis course, students should be					
Outcomes			· ·	tion mechanisms that mediate cel	lular communication			
	to achieve a plethora of cellular responses CLO 2 illustrate the controls of the metabolic and cellular regulation based on their understanding of cytoskeleton							
				•	• ,			
	as target of signal transduction, protein trafficking and sorting pathways, and cell-cell and cell-matrix adhesion							
	CLO 3 de	evelop critical thinkin	g and analytical skills					
Pre-requisites	Pass in B	IOC3601 or BIOL340	01 or BIOL3402 or BIOL3404					
(and Co-requisites and Impermissible combinations)								
Offer in 2019 - 2020	Y 1st	sem Offer in 2020	- 2021 · Y	Examination	Dec			
Grade Descriptors	Α	Demonstrate thorough	and complete mastery at an advanced	d level of extensive knowledge and skills re	equired for attaining all the			
(A+ to F)		knowledge to a wide ra	nge of complex, familiar and unfamilia					
	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 critical thinking and analytical skills, and ability to apply knowledge to familiar and some unfamiliar situations.						
	С			dge and skills required for attaining mos				
	D	outcomes. Show evidence of some critical thinking and analytical skills, 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 critical thinking, but with limited analytical skills. 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 critical thinking and analytical skills. Show very little or no ability to apply knowledge to solve problems.							
Course Type	Lecture-ba	ased course						
Course Teaching	Activities	3	Details		No. of Hours			
& Learning Activities	Lectures							
	Tutorials				12			
		Self study			100			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignme	ents		30	CLO 1,2,3			
	Examinat			70	CLO 1,2,3			
Required/recommended reading and			ar Cell Biology, 8th ed. Freema ar Biology of the Cell, 6th ed. 0	n (New York) & Macmillan (Engla	nd).			

BIOC4611	Advanced biochemistry II (6 credits)	Academic Year	2019
Offering Department	Biomedical Sciences	Quota	50
Course Co-ordinator	Prof D Chan, Biomedical Sciences (chand@hku.hk)		
Teachers Involved	(Dr C M Qian,Biomedical Sciences) (Dr J Tanner,Biomedical Sciences) (Dr M Kotaka,Physiology) (Dr N S Wong,Biomedical Sciences) (Prof D Chan,Biomedical Sciences)		
Course Objectives	This course is aim at providing students with an up-to-date knowledge of prot structure and disease; realizing the importance of kinetics in cellular functional technological advances in the characterization of macromolecules.		
Course Contents & Topics	Topics including protein folding and misfolding in diseases; conformation of prochanges in protein function; catalytic mechanisms of enzymes and enzyme characterization of macromolecules using X-ray crystallography, nuclear spectroscopy methods; protein engineering and therapeutic approaches targeting	kinetics; biomolec magnetic resona	ular interactions; ince and other
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 describe how protein structures inform functions CLO 2 recognize the roles of enzyme kinetics in cellular functions CLO 3 derive structural information of macromolecules from experimental data	•	

Course Type Course Teaching & Learning Activities Assessment Methods	Lecture-lectures Lectures Tutorials	organizational skill of in based course es s s s y / Self study		ing knowledge to the design of scientific m		
Course Teaching & Learning Activities	Lecture-lectures Lectures Tutorials	organizational skill of in based course es	superficial demonstration of applyi formation for presentation and com	ing knowledge to the design of scientific m	No. of Hours 36 12	
Course Teaching	Lecture-k Activitie	organizational skill of in based course es s	superficial demonstration of applyi formation for presentation and com	ing knowledge to the design of scientific m	No. of Hours	
Course Teaching	Lecture-l	organizational skill of in based course es	superficial demonstration of applyi formation for presentation and com	ing knowledge to the design of scientific m	No. of Hours	
	Lecture-l	organizational skill of in	superficial demonstration of applyi formation for presentation and com	ing knowledge to the design of scientific m	nethodológies; insufficient	
Course Type		organizational skill of in	superficial demonstration of applyi	ing knowledge to the design of scientific m		
			superficial demonstration of applyi	ing knowledge to the design of scientific m		
	Fail			nd communication. tion; lack of ability to recognize mechanisms		
	D	·				
	С	interpretation of data; systematic organization	some capable demonstration of of information for presentation and		ntific methodologies and	
	В	interpretation of data; c systematic organization	apable demonstration of applying k of information for presentation and		ologies; and cohesive and	
Grade Descriptors (A+ to F)	A	enzyme function and methodologies and coh	interpretation of data; effectual esive, systematic and creative orga	nforms function; clear evidence of ability to demonstration of applying knowledge to unization of information for presentation and o	the design of scientific communication.	
Offer in 2019 - 2020		ffer in 2020 - 2021 : N		Examination		
(and Co-requisites and Impermissible combinations)	Pass in E	Pass in BIOC4610, or already enrolled in this course				
Pre-requisites	Pass in E	Pass in BIOC3601; and BIOL3404 or CHEM2441; and				
		CLO 4 apply their knowledge on protein engineering and therapeutics, and on experimental designs in basic and applied research				

BIOC4612	Molecular biology of the gene (6 credits) Academic Ye				emic Year	2019		
Offering Department	Biomedic	Siomedical Sciences Quota 50					50	
Course Co-ordinator	Prof K S	Prof K S E Cheah, Biomedical Sciences (hrmbdkc@hku.hk)						
Teachers Involved	(Dr R K I (Prof K S	(Dr K M Yao,Biomedical Sciences) (Dr R K Ng,Biomedical Sciences) (Prof K S E Cheah,Biomedical Sciences) (Prof. ZJ Zhou,Biomedical Sciences)						
Course Objectives	To provide an up-to-date knowledge of molecular biology, especially with respect to the regulation of eukaryotic gene expression.							
Course Contents & Topics	function.	a comprehensive Through this countries transcription will be	rse an ui	covering many d nderstanding of how d.	etailed molecul v gene expressi	ar aspects of q on can be regula	gene regul ated at leve	ation and gene ls of transcriptio
Course Learning	On succe	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 d	describe the mecha	anisms fo	or regulation of tran	scription, RNA p	rocessing and tr	ranslation ir	n eukaryotes
	n	nultiple levels		ostasis can be mair				
			, ,	ene expression regu		ells and develop	mental prod	esses
				ts in gene regulation				
Pre-requisites (and Co-requisites and Impermissible	Pass in E	Pass in BIOC3601 or BIOL3401 or BIOL3402 or BIOL3404 or BBMS2007						
combinations)								
•	Y 2n	nd sem Offer in 2	2020 - 20	21 : Y		Exam	nination	May
combinations)	Y 2n	Demonstrates a de	eep and co	omprehensive understan		on of eukaryotic ger	ne expression	and its relevance to
combinations) Offer in 2019 - 2020 Grade Descriptors		Demonstrates a de disease and effect experimental data f Demonstrates a co	eep and co tively relate from gene i ompetent o e to link the	omprehensive understan	evelopmental proce	on of eukaryotic ger sses. Uses skill and	ne expression d insight to a e expression	and its relevance to nalyse and interpre and its relevance to
combinations) Offer in 2019 - 2020 Grade Descriptors	A	Demonstrates a de disease and effect experimental data f Demonstrates a condisease and is able gene regulation students a barbonstrates a barb	eep and co tively relate from gene in competent of the to link the idies. asic under or relate the	omprehensive understantes the knowledge to de regulation studies. grasp of the key concele knowledge to development of the regulate knowledge to develope knowledge to develope to develo	evelopmental proce ots in the regulation nental processes. Co ion of eukaryotic o	on of eukaryotic ger sses. Uses skill and n of eukaryotic gene orrectly analyses and ene expression and	ne expression d insight to a e expression d interprets ex d its relevanc	and its relevance to nalyse and interpre and its relevance to operimental data from the to disease and is
combinations) Offer in 2019 - 2020 Grade Descriptors	В	Demonstrates a de disease and effect experimental data f Demonstrates a co disease and is able gene regulation stu Demonstrates a book sometimes able to experimental data f Demonstrates a si	eep and co tively relate from gene in competent g to to link the idies. asic under or relate the from gene in implistic kr	omprehensive understantes the knowledge to de regulation studies. grasp of the key concele knowledge to development of the regulate knowledge to develope knowledge to develope to develo	evelopmental proce- ots in the regulation nental processes. Common of eukaryotic commental processes.	on of eukaryotic ger sses. Uses skill and n of eukaryotic gene orrectly analyses and ene expression and Displays a limited ene expression and	ne expression d insight to a e expression d interprets ex d its relevanc capacity to a d rarely relate	and its relevance to nalyse and interpre and its relevance to perimental data from e to disease and is nalyse and interpre- s the information to
combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	A B C D Fail	Demonstrates a de disease and effect experimental data f Demonstrates a co disease and is able gene regulation stu Demonstrates a bis sometimes able to experimental data f Demonstrates a si developmental prostudies. Demonstrates inco developmental processories	eep and co tively relate from gene in competent of e to link the idies. asic under o relate the from gene in implistic knows.	omprehensive understances the knowledge to de regulation studies. grasp of the key concept knowledge to develope the knowledge to develope restanding of the regulate e knowledge to develope regulation studies.	evelopmental proce- ots in the regulatio- tental processes. Co- tion of eukaryotic go- mental processes. tion of eukaryotic go- kills and is rarely a the regulation of go-	on of eukaryotic gersses. Uses skill and not eukaryotic genorrectly analyses and ene expression and Displays a limited ene expression and to interpret expenses on another to interpret expenses on and the expression and gene expression and gene expression and gene expression and the expression and	ne expression d insight to a e expression d interprets ex d its relevanc capacity to a d rarely relate rimental data d is unable to	and its relevance to nalyse and interpre and its relevance to operimental data from the to disease and is nalyse and interpre- s the information to from gene regulation
combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type	A B C D Fail Lecture-t	Demonstrates a de disease and effect experimental data f Demonstrates a cc disease and is able gene regulation stu Demonstrates a bs sometimes able to experimental data f Demonstrates a is developmental proc studies. Demonstrates inco developmental proc based course	peep and co tively relate from gene in competent of the to link the dies. asic under o relate the from gene in implistic known cesses. Discontinuos.	omprehensive understanes the knowledge to de regulation studies. grasp of the key concele knowledge to development of the regulation studies. The regulation studies with the regulation studies of the regulation studies. The regulation studies incorrect knowledge of the regulation studies incorrect knowledge of the regulation studies.	evelopmental proce- ots in the regulatio- tental processes. Co- tion of eukaryotic go- mental processes. tion of eukaryotic go- kills and is rarely a the regulation of go-	on of eukaryotic gersses. Uses skill and not eukaryotic genorrectly analyses and ene expression and Displays a limited ene expression and to interpret expenses on another to interpret expenses on and the expression and gene expression and gene expression and gene expression and the expression and	ne expression d insight to a e expression d interprets ex d its relevanc capacity to a d rarely relate rimental data d is unable to	and its relevance to nalyse and interpre and its relevance to operimental data from the to disease and is nalyse and interpre to the information to from gene regulation
combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching	A B C D Fail Lecture-t Activities	Demonstrates a de disease and effect experimental data f Demonstrates a cc disease and is able gene regulation stu Demonstrates a be sometimes able to experimental data f Demonstrates a bi developmental procupulations. Demonstrates inco developmental procupulation developmental procupulations and developmental procupulations.	peep and co tively relate from gene in competent of the to link the dies. asic under o relate the from gene in implistic known cesses. Discontinuos	omprehensive understances the knowledge to de regulation studies. grasp of the key concept knowledge to develope restanding of the regulate knowledge to develope regulation studies. In the regulation studies where the knowledge of the regulation studies where the knowledge of the regulation studies where	evelopmental proce- ots in the regulatio- tental processes. Co- tion of eukaryotic go- mental processes. tion of eukaryotic go- kills and is rarely a the regulation of go-	on of eukaryotic gersses. Uses skill and not eukaryotic genorrectly analyses and ene expression and Displays a limited ene expression and to interpret expenses on another to interpret expenses on and the expression and gene expression and gene expression and gene expression and the expression and	ne expression d insight to a e expression d interprets ex d its relevanc capacity to a d rarely relate rimental data d is unable to	and its relevance to nalyse and interpretand its relevance to operimental data from the to disease and is nalyse and interpretand interpretand in the information to relate the ideas to the No. of Hours
combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching	A B C D Fail Lecture-t Activitie Lectures	Demonstrates a de disease and effect experimental data f Demonstrates a cc disease and is able gene regulation stu Demonstrates a be sometimes able to experimental data f Demonstrates a si developmental proc studies. Demonstrates inco developmental proc based course	peep and co tively relate from gene in competent of the to link the dies. asic under o relate the from gene in implistic known cesses. Discontinuos	omprehensive understanes the knowledge to de regulation studies. grasp of the key concele knowledge to development of the regulation studies. The regulation studies with the regulation studies of the regulation studies. The regulation studies incorrect knowledge of the regulation studies incorrect knowledge of the regulation studies.	evelopmental proce- ots in the regulatio- tental processes. Co- tion of eukaryotic go- mental processes. tion of eukaryotic go- kills and is rarely a the regulation of go-	on of eukaryotic gersses. Uses skill and not eukaryotic genorrectly analyses and ene expression and Displays a limited ene expression and to interpret expenses on another to interpret expenses on and the expression and gene expression and gene expression and gene expression and the expression and	ne expression d insight to a e expression d interprets ex d its relevanc capacity to a d rarely relate rimental data d is unable to	and its relevance to nalyse and interpretand its relevance to the perimental data from the to disease and is nalyse and interpreta the information to from gene regulation or relate the ideas to the total state of the total
combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching	B C D Fail Lecture-t Activitie Lectures Tutorials	Demonstrates a de disease and effect experimental data f Demonstrates a cc disease and is able gene regulation stu Demonstrates a become sometimes able to experimental data f Demonstrates a si developmental proc studies. Demonstrates noo developmental proc de	peep and co tively relate from gene in competent of the to link the dies. asic under o relate the from gene in implistic known cesses. Discontinuos	omprehensive understanes the knowledge to de regulation studies. grasp of the key concele knowledge to development of the regulation studies. The regulation studies with the regulation studies of the regulation studies. The regulation studies incorrect knowledge of the regulation studies incorrect knowledge of the regulation studies.	evelopmental proce- ots in the regulatio- tental processes. Co- tion of eukaryotic go- mental processes. tion of eukaryotic go- kills and is rarely a the regulation of go-	on of eukaryotic gersses. Uses skill and not eukaryotic genorrectly analyses and ene expression and Displays a limited ene expression and to interpret expenses on another to interpret expenses on and the expression and gene expression and gene expression and gene expression and the expression and	ne expression d insight to a e expression d interprets ex d its relevanc capacity to a d rarely relate rimental data d is unable to	and its relevance to nalyse and interpretand its relevance to the perimental data from the to disease and is nalyse and interpreta in the information to relate the ideas to the total state of the total s
combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching & Learning Activities	A B C D Fail Lecture-t Activitie Lectures Tutorials Reading	Demonstrates a de disease and effect experimental data f Demonstrates a cc disease and is able gene regulation stu Demonstrates a cc disease and is able gene regulation stu Demonstrates a bit of the sometimes able to experimental data f Demonstrates a si developmental processure developmental processed course passed course passed course passed course passed study	sep and co dively relate from gene rompetent g e to link the dies. asic under o relate the from gene e implistic kr coesses. Dis omplete or cesses. Un	omprehensive understances the knowledge to de regulation studies. grasp of the key concept knowledge to development of the regulation of the regulation studies. In the regulation studies were splays weak analytical sincorrect knowledge of the regulation studies. In the regulation studies weak analytical sincorrect knowledge of able to analyse or interpublication.	evelopmental proce- ots in the regulatio- tental processes. Co- tion of eukaryotic go- mental processes. tion of eukaryotic go- kills and is rarely a the regulation of go-	on of eukaryotic gersses. Uses skill and not eukaryotic genorrectly analyses and ene expression and Displays a limited ene expression and ble to interpret expense expression and a from gene regulation.	ne expression d insight to a e expression id interprets ex d its relevanc capacity to a d rarely relate rrimental data d is unable to ion studies.	and its relevance to nalyse and interpretand its relevance to operimental data from the to disease and is nalyse and interpretain the information to relate the ideas to the i
combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching & Learning Activities Assessment Methods	B C D Fail Lecture-t Activitie Lectures Tutorials	Demonstrates a de disease and effect experimental data f Demonstrates a cc disease and is able gene regulation stu Demonstrates a cc disease and is able gene regulation stu Demonstrates a bit of the sometimes able to experimental data f Demonstrates a si developmental processure developmental processed course passed course passed course passed course passed study	sep and co dively relate from gene rompetent g e to link the dies. asic under o relate the from gene e implistic kr coesses. Dis omplete or cesses. Un	omprehensive understanes the knowledge to de regulation studies. grasp of the key concele knowledge to development of the regulation studies. The regulation studies with the regulation studies of the regulation studies. The regulation studies incorrect knowledge of the regulation studies incorrect knowledge of the regulation studies.	evelopmental proce- ots in the regulation tental processes. Of ion of eukaryotic gomental processes. ion of eukaryotic gomental processes, ion of eukaryotic gomental processes, identification of gomental processes and is rarely a	on of eukaryotic gersses. Uses skill and not eukaryotic genorrectly analyses and ene expression and Displays a limited ene expression and to interpret expenses on another expenses on another to interpret expenses on another	ne expression d insight to a e expression d interprets ex d its relevanc capacity to a d rarely relate rrimental data d is unable to ion studies.	and its relevance to nalyse and interpretand its relevance to perimental data from the total data from the state of the information to perimental data from the state of the information to relate the ideas to the information to relate the ideas to the information to perimental data from the ideas to the information to perimental data from the ideas to the information to perimental data from the ideas to th
combinations) Offer in 2019 - 2020 Grade Descriptors	A B C D Fail Lecture-t Activitie Lectures Tutorials Reading	Demonstrates a de disease and effect experimental data f Demonstrates a co disease and is able gene regulation stu Demonstrates a to experimental data f Demonstrates a si developmental proc studies. Demonstrates inco developmental proc studies. Demonstrates inco developmental proc studies. Demonstrates inco developmental proc based course	sep and co dively relate from gene rompetent g e to link the dies. asic under or relate the from gene e implistic kr cresses. Dis organical services of the organical services of the organical services of the organical services of the organical services of the organical services of the organical services of the organical services of the organical services of the organical services of the organical services of the organical services of the organical services of the organical services of the organical services of the organical services	omprehensive understances the knowledge to de regulation studies. grasp of the key concept knowledge to development of the regulation of the regulation studies. In the regulation studies were splays weak analytical sincorrect knowledge of the regulation studies. In the regulation studies weak analytical sincorrect knowledge of able to analyse or interpublication.	evelopmental proce- ots in the regulation tental processes. Of ion of eukaryotic gomental processes. ion of eukaryotic gomental processes, ion of eukaryotic gomental processes, identification of gomental processes and is rarely a	on of eukaryotic gersses. Uses skill and not eukaryotic genorrectly analyses and ene expression and Displays a limited ene expression and ble to interpret expense expression and a from gene regulation.	ne expression d insight to a e expression d interprets ex d its relevanc capacity to a d rarely relate rrimental data d is unable to ion studies.	and its relevance to nalyse and interpretand its relevance to perimental data from the to disease and is nalyse and interpretand interpretand in the interpretand in t

Watson JD et al. (2014) Molecular Biology of the Gene, 7th ed. Pearson/Benjamin Cummings, San Francisco.

BIOC4613	Advance credits)	ed techniques in bio	chemistry & molecular biolog	y (6 Academic Ye	2019	
Offering Department	Biomedica	al Sciences		Quota	70	
Course Co-ordinator	Prof D Cha					
Teachers Involved	(Dr B C W Wong,Biomedical Sciences) (Dr J A Tanner,Biomedical Sciences) (Dr. B Gao,Biomedical Sciences) (Dr. M C H Cheung,Biomedical Sciences) (Prof D Chan,Biomedical Sciences)					
Course Objectives	This is an advanced experimental-based course for students majoring in Biochemistry and related disciplines. The aim is to provide the necessary training for students to pursuit postgraduate research education and potentic employment in a scientific laboratory/industry environment.					
Course Contents & Topics	Hands-on	experiments using a atics. Students will also	advanced techniques in biochem have the opportunity to familiarize t			
Course Learning	On succes	ssful completion of this c	ourse, students should be able to:			
Outcomes	bio	ology	s of current advanced techniques co	•	nistry and molecula	
			echniques in other novel experiment	al settings		
		itically evaluate experime				
		•	hes to test or validate hypotheses			
			tal report using correct terminologies	and nomenclatures		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BI	OC3604				
Offer in 2019 - 2020	Y 1st	sem Offer in 2020 - 20	21 : Y	Examination	Dec	
Grade Descriptors (A+ to F)	В	Comprehensive and in-depth understanding of the principles and applications of advance technologies in biochemistry; clear and effective ability to identify problems and generate solutions relating to applications in a laboratory setting; clear evidence of ability to evaluate experimental data; cohesive and systematic planning and organization of experimental design and presentation of experimental data. Comprehensive understanding of the principles and applications of advance technologies in biochemistry; clear ability to identify problems and generate solutions relating to applications in a laboratory setting; evidence of ability to evaluate experimental data;				
	С	systematic planning and organization of experimental design and presentation of experimental data. Sound understanding of the principles and applications of advance technologies in biochemistry; sound ability to identify problems and generate solutions relating to applications in a laboratory setting; some evidence of ability to evaluate experimental data; satisfactory planning and organization of experimental design and presentation of experimental data.				
	D	data; satisfactory planning and organization of experimental design and presentation of experimental data. Superficial understanding of the principles and applications of advance technologies in biochemistry; limited ability to identify problems and generate solutions relating to applications in a laboratory setting; some awareness of ability to evaluate experimental data; some evidence of planning and organization of experimental design and presentation of experimental data.				
	Fail Lack of understanding of the principles and applications of advance technologies in biochemistry; lack of ability to identify problems and generate solutions relating to applications in a laboratory setting; lack of evidence of ability to evaluate experimental data; insufficient evidence of planning and organization of experimental design and presentation of experimental data.					
Course Type	Lecture wi	ith laboratory component	t course			
Course Teaching	Activities	3	Details		No. of Hours	
& Learning Activities	Lectures				12	
	Laborator	ν			72	
	Tutorials	•			6	
	Reading / Self study				76	
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents		50	CLO 1,2,3,4,5	
	Examinati		One 3-hour written examination	50	CLO 1,2,3,4	
Required/recommended reading and online materials		Walker KM (2010) Princ Press, Cambridge.	iples and Techniques of Biochemist	ry and Molecular Biology		

BIOC4966	Biochen	nistry internship (6 credits)	Academic Year	2019
Offering Department	Biomedica	al Sciences	Quota	20
Course Co-ordinator	Prof J D F	luang, Biomedical Sciences (jdhuang@hku.hk)		
Teachers Involved	١,	mic staff in Biochemistry Major,Biomedical Sciences) Huang,Biomedical Sciences)		
Course Objectives	study. Th	se aims to offer students the opportunities to gain work experience in e workplace learning experience would be of great benefit to the the study to the real work environments. Students have to take on a nin the University or outside the University arranged by the School/Dep	students to apply t least 160 hours o	their knowledge
Course Contents & Topics	various ta 2. Outside be superv	the university: The student will be supervised by a staff member (S sks as instructed by the Supervisor. the university: The student will work in an external agency related to rised under a staff member of the external agency (the External Supnt/School of the student (the Internal Supervisor).	the major of study	The student will
Course Learning Outcomes On successful completion of this course, students should be able to: CLO 1 recognize the strengths and limitations of their area of training or expertise CLO 2 examine the role of science in our society CLO 3 acquire problem-solving skills to solve novel and ill-defined problems				

Pre-requisites (and Co-requisites and Impermissible combinations)	including E This capst	BIOC3604. one course is for E	Siochemistry Majo	, .	ry core/elective courses in their year 3 study.	Biochemistry Major
Offer in 2019 - 2020	Y 1st	sem 2nd sem	Summer Offer in	2020 - 2021 : Y	Examination	No Exam
Grade Descriptors (Pass /Pass with distinction /Fail)	Pass	assigned by supervisithe job. Successfully	sor(s). Establishes effe fulfills the requiremen	ctive collaboration and com ts set out in the Course Des	Illy handles and carries out the warmunication with supervisor(s), coscription regarding working hours at performance in the above wou	olleagues, and clients in , written and oral report,
	Fail	by supervisor(s). Fail	ls to establish effective the requirements set	collaboration or communication	andle or carry out the work require ation with supervisor(s), other coll on regarding working hours, wri	leagues, or clients in the
Course Type	Internship					
Course Teaching	Activities	i	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)		
Assessment Methods and Weighting	Methods		Details		Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Oral prese	entation			30	CLO 1,2,3
	Superviso	r's feedback			30	CLO 3
	Written re	port			40	CLO 1,2,3
Additional Course Information	be record interested Enrolment	ed on the student to enrol in this cou of this course is r	t's transcript. This urse should contac not conducted via	course will be asses to the Department to ob the online course sele	apstone requirement. Detased on "Pass/Fail" basis. Itain the approval. Itain system and should befrom the course coordinato	Students who are e made through the

BIOC4999	Biochen	nistry project (12 ci	redits)	Academic Ye	ar 2019		
Offering Department	Biomedica	al Sciences		Quota	25		
Course Co-ordinator	Dr N S Wo	ong, Biomedical Scienc	es (nswong@hku.hk)				
Teachers Involved	,	mic staff in Biochemisti ong,Biomedical Scienc	ry Major,Biomedical Sciences) ces)				
Course Objectives	reasoning teamwork	To enable students to acquire the basic skills in scientific research emphasizing on critical and analytical reasoning, free and creative thinking, scholarly communication (both orally and in writing), research integrity, teamwork and time management. The course is particularly useful for those students who intend to pursue a career in life science either in research or industry.					
Course Contents & Topics	Experimer Critical ap Formulation Design of	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.					
Course Learning	On succes	ssful completion of this	course, students should be able	to:			
Outcomes	CLO 1 d	escribe recent research	n development in a defined area	of biochemistry and molecula	r biology		
			stions and design experiments to	•			
			imental techniques to solve rese	arch problems			
		nanage and interpret ex	•				
Pre-requisites			g skills and logically report their re vanced level (level 3 or 4) discip		B:		
(and Co-requisites and Impermissible combinations)	BIOC4610 This capst	and BIOC4613 can be cone course is for Bioch	rses: BIOL3401, BIOC3601, BIO e taken concurrently with this cou nemistry Major students only, pened to students who are in yea	ırse.			
Offer in 2019 - 2020		ar long Offer in 2020 -		Examination	No Exam		
Grade Descriptors (A+ to F)	A	9 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1					
	В	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	, , , , , ,					
	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.						
Course Type	Project-ba	sed course	-				
Course Teaching	Activities	i	Details		No. of Hours		
& Learning Activities	Reading /	ding / Self study			240		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods		

	Dissertation		60	to CLO Mapping CLO 1,2,3,4,5
	Oral presentation	including continuous assessment (15%)	40	CLO 5
Required/recommended reading and online materials	None prescribed			'

	From molecules to cells (6 credits) Academic Year					
Biological Sciences Quota Prof B K C Chow, Biological Sciences (bkcc@hku.hk)						
how, Biological Scie	nces (bkcc@hku.hk)					
Biological Sciences)					
g,Biological Science	,					
en,Biological Sciend						
Chow,Biological Scie	,					
	c conceptual understanding of th					
studies in applied biology, genetics, biochemistry, nutrition, biotechnology, microbiology, plant and animal						
physiology and developmental biology.						
An issue-based approach will be adopted to enable students to integrate basic concepts in molecules and cells and						
to inspire further investigation through the exploration of contemporary biological issues. The course is divide 4 parts and the following is a list of some of the questions to be asked and discussed:						
	children resemble their parents?		hiology2 What are			
nenetic inheritance?	What determines gender and s	exuality? Why is that children	resemble but no			
	nappen if some genes are non-ful					
	diets related to good health? Do		tary requirements			
live without plants?						
ell division: What ar	re the common features in a c	ell? How do cells communica	ite and assemble			
	organs? What is a cell cycle and		ppens if cell-cycle			
•	newly formed cells commit them					
	n biology: To what extent can ge					
•	ed food safe for consumption? W	nat are the Genome Projects a	and wny nave tney			
nt?	course, students should be able	to:				
	· · · · · · · · · · · · · · · · · · ·		se evaressed in a			
organism	hips between genes in a genom	e and the inhelited pheliotype	es expresseu iii a			
	ciple on how mutation of a gene c	an lead to the development of	a nenetic disease			
	ce of dietary intake of biomolecule					
	in a cell division and that dist					
opment		and and on the process may				
CLO 5 describe concepts used in genetic engineering						
	of genetic engineering in gene the	erapy and production of genetic	ally modified food			
	s course are expected to have					
	t HKDSE Chemistry, they are ϵ					
		-	•			
nts having taken any	y level 2 (or above) Biomedical S	ciences (BBMS) or Biochemisti	y (BIOC) course.			
n 2nd sem Offer		Examination	Dec May			
	astery at an advanced level of extensive					
	alytical and critical abilities and logical the of complex, familiar and unfamiliar site					
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.						
C 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.						
	evidence of command of knowledge recies, logical and coherent thinking. Show					
	inimally effective or ineffective. Writings					
theories. Writings are irre	elevant or superficial.					
d course						
	Details		No. of Hours			
			36			
			12			
elf study			100			
	Details	Weighting in final	Assessment			
		course grade (%)	Methods			
			to CLO Mapping			
		60	CLO 1,2,3,4,5,6			
		40	CLO 1,2,3,4,5,6			
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BIOL1111	Introductory microbiology (6 credits)	Academic Year	2019
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 r natural environment, disease and public health, food production and spoilage a		
Course Contents & Topics	Evolutionary diversity of bacteria, archaea, eukarya and viruses; Metabolic s Microbial ecology, marine microbiology, terrestrial microbiology; Microbial inter human microbiome; Medical microbiology and immunology; Biotechnology a fermentations.	actions with animal	s and plants; The
Course Learning	On successful completion of this course, students should be able to:		

Outcomes	CLO 1	1 describe the key features of the major microbial phyla and place them in an evolutionary context					
		explain the major physiolo compare the similarities an			nd eukaryotic m	icroorganisms and	
		identify the microorganism food production and spoila		e in ecological process	es, human dise	ase and medicine,	
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL						
Offer in 2019 - 2020	N O	Offer in 2020 - 2021 : N			Examination		
Grade Descriptors (A+ to F)	Α						
	В	(70-84%) Approaches the st Ideas show a complete und creative and appealing.	tandard of excellence. All criderstanding of concepts. Are				
	С	(55-69%) Meets an acceptable standard. All criteria are addressed. Organization of ideas and clarity are sufficient. Ideas show an effective understanding of concepts. Arguments identify major issues. Presentation is appealing but may lack clarity.					
	D	(45-54%) Below acceptable standard. Most criteria are addressed. Organization of ideas and clarity are weak. Ideas show an incomplete understanding of concepts. Arguments are not persuasive. Presentation lacks creativity or is not appealing.					
	Fail	(<45%) Unacceptable. Inabi understanding of concepts. N				Ideas show a lack of	
Course Type	Lecture	with laboratory component	course				
Course Teaching	Activiti	es	Details			No. of Hours	
& Learning Activities	Lecture	S				24	
	Laborat	tory				24	
	Tutorial	S				6	
	Reading	g / Self study				100	
Assessment Methods and Weighting	Method	ls	Details		ting in final grade (%)	Assessment Methods to CLO Mapping	
	Examin	ation			70	CLO 1,2,3	
	Laborat	ory reports			30	CLO 3	
Required/recommended reading and online materials		Biology of Microorganisms	, Pearson Benjamin C	ummings, 12th Edition	ı, 2009 [HKU li	brary call number	
Course Website	http://mo	oodle.hku.hk/					

	introau	ction to food and no	utrition (6 credits)	Academic Yea	r 2019
Offering Department	Biologica	l Sciences	•	Quota	150
Course Co-ordinator	Dr L Zha	ng, Biological Sciences	(lzhang17@hku.hk)		
Teachers Involved	Dr L Zha	Lee,Biological Sciences ang,Biological Sciences) Shah,Biological Science	,		
Course Objectives	field to to production nutrition at This is at	the dinner table, a bas on, processing and stora as part of life style instru	sic understanding of the generage will be covered. Food safemental to good health will be described as to be taken by students	the study of Food and Nutrition eral properties of macro and notety, food selection behaviour assiscussed. It also from various disciplines. It also	nicronutrients food s well as balanced
Course Contents & Topics	Topics w	vill include food compos nd regulation; determinar	sition and functional properties	s of major nutrients; food additi f complex processed foods; heal	
Course Learning			course, students should be ab	le to:	
Outcomes	CLO 1	understand the key com	ponents of food and be able to	discuss their functional properti	es
	CLO 2	understand the significa	nce of food safety and be able	to identify sources of contamina	tion
	CLO 3	understand the concept	of a balanced diet	·	
	CLO 4	critically assess health p	problems associate with malnu	trition	
Pre-requisites (and Co-requisites	NIL				
•					
and Impermissible combinations) Offer in 2019 - 2020	Y 1s	t sem Offer in 2020 - 2	2021 : Y	Examination	Dec
combinations) Offer in 2019 - 2020 Grade Descriptors	Y 1s	Demonstrate thorough gra knowledge. Demonstrate h	asp of the subject matter covered.	Show exceptional ability to articulate cills.	oncepts and integrate
combinations) Offer in 2019 - 2020		Demonstrate thorough gra knowledge. Demonstrate h Demonstrate substantial gr	asp of the subject matter covered. ighly effective organization / writing sk rasp of the subject matter covered. Sh	Show exceptional ability to articulate calls. The state of the state	oncepts and integrate
combinations) Offer in 2019 - 2020 Grade Descriptors	A	Demonstrate thorough gra knowledge. Demonstrate h Demonstrate substantial g the materials to solve prob Demonstrate general but	asp of the subject matter covered ighly effective organization / writing skrasp of the subject matter covered. Stems. Demonstrate effective organizat incomplete grasp of the subject ma	Show exceptional ability to articulate calls. The state of the state	concepts and integrate
combinations) Offer in 2019 - 2020 Grade Descriptors	A B	Demonstrate thorough graknowledge. Demonstrate he Demonstrate substantial grather materials to solve prob Demonstrate general but problems. Demonstrate ad Demonstrate partial but Misunderstanding of the massic organization / writing	asp of the subject matter covered ighly effective organization / writing skrasp of the subject matter covered. St lems. Demonstrate effective organizat incomplete grasp of the subject ma equate organization / writing skills. limited grasp, with retention of saterials is not uncommon. Ability to apskills.	Show exceptional ability to articulate of ills. now full capacity to use the appropriate of ion / writing skills. tter covered. Show ability to apply corome relevant information, of the subply concepts and solve simple problems	concepts and assimilate concepts to solve simple plect matter covered. is limited. Demonstrate
combinations) Offer in 2019 - 2020 Grade Descriptors	A B C	Demonstrate thorough gra knowledge. Demonstrate h Demonstrate substantial gra the materials to solve prob Demonstrate general but problems. Demonstrate ad Demonstrate partial but Misunderstanding of the basic organization / writing Demonstrate little or no g	asp of the subject matter covered. ighly effective organization / writing sk rasp of the subject matter covered. St lems. Demonstrate effective organization complete grasp of the subject ma equate organization / writing skills. limited grasp, with retention of saterials is not uncommon. Ability to apskills. rasp, with retention of little relevant	Show exceptional ability to articulate of ills. now full capacity to use the appropriate of ion / writing skills. tter covered. Show ability to apply common relevant information, of the sub-	concepts and integrate concepts and assimilate neepts to solve simple pject matter covered, is limited. Demonstrate red. Fail to understand
combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	A B C D	Demonstrate thorough gra knowledge. Demonstrate h Demonstrate substantial gra the materials to solve prob Demonstrate general but problems. Demonstrate ad Demonstrate partial but Misunderstanding of the basic organization / writing Demonstrate little or no g	asp of the subject matter covered. ighly effective organization / writing sk rasp of the subject matter covered. St lems. Demonstrate effective organization complete grasp of the subject ma equate organization / writing skills. limited grasp, with retention of saterials is not uncommon. Ability to apskills. rasp, with retention of little relevant	Show exceptional ability to articulate of ills. now full capacity to use the appropriate of ion / writing skills. Itter covered. Show ability to apply corume relevant information, of the subply concepts and solve simple problems information, of the subject matter covering the sub	concepts and integrate concepts and assimilate neepts to solve simple pject matter covered, is limited. Demonstrate red. Fail to understand
Combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching	A B C D	Demonstrate thorough graknowledge. Demonstrate had Demonstrate substantial grammaterials to solve probing Demonstrate general but problems. Demonstrate and Demonstrate partial but Misunderstanding of the massic organization / writing Demonstrate little or no goncepts and show minimaterials.	asp of the subject matter covered. ighly effective organization / writing sk rasp of the subject matter covered. St lems. Demonstrate effective organization complete grasp of the subject ma equate organization / writing skills. limited grasp, with retention of saterials is not uncommon. Ability to apskills. rasp, with retention of little relevant	Show exceptional ability to articulate of ills. now full capacity to use the appropriate of ion / writing skills. Itter covered. Show ability to apply corume relevant information, of the subply concepts and solve simple problems information, of the subject matter covering the sub	concepts and integrate concepts and assimilate neepts to solve simple pject matter covered, is limited. Demonstrate red. Fail to understand
Combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching	A B C D Fail Lecture-t	Demonstrate thorough graknowledge. Demonstrate had Demonstrate substantial githe materials to solve probing Demonstrate general but problems. Demonstrate and Demonstrate partial but Misunderstanding of the massic organization / writing Demonstrate little or no geoncepts and show minime passed course	asp of the subject matter covered ighly effective organization / writing sk rasp of the subject matter covered. Si lems. Demonstrate effective organizatincomplete grasp of the subject maequate organization / writing skills. Ilmited grasp, with retention of saterials is not uncommon. Ability to as skills. rasp, with retention of little relevant al competence in problem solving. Den	Show exceptional ability to articulate of ills. now full capacity to use the appropriate of ion / writing skills. Itter covered. Show ability to apply corume relevant information, of the subply concepts and solve simple problems information, of the subject matter covering the sub	concepts and integrate concepts and assimilate concepts to solve simple oject matter covered. is limited. Demonstrate red. Fail to understand kills.
Combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching	A B C D Fail Lecture-t Activitie	Demonstrate thorough graknowledge. Demonstrate had Demonstrate substantial the materials to solve probing the materials to solve probing Demonstrate general but problems. Demonstrate and Demonstrate partial but Misunderstanding of the massic organization / writing Demonstrate little or no gooncepts and show minimal passed course	asp of the subject matter covered ighly effective organization / writing sk rasp of the subject matter covered. Si lems. Demonstrate effective organizatincomplete grasp of the subject maequate organization / writing skills. Ilmited grasp, with retention of saterials is not uncommon. Ability to as skills. rasp, with retention of little relevant al competence in problem solving. Den	Show exceptional ability to articulate of ills. now full capacity to use the appropriate of ion / writing skills. Itter covered. Show ability to apply corume relevant information, of the subply concepts and solve simple problems information, of the subject matter covering the sub	concepts and integrate concepts and assimilate concepts to solve simple oject matter covered, is limited. Demonstrate red. Fail to understand kills. No. of Hours
combinations) Offer in 2019 - 2020 Grade Descriptors	A B C D Fail Lecture-t Activitie Lectures Tutorials	Demonstrate thorough graknowledge. Demonstrate had Demonstrate substantial the materials to solve probing the materials to solve probing Demonstrate general but problems. Demonstrate and Demonstrate partial but Misunderstanding of the massic organization / writing Demonstrate little or no gooncepts and show minimal passed course	asp of the subject matter covered ighly effective organization / writing sk rasp of the subject matter covered. Stems. Demonstrate effective organizatincomplete grasp of the subject maequate organization / writing skills. limited grasp, with retention of saterials is not uncommon. Ability to agskills. rasp, with retention of little relevant al competence in problem solving. Den	Show exceptional ability to articulate of ills. now full capacity to use the appropriate of ion / writing skills. Itter covered. Show ability to apply corume relevant information, of the subply concepts and solve simple problems information, of the subject matter covering the sub	concepts and integrate concepts and assimilate concepts to solve simple opect matter covered. Is limited. Demonstrate red. Fail to understand kills. No. of Hours 36

	Assignments		30	CLO 1,2,3,4
	Examination		70	CLO 1,2,3,4
Required/recommended reading and online materials	Hotchkiss J.H. & Porter N.N. Food Fenema O.R. Food Chemistry. Ma Brown A. Understanding Food: Pri Whitney E. & Rolfes S.R. Understa	rcel Dekker, 1996 inciples and Preparation. Wadswor		011
Course Website	http://moodle.hku.hk/			

BIOL1309	Evolution	nary diversity (6	credits)	Į.	Academic Year	2019	
Offering Department	Biological	Sciences	•	(Quota	250	
Course Co-ordinator	Prof R M	K Saunders, Biologic	al Sciences (saunders@hku.i	hk)			
Teachers Involved	(Dr M Yas (Dr S Can	unter,Biological Scie suhara,Biological Scie inicci,Biological Scier K Saunders,Biologic	ences) nces)				
Course Objectives	To provide fundamen used as the	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	(Rhodoph seedless Ginkgoph Mollusca, (Batracho	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, Metatheria) and Eutheria).					
Course Learning Outcomes	On succes CLO 1 int ev CLO 2 de	ssful completion of the terpret phylogenies volutionary changes in escribe the characteri e main taxonomic gro	nis course, students should be in order to understand the in structures, processes and b istics of different evolutionary oups elective advantages of the high	relatedness of taxono ehaviours lineages of plants and	d animals and re	call the names of	
		chiairi irie hossibie se	siective advantages of the high	iligitied structures, pro	ocesses and bei	ilaviouis	
(and Co-requisites and Impermissible	NIL						
(and Co-requisites and Impermissible combinations)	NIL	I sem Offer in 2020) - 2021 : Y	E	Examination	May	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020	NIL	Demonstrate thorough learning outcomes, with	mastery at an advanced level of exhibit extensive use of named examples	tensive knowledge require	d for attaining mos	t or all of the course	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	NIL Y 2nd	Demonstrate thorough learning outcomes, with Apply highly effective pr Demonstrate substantia named examples. Show Demonstrate general b	mastery at an advanced level of extensive use of named examples resentation skills. al command of knowledge required for a command of knowledge required for the command of knowledge required for the command of knowledge.	tensive knowledge require. Show evidence of signification attaining most of the coupal thinking. Apply effective dge and skills required fo	d for attaining mos cant critical abilities rse learning outcom presentation skills. r attaining most of	t or all of the courses and logical thinking. nes, with some use of the course learning	
Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	Y 2nd A B	Demonstrate thorough learning outcomes, with Apply highly effective pr Demonstrate substantia named examples. Show Demonstrate general boutcomes, with only lir moderately effective pre Demonstrate partial but with insufficient use of moderates.	mastery at an advanced level of extensive use of named examples resentation skills. al command of knowledge required for vevidence of critical abilities and logical put incomplete command of knowle mited use of named examples. Sh	tensive knowledge require. Show evidence of signification attaining most of the coupeal thinking. Apply effective dge and skills required foow evidence of some critical skills required for attaining	d for attaining mos cant critical abilities rse learning outcom presentation skills. r attaining most of ical abilities and lo g some of the cours	t or all of the course and logical thinking. nes, with some use of the course learning gical thinking. Apply se learning outcomes,	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	Y 2nd A B C	Demonstrate thorough learning outcomes, with Apply highly effective properties of the properties of th	mastery at an advanced level of exity the extensive use of named examples resentation skills. al command of knowledge required for evidence of critical abilities and logical transport of the examples. She assentation skills. It limited command of knowledge and amed examples. Show evidence of one evidence of command of knowledge and one evidence of command of knowledge examples. Show little or no evidence examples. Show little or no evidence.	tensive knowledge require. Show evidence of signification attaining most of the coupal thinking. Apply effective dge and skills required foow evidence of some critical skills required for attaining imited critical abilities and lege and skills required for	d for attaining mos cant critical abilities rse learning outcom presentation skills. r attaining most of ical abilities and lo g some of the cours ogical thinking. Appl attaining the course	t or all of the courses and logical thinking. The course learning the course learning of the course learning outcomes, by limited presentation to learning outcomes, but the course learning outcomes, and the course learning outcomes.	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	Y 2nd A B C D Fail	Demonstrate thorough learning outcomes, with Apply highly effective promonstrate substantia named examples. Show Demonstrate general boutcomes, with only limoderately effective pre Demonstrate partial but with insufficient use of nakills. Demonstrate little or nowithout use of named	mastery at an advanced level of exhipse extensive use of named examples resentation skills. al command of knowledge required for evidence of critical abilities and logical transport of the examples. She exertation skills. It limited command of knowledge and examples. She exertation skills. To evidence of command of knowledge and examples. Show evidence of the examples. Show evidence of examples. Show little or no evidence effective.	tensive knowledge require. Show evidence of signification attaining most of the coupal thinking. Apply effective dge and skills required foow evidence of some critical skills required for attaining imited critical abilities and lege and skills required for	d for attaining mos cant critical abilities rse learning outcom presentation skills. r attaining most of ical abilities and lo g some of the cours ogical thinking. Appl attaining the course	t or all of the courses and logical thinking. The course learning the course learning of the course learning outcomes, by limited presentation to learning outcomes, but the course learning outcomes, and the course learning outcomes.	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching	NIL Y 2nd A B C D Fail Lecture w Activities	Demonstrate thorough learning outcomes, with Apply highly effective pr Demonstrate substantia named examples. Show Demonstrate general boutcomes, with only lir moderately effective pre Demonstrate partial but with insufficient use of roskills. Demonstrate little or now without use of named minimally effective or incited the second of the second outcomes.	mastery at an advanced level of exhipse extensive use of named examples resentation skills. al command of knowledge required for evidence of critical abilities and logical transport of the examples. She exertation skills. It limited command of knowledge and examples. She exertation skills. To evidence of command of knowledge and examples. Show evidence of the examples. Show evidence of examples. Show little or no evidence effective.	tensive knowledge require. Show evidence of signification attaining most of the coupal thinking. Apply effective dge and skills required foow evidence of some critical skills required for attaining imited critical abilities and lege and skills required for	d for attaining mos cant critical abilities rse learning outcom presentation skills. r attaining most of ical abilities and lo g some of the cours ogical thinking. Appl attaining the course	t or all of the courses and logical thinking. The course learning gical thinking. Apply se learning outcomes, by limited presentation elearning outcomes, essentational skills are	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching	NIL Y 2nd A B C D Fail Lecture w	Demonstrate thorough learning outcomes, with Apply highly effective pr Demonstrate substantia named examples. Show Demonstrate general boutcomes, with only lir moderately effective pre Demonstrate partial but with insufficient use of roskills. Demonstrate little or now without use of named minimally effective or incited the second of the second outcomes.	mastery at an advanced level of exh extensive use of named examples resentation skills. al command of knowledge required for evidence of critical abilities and logicut incomplete command of knowledge in the sentitle of th	tensive knowledge require. Show evidence of signification attaining most of the coupal thinking. Apply effective dge and skills required foow evidence of some critical skills required for attaining imited critical abilities and lege and skills required for	d for attaining mos cant critical abilities rse learning outcom presentation skills. r attaining most of ical abilities and lo g some of the cours ogical thinking. Appl attaining the course	t or all of the courses and logical thinking. The course learning gical thinking. Apply see learning outcomes, ly limited presentation elearning outcomes, essentational skills are No. of Hours 24	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching	NIL Y 2nd A B C D Fail Lecture w Activities Lectures Laborator	Demonstrate thorough learning outcomes, with Apply highly effective pr Demonstrate substantia named examples. Show Demonstrate general boutcomes, 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 incith laboratory compositions.	mastery at an advanced level of exh extensive use of named examples resentation skills. al command of knowledge required for evidence of critical abilities and logicut incomplete command of knowledge in the sentitle of th	tensive knowledge require. Show evidence of signification attaining most of the coupal thinking. Apply effective dge and skills required foow evidence of some critical skills required for attaining imited critical abilities and lege and skills required for	d for attaining mos cant critical abilities rse learning outcom presentation skills. r attaining most of ical abilities and lo g some of the cours ogical thinking. Appl attaining the course	t or all of the courses and logical thinking. The course learning gical thinking. Apply se learning outcomes, ly limited presentation e learning outcomes, sentational skills are No. of Hours 24 36	
and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching & Learning Activities	NIL Y 2nd A B C D Fail Lecture w Activities Lectures Laborator	Demonstrate thorough learning outcomes, with Apply highly effective pr Demonstrate substantia named examples. Show Demonstrate general be outcomes, with only lir moderately effective pre Demonstrate partial but with insufficient use of n skills. Demonstrate little or n without use of named minimally effective or in ith laboratory composite.	mastery at an advanced level of exh extensive use of named examples resentation skills. al command of knowledge required for evidence of critical abilities and logicut incomplete command of knowledge in the sentitle of th	tensive knowledge require. Show evidence of signification attaining most of the coupal thinking. Apply effective dge and skills required foow evidence of some critical skills required for attaining imited critical abilities and lege and skills required for	d for attaining mos cant critical abilities rse learning outcom presentation skills. r attaining most of ical abilities and lo g some of the cours ogical thinking. Appl attaining the course	t or all of the courses and logical thinking hes, with some use of the course learning gical thinking. Apply see learning outcomes by limited presentation elearning outcomes essentational skills are to the course of the course	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching & Learning Activities Assessment Methods	NIL Y 2nd A B C D Fail Lecture w Activities Lectures Laborator Reading / Methods	Demonstrate thorough learning outcomes, with Apply highly effective properties of the properties of th	mastery at an advanced level of exh extensive use of named examples resentation skills. al command of knowledge required for evidence of critical abilities and logicut incomplete command of knowledge in the sentitle of th	tensive knowledge require . Show evidence of significate or attaining most of the coupled thinking. Apply effective dge and skills required fo ow evidence of some critical abilities and le ge and skills required for the critical abilities and le ge and skills required for the of critical abilities and le Weighti	d for attaining mos cant critical abilities rse learning outcom presentation skills. r attaining most of ical abilities and lo g some of the cours ogical thinking. Appl attaining the course ogical thinking. Pre	t or all of the courses and logical thinking. The course learning gigical thinking. Apply se learning outcomes, by limited presentation are learning outcomes, seentational skills are No. of Hours 24 36 100 Assessment Methods to CLO Mapping	
and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching & Learning Activities Assessment Methods	NIL Y 2nd A B C D Fail Lecture w Activities Lectures Laborator Reading /	Demonstrate thorough learning outcomes, with Apply highly effective properties of the properties of th	mastery at an advanced level of exh extensive use of named examples resentation skills. al command of knowledge required for evidence of critical abilities and logical incomplete command of knowledge and the command of knowledge and examples. Show evidence of logical incomplete command of knowledge and the command of knowledge and t	tensive knowledge require . Show evidence of signific or attaining most of the cou- cal thinking. Apply effective dge and skills required fo ow evidence of some criti- skills required for attaining imited critical abilities and le ge and skills required for oe of critical abilities and I Weighti course	d for attaining mos cant critical abilities rse learning outcom presentation skills. r attaining most of ical abilities and lo g some of the cours ogical thinking. Appl attaining the course ogical thinking. Pre	t or all of the courses and logical thinking hes, with some use of the course learning gical thinking. Apply se learning outcomes by limited presentation at learning outcomes, seentational skills are to the course seen and the course seen at learning outcomes, seen tational skills are to the course of the cou	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching & Learning Activities Assessment Methods	NIL Y 2nd A B C D Fail Lecture w Activities Lectures Laborator Reading / Methods	Demonstrate thorough learning outcomes, with Apply highly effective pro Demonstrate substantia named examples. Show Demonstrate general boutcomes, with only lir moderately effective pre Demonstrate partial but with insufficient use of n skills. Demonstrate little or now without use of named minimally effective or in the laboratory composition.	mastery at an advanced level of exh extensive use of named examples resentation skills. al command of knowledge required for evidence of critical abilities and logical incomplete command of knowledge and the command of knowledge and examples. Show evidence of logical incomplete command of knowledge and the command of knowledge and t	tensive knowledge require . Show evidence of significate attaining most of the could thinking. Apply effective dge and skills required for own evidence of some critical skills required for attaining mitted critical abilities and lege and skills required for zero of critical abilities and I ge and skills required for zero of critical abilities and I weight in the course weight with the course of critical abilities and I weight in the course weight	d for attaining mos cant critical abilities rse learning outcom presentation skills. r attaining most of ical abilities and lo g some of the cours ogical thinking. Appl attaining the course ogical thinking. Pre	t or all of the courses and logical thinking. The course learning gigical thinking. Apply se learning outcomes, by limited presentation are learning outcomes, seentational skills are No. of Hours 24 36 100 Assessment Methods to CLO Mapping	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	NIL Y 2nd A B C D Fail Lecture w Activities Lectures Laborator Reading / Methods Examinat Laborator P. H. Rave	Demonstrate thorough learning outcomes, with Apply highly effective pr Demonstrate substantia named examples. Show Demonstrate general be outcomes, with only lir moderately effective pre Demonstrate partial but with insufficient use of n skills. Demonstrate little or n without use of named minimally effective or in ith laboratory composition. Self study	mastery at an advanced level of exh extensive use of named examples resentation skills. al command of knowledge required for evidence of critical abilities and logical incomplete command of knowledge and the command of knowledge and examples. Show evidence of logical incomplete command of knowledge and the command of knowledge and t	tensive knowledge require . Show evidence of significate and sills required for own evidence of significate and skills required for own evidence of some critical skills required for attaining imited critical abilities and lege and skills required for one of critical abilities and lege and skills required for one of critical abilities and lege and skills required for one of critical abilities and lege and skills required for one of critical abilities and lege and skills required for one of critical abilities and lege and skills required for one of critical abilities and lege and skills required for one of critical abilities and lege and skills required for critical abilities and lege an	d for attaining moscant critical abilities rse learning outcompresentation skills. r attaining most of ical abilities and lo g some of the cours ogical thinking. Appl attaining the cours ogical thinking. Pre	t or all of the courses and logical thinking. nes, with some use of the course learning gical thinking. Apply se learning outcomes, by limited presentation are learning outcomes, sentational skills are No. of Hours 24 36 100 Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2,3	

BIOL1501	Bioeth	nics (6 credits)				Academic Year	2019
Offering Department	Biologic	cal Sciences					Quota	40
Course Co-ordinator	, Biol	ogical Sciences)					
Teachers Involved	(,Biol	ogical Sciences)						
Course Objectives	The ain	n is to explore the	e ethical implic	ations of the I	atest major advand	ces in biolo	ogy and medicine	
Course Contents & Topics	advanc genetic and the	ements in biolog s, reproduction,	ical and medi disease diagn in research. E	ical sciences. osis and ther Ethical and mo	student and mento Major areas to b apy, development, oral principles and	be discuss , transplar	sed include but a ntation, aging, dyi	re not limited to: ng, environment,
Course Learning Outcomes	CLO 1	bioethics specific reflect upon and	the current e cally related to I formulate in	thical theorie the advancer a profession	nould be able to: s, discussions, ar ment of modern mo al manner their ov gue with those who	olecular bi wn opinion	ology and genomins on these matte	cs ers as well as to

	CLO 3 understand the basis of one's own position, as well as the basis of another person's opinion						
	CLO 4 deal with the quandaries that arise when facing modern medical technology and advancements						
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL						
Offer in 2019 - 2020		Offer in 2020 - 2021 : N Examination					
Grade Descriptors (A+ to F)	A	Demonstrate thorough grasp of the su evidence of creative ability and com techniques and analysis of data and r highly effective individual as well as co	npetence in professional-level proble esults to draw appropriate and insigh Illaborative-based organizational and	em solving. Critically use cor ntful conclusions to real-world presentational skills.	mmunication skills and problems. Demonstrate		
	В	Demonstrate substantial grasp of the thinking with some evidence of compe analysis of data and results to draw (as well as collaborative-based organiz	etence in professional-level problem s generally appropriate conclusions to	solving. Use communication sk	kills and techniques and		
	С	Demonstrate general but incomplete g and logical thinking with limited compe analysis of data and results to draw Demonstrate moderately individual as	etence in professional-level problem s moderately appropriate but someti	solving. Use communication si mes erroneous conclusions t	kills and techniques and o real-world problems.		
	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 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 re and logical thinking, and minimal con and analysis of data and results ineffe problems. Demonstrate ineffectivenes	npetence in professional-level proble ectively, leading generally to inapprop	m solving. Use communication oriate and usually erroneous controls.	n skills and techniques onclusions to real-world		
Course Type	Lecture-l	pased course					
Course Teaching	Activitie	es Details	3		No. of Hours		
& Learning Activities	Lectures	3			36		
	Tutorials	s .			12		
	Assessn	nent			100		
Assessment Methods and Weighting	Method	S Details	5	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignm		uous assessment of essays, tation and debate exercises	60	CLO 1,2,3,4		
	Examina	ation		40	CLO 1,2,3,4		
Required/recommended reading and online materials		web-based reading materials					
Additional Course Information	This cou	rse will be offered subject to a mir	nimum enrollment number and	l availability of teachers.			

BIOL1502	The gene	(6 credits)			Academic Year	2019
Offering Department	Biological S	Sciences			Quota	50
Course Co-ordinator	, Biologic	cal Sciences ()				
Teachers Involved	(,Biologic	cal Sciences)				
Course Objectives	genome ar well as lots is to open	ive is to expose stude ad many agricultural cro of technical and ethical up students from all ba entific and social discipli	ps and animals genom I issues/challenges tha ackgrounds to this bas	ies, it brings not only pr t general public need to	omises of a bette deal with. The g	r quality of life a oal of this cours
Course Contents & Topics	Introduction Basic gene Basic Mole Bacterial G Human Ge Human Ge Genes and Genes and Genes and Animal and Genes and		chnology - Recombinal onment istory and its Impacts! scovery!	nt DNA and cloning		
Course Learning	On succes	sful completion of this co	ourse, students should	be able to:		
Outcomes	CLO 1 de	monstrate understandin	g and to explain the pr	inciple of inheritance, re	ecombinant DNA	and cloning
	CLO 2 ga	in deep understanding a	about the advancemen	t of biotechnology		
	CLO 3 de	termine and explain the	benefits and shortcom	ings of the application of	of biotechnology k	nowledge
Pre-requisites (and Co-requisites and Impermissible combinations)	equivalent.	idents with level 3 or	above in HKDSE Bio	logy or Combined Sci		y component o
Offer in 2019 - 2020	N Offe	r in 2020 - 2021 : N			Examination	
Grade Descriptors (A+ to F)	A	Demonstrate thorough grasp evidence of creative ability techniques and analysis of d highly effective individual as	and competence in profes lata and results to draw app well as collaborative-based of	sional-level problem solving ropriate and insightful conclu organizational and presentation	. Critically use comm sions to real-world pro onal skills.	nunication skills and oblems. Demonstrate
	В	Demonstrate substantial grathinking with some evidence analysis of data and results as well as collaborative-base	of competence in profession to draw generally appropria d organizational and presen	nal-level problem solving. Use te conclusions to real-world tational skills.	e communication skills problems. Demonstrat	and techniques and e effective individua
	С	Demonstrate general but including and logical thinking with limit				

			lts to draw moderately appropriate dividual as well as collaborative-bas					
	evide skills world	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter evidence of coherent and logical thinking, but lacking competence in professional-level problem solving skills and techniques and analysis of data and results to draw sometimes appropriate but often erroned world problems. Demonstrate individual as well as collaborative-based organizational and presentat effectiveness.						
	and I	ogical thinking, and manalysis of data and re	ate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of coher al thinking, and minimal competence in professional-level problem solving. Use communication skills and technique sis of data and results ineffectively, leading generally to inappropriate and usually erroneous conclusions to real-work Demonstrate ineffectiveness individual as well as collaborative-based organizational and presentational skills.					
Course Type	Lecture-based of	course						
Course Teaching	Activities		Details			No. of Hours		
& Learning Activities	Lectures					36		
	Tutorials					12		
	Reading / Self s	study	including 45 hours on presentation (include preparents)	riting, 30	93			
Assessment Methods and Weighting	Methods		Details	_	ng in final grade (%)	Assessment Methods to CLO Mapping		
	Assignments		discussion forum	;	35	CLO 1,2,3		
	Essay		essays & written reports		25	CLO 1,2,3		
	Presentation		poster & oral presentation	;	30	CLO 1,2,3		
	Test		in-class participation & qui	zzes	10	CLO 1,2,3		
Required/recommended reading and online materials	Library & web-b	ased reading mat	erials	·				
Additional Course Information	This course will	be offered subjec	t to a minimum enrollment nu	umber and availabilit	y of teachers	S.		

BIOL2101	Principle	es of food che	mistry (6 credits)	Academic Y	ear 2019				
Offering Department	Biological	Sciences		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	To provide a basic understanding of chemistry in food systems, and to provide practical training in chemistr related to food science and nutrition.								
Course Contents & Topics	componer	nts such as enzyr	components of food, including warnes, vitamins, minerals, colorants,	flavorants and additives. The p	hysical and chemica				
	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								
Course Learning	On successful completion of this course, students should be able to:								
Outcomes	CLO 1 understand the functions and properties of major and minor food components								
			ic chemistry behind food processing						
	CLO 3 un	derstand how ma	ajor chemical and biochemical react	tions influence food quality					
		ive integrated the intext	eir knowledge of biological and ch	emical principles into a food s	cience and nutrition				
Pre-requisites	Pass in BI	OL1201; and NO	T for students who have passed in	BIOL3201.					
(and Co-requisites and Impermissible combinations)	The cours	e is only for stude	ents admitted in 2017-2018 or there	after.					
Offer in 2019 - 2020	Y 1st	sem Offer in 20	20 - 2021 : Y	Examination	Dec				
Grade Descriptors (A+ to F)	A	Demonstrate thorou	igh grasp of the subject matter covered. Shouly this knowledge. Critically use lab skills an	ow extensive knowledge and understan	ding of the topics covered				
	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.								
	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 and techniques and analysis of data and results to draw appropriate conclusions occasionally.								
	Fail	knowledge and und	or no grasp, with retention of little relevan derstanding in few areas of the content an skills and techniques and analysis of data onclusions.	d has achieved very limited competen	ce in some of the topics				
Course Type	Lecture wi	th laboratory com	nponent course						
Course Teaching	Activities	3	Details		No. of Hours				
& Learning Activities	Lectures				24				
	Laborator	У			26				
	Laborator				36				
		Self study			100				
		Self study	Details	Weighting in final course grade (%)					
	Reading /	,	Details Laboratory reports		100 Assessment Methods				
	Reading / Methods	ents		course grade (%)	100 Assessment Methods to CLO Mapping				
	Reading / Methods Assignment	ents		course grade (%)	Assessment Methods to CLO Mapping CLO 1,2,3,4				
Assessment Methods and Weighting Required/recommended reading and online materials	Reading / Methods Assignme Examinat Test Fennema	ents ion OR, Food Chemi		30 50 20	Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4				
and Weighting Required/recommended reading and	Reading / Methods Assignme Examinat Test Fennema Belitz HD,	ents ion OR, Food Chemi	Laboratory reports stry (Marcel Dekker 4th Ed, 2008)	30 50 20	Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4				

Information

BIOL2102	Biostatis	stics (6 credits)		Academic Yea	r 2019		
Offering Department	Biological			Quota	169		
Course Co-ordinator	Prof. K M	Y Leung, Biological Sci	ences (kmyleung@hku.hk)				
Teachers Involved	(Prof. K M	Y Leung, Biological Sci	ences)				
Course Objectives	interpret, introduce	and critically evaluate the students to fundam	udents with biostatistics. The cours the statistics used in biological a ental principles of various statistica Il test and avoid common statistical	ind biomedical studies. Th I tests, basic computational	e course will also		
Course Contents	Introduction	n to Statistics and	Probability; Different Probability	Distributions including No	rmal Distribution;		
& Topics	Describing, Exploring and Comparing Data; Hypothesis Testing and Inferential Statistics (Both Parametric and No Parametric Tests such as Chi square test, Student t tests, Mana-Whitney test, Wilcoxon test, Analysis of Variance and Kruskal-Wallis test); Correlation and Regression; Power Analysis; Experimental design.						
Course Learning		sful completion of this	course, students should be able to:				
Outcomes	CLO 1	formulate biological q	uestions into statistical questions				
	CLO 2 design experiments effectively						
	CLO 3		ret statistics in scientific paper				
	CLO 4		arry out common statistical computa				
	CLO 5		nptions of commonly used statistica	Il methods			
	CLO 6	critically evaluate the					
	CLO 7	create novel hypothes	<u> </u>				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BI	OC1600 or BIOL1110 c	or BIOL2306 or ENVS1301 or ENVS	S2002			
Offer in 2019 - 2020	Y 2nd	sem Offer in 2020 - 2	2021 : Y	Examination	May		
Grade Descriptors (A+ to F)	A Demonstrate thorough grasp of the subject and skills required for attaining all the course learning outcomes. S analytical and critical abilities and logical thinking, with evidence of original thought. Apply highly effective compute and techniques for basic statistical analyses. Be able to critically use data and statistical results to draw appreinsightful conclusions. Apply highly effective organizational and presentational skills.				ve computational skill		
	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	Demonstrate general but in Present evidence of some a techniques for basic statist	complete grasp of the subject and skills req analytical and critical abilities and logical thi ical analyses. Demonstrate mostly correct ns. Apply moderately effective organizationa	nking. Apply moderately effective of but some erroneous use of data a	computational skills an		
	D	Demonstrate partial and lir Present evidence of some effective computational skill results to draw appropriate	mited grasp of the subject and skills requir coherent and logical thinking, but with limit is and techniques for basic statistical analys conclusions. Apply limited or barely effective	red for attaining some of the counted analytical and critical abilities. ses. Demonstrate limited ability to be organizational and presentational	Apply limited or barel use data and statistica skills.		
	Fail	Present evidence of little of ineffective computational sl	ttle or no grasp of the subject and skills re or lack of analytical and critical abilities, log kills and techniques for basic statistical ana opriate conclusions. Apply minimally effectiv	gical and coherent thinking. Apply lyses. Demonstrate misuse of dat	minimally effective of minimally effective of a and statistical result		
Course Type		ased course					
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures				36		
	Tutorials	0 15 4 1	including demonstrations and pro	jects	24		
		Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	nts		70	CLO 1,2,3,4,5,6,		
	Examinati	on		30	CLO 1,3,5		
Required/recommended eading and online materials	Dytham, C Goureia O Good, P.I.	Examination 30 CLO 1,3,5 Zar, J. H. (2010). Biostatistical Analysis, 5th edition. Pearson. Dytham, C. (1999). Choosing and Using Statistics: A Biologist's Guide. Oxford: Blackwell Science. Goureia Oliveira, A.G. (2013). Biostatistics Decoded. Wiley (e-book via ebrary). Good, P.I. (2013). Introduction to Statistics through Resampling Methods and R. Wiley (e-book via ebrary). Verzani, J. (2014). Using R for Introductory Statistics. 2nd edition. CRC Press. [e-book via ebrary]					
Course Website		dle.hku.hk/					
Additional Course			ww.biosch.hku.hk/ecology/lsc/biol2	100/			

BIOL2103	Biological sciences laboratory course (6 credits)	Academic Year	2019
Offering Department	Biological Sciences	Quota	210
Course Co-ordinator	Dr W Y Lui, Biological Sciences (wylui@hku.hk)		
Teachers Involved	(Dr A Yan,Biological Sciences) (Dr W Y Lui,Biological Sciences) (Prof B K C Chow,Biological Sciences)		
Course Objectives	The objective is to provide students a comprehensive training in babiological studies. The course will cover a number of techniques used to conduct scientific research.		
Course Contents & Topics	This course will be divided into three modules and each module will hat Module one: Nucleic acid analysis DNA & RNA isolation, spectrometry, gel electrophoresis, restriction enzing Module two: Protein analysis Centrifugation, chromatography and SDS-PAGE electrophoresis.	,	juence analysis.

	Module three: Microbiology Microscopy, observation of microorganisms and staining of bacteria, isolation of pure cultures by serial dilution, enumeration of microbial cells by Petroff-Hausser counting chamber, and turbidity. Ideasification of microbes from natural source and statistical analysis.					
Course Learning		On successful completion of this course, students should be able to:				
Outcomes		•	lge in proper use of simple resea			
	CLO 2	demonstrate knowled setting	dge and understanding of how a	and why certain techniques are	used in a research	
			boratory techniques for carrying			
			ent ways that microorganisms we etc. and how they were counted	ere categorized according to thei	r size, shape, colou	
Pre-requisites (and Co-requisites and Impermissible combinations)		Pass in BIOL1110. Not for students having taken any level 3 (or above) Biochemistry (BIOC) course or BBMS2001.				
Offer in 2019 - 2020	Y 1s	st sem 2nd sem (Offer in 2020 - 2021 : Y	Examination	Dec May	
Grade Descriptors (A+ to F)	A	outcomes. Show stro	ong analytical and critical abilities and	tensive knowledge required for attaining logical thinking, with evidence of origing sults to draw appropriate and insightful	al thought. Apply highly	
	B 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.					
	C 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 and presentational skills.					
	D 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 Demonstrate little or no evidence of command of knowledge required for attaining the course learning outcomes. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. 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.					
Course Type	Laborato	ory and workshop cou	urse			
Course Teaching	Activitie	es	Details		No. of Hours	
Learning Activities	Laborat	ory	11 laboratory sessions (4 h	11 laboratory sessions (4 hours each)		
	Tutorials	3	lecture/tutorials			
	Reading	g / Self study			100	
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignn	nents		40	CLO 1,2,3,4	
	Test		Final examination	60	CLO 1,2	
Course Website	http://mc	odle.hku.hk/				
Additional Course Information	Lab A or Quota 10	05 - 2nd Semester	nts and Lab. B on Thurs. with 70			

BIOL2220	Princip	es of biochemistry (6 credits)		Academic Year	2019	
Offering Department	Biologica	Sciences		Quota	100	
Course Co-ordinator	Dr C S C	Lo, Biological Sciences (clivelo@hku.hk)				
Teachers Involved	(Dr C S C	Lo,Biological Sciences)				
Course Objectives		se is designed to provide undergraduate (non-b mistry as well as hands-on experience in biocher	, , ,	overview of funda	amental concept	
Course Contents & Topics	emphasis	An introduction to various biomolecules in terms of their structures, functions, syntheses and metabolisms, with emphasis on amino acids, proteins, enzymes, carbohydrates, lipids and nucleic acids. The correlations between their biochemical properties and their roles in various life processes will be illustrated.				
Course Learning	On succe	essful completion of this course, students should	be able to:			
Outcomes	CLO 1 d	escribe the key structural features of carbohydra	ites, proteins, lipids and	l nucleotides		
	CLO 2 u	nderstand the basic enzyme kinetic properties				
		xplain how the common sugars, fatty acids and ells	d amino acids are met	abolized and syn	thesized in livinç	
Pre-requisites	Pass in E	IOL1110; and				
(and Co-requisites and Impermissible combinations)	Not for st	udents who have passed in BIOC2600, or have a	already enrolled in this	course.		
Offer in 2019 - 2020	Y 1st	sem Offer in 2020 - 2021 : 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. Integration of the full range of appropriate theories, principles, evidence and techniques				
	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. General integration of theories, principles, evidence and techniques				
	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. Some partial integration of theories, principles, evidence and techniques					
		familiar situations. Some partial integration of theories, pri	incipics, evidence and teenin	ques		
	D	tamiliar situations. Some partial integration of theories, pri Demonstrate partial but limited command of knowledge a Show evidence of some coherent and logical thinking, bu knowledge to solve problems. Limited integration of theori	and skills required for attaini It with limited analytical and o	ng some of the cours critical abilities. Show		

	problems. Little or no or inapt integration of theories, principles, evidence and techniques					
Course Type	Lecture with laboratory component course					
Course Teaching	Activities	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		60	CLO 1,2,3		
	Laboratory reports		10	CLO 1,2,3		
	Test		30	CLO 1,2,3		
Required/recommended reading and online materials	L.A. Moran, H.R. Horton, K.G. International Edition)	Scrimgeour, M.D. Perry: Principle	es of Biochemistry 5th	edition (Pearson		
Course Website	http://moodle.hku.hk/					

BIOL2306	Ecology	and evolution (6 c	redits) Academic	Year 2019		
Offering Department	Biological	Sciences	Quota	80		
Course Co-ordinator	Prof D Du	dgeon, Biological Scier	nces (ddudgeon@hku.hk)			
Teachers Involved	,	udgeon,Biological Scier	,			
			component only),Biological Sciences)			
Course Objectives	explains h and non-li what we s	The interaction between organisms and their environment is addressed using an issue-based approach in order to explains how the ecology of plants and animals has been shaped by evolution through interactions with their living and non-living environment. The course also demonstrates how we can understand and explain the significance o what we see in nature using scientific methods. A field course component provides the opportunity to investigate how the environment influences community composition, biodiversity and adaptive radiation in a variety of habitats.				
Course Contents & Topics	and how r and adap species a ecology a evolutiona interaction structuring with the e record an environme that threat Lectures variety of	The environment influences organisms profoundly. It affects their present-day ecology (determining where they live and how many can survive there) and, through natural selection acting over past generations, influences their form and adaptations. Present day human-induced changes to the environment are also responsible for endangering species and degrading their habitats. This introductory course introduces some basic scientific principles of ecology and evolution, showing how they are linked to the environment by physiological tolerances and evolutionary adaptation which, in turn, lead to specialization and generate biodiversity. Individuals and their interactions will be a major focus of the course together with discussion of population dynamics, community structuring, life histories, and niche dynamics. The principles of ecology and evolution resulting from interaction with the environment will also be demonstrated by describing the origins of modern humans, including our fossil record and relationship to other primates, and the main ecological transformations caused by humans and their environmental impacts. The course will conclude with an account of the importance of biodiversity, and the factors that threaten it globally. Lectures are complemented by a 5-day residential field course during the Reading Week when students visit a variety of Hong Kong habitats to study their biodiversity, community composition and the relationship between organisms and their environment				
Course Learning			course, students should be able to:			
Outcomes	CLO 1 understand how scientific methods (hypotheses, experiments, comparisons) are used to investigate ecological and evolutionary processes CLO 2 understand the basic mechanism of natural selection, and how interactions with the environment lead to					
	adaptation and generate biodiversity					
	CLO 3 understand that ecology and behaviour can be interpreted in the light of selective pressures from the environment upon individual organisms					
	CLO 4 understand the ecological factors influencing evolution, using the human evolutionary tree as an example					
	CLO 5 understand the community ecology and biodiversity of selected Hong Kong habitats, and typical adaptations of organisms found there					
Pre-requisites	Pass in B	IOL1110 or BIOL1309 o	or ENVS1301 or ENVS1401			
(and Co-requisites and Impermissible combinations)						
Offer in 2019 - 2020	Y 1st	sem Offer in 2020 - 2	2021 : Y Examinat	on Dec		
Grade Descriptors (A+ to F)	A	learning outcomes, and e	ear-complete understanding and a thorough grasp of the subject as dem xcellent use of named (organism) examples, including local species a nal and/or analytical skills and fieldwork techniques. Excellent or outstar level.	nd habitats. Show exceller		
	В	Evidence of substantial uno outcomes, and use of r	derstanding and a good grasp of the subject as demonstrated by attainm named (organism) examples, including local species and habitats. tical skills and fieldwork techniques. Work more than sufficient for what it	Show good organizational		
	С	Evidence of general unde incomplete attainment of	rstanding with an adequate (but incomplete) grasp of the subject, as most of the learning outcomes, with limited use of named (orga presentational and/or analytical skills and fieldwork techniques. Work subjects to the subject in the subject is a subject to the subject in the subject is a subject to the subject in the subject is a subject to the sub	lemonstrated by general bunism) examples. Show fai		
	D	Evidence of retention of a incomplete), as demonstr	minimum of relevant information and incomplete understanding of the sated by partial but limited attainment of learning outcomes. Insufficianisms. Work merely (for D+) or barely (D) adequate for what is required	ent familiarity with fieldwork		
	Fail		quate knowledge and understanding of the subject such that the majority dence of familiarity with fieldwork techniques, habitats or organisms. Wor			
Course Type		ith laboratory compone				
Course Teaching	Activities	3	Details	No. of Hours		
& Learning Activities	Lectures		24 hours lectures, plus 10 hours of lectures durir residential field course	34		
	Laborator	гу	at least 36 hours field and laboratory work, as groups a individuals	36		
	Reading	/ Self study	during the semester in the form of internet tutorial assigned reading and a laboratory workshop	80		

Assessment Methods and Weighting	Methods	Assessment Methods to CLO Mapping		
	Assignments		30	CLO 5
	Examination		70	CLO 1,2,3,4
Required/recommended reading and online materials	Boyd, R. & Silk, J.B. (1997) How Hibrary.) Stilling, P. (2002) Ecology: Theorie An up-to-date list of references to relevant to each lecture will be pro	s and Applications (4th Edition). Po the primary scientific literature, b	rentice Hall, Singapore.	
Course Website	http://moodle.hku.hk			
Additional Course Information	A compulsory 5-day residential fiel Details of the location and cost of t will be made available at the start per head in 2019-2020 around \$11	the residential field course, which wo of the semester. Priority will be give	vill be held in the Reading	

BIOL2408	Green ea	arth-plants and mar	nkind (6 credits)	Academic Yea	r 2019		
Offering Department	Biological		•	Quota	40		
Course Co-ordinator	Prof. M L	of, M.L. Chye, Biological Sciences (mlchye@hku.hk)					
Teachers Involved	(Prof. M L	Prof. M L Chye, 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 on the essential attributes of plants to humans. At the end of the course, students are expected to know the distinct eatures 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	The impor	The importance of plants to human. How to be a plant? Types of plant biotic interactions. Plant-plant interactions. Plants and pathogens. Phytohormones. Plants and environment. Genetic improvements in agriculture. You are what you eat? Medicinal plants.					
Course Learning		.	course, students should be able	to:			
Outcomes	CLO 1 Re	ealize how plant structur	re enables functions				
	CLO 2 Co	omprehend the essentia	als of plant growth and developm	nent			
		nderstand the abilities	of plants to detect, process, a	and interpret information from	their surrounding		
		ecognize the interaction ppreciate the contributio	s of plant with the living and non or plants to humans	-living environment			
Pre-requisites	Pass in BI	•	e. piante te mantane				
(and Co-requisites and Impermissible combinations)	1 400 111 51	1021110					
Offer in 2019 - 2020	N Offe	er in 2020 - 2021 : Y		Examination			
Grade Descriptors	A		stery at an advanced level of extensive		attaining all the cours		
(A+ to F)		learning outcomes. Demons with evidence of original that appropriate and insightful or	strate thorough grasp of the subject. Sh hought. Apply highly effective lab skills onclusions. Apply highly effective organi	now strong analytical and critical abiliti s and techniques. Critical use of dat zational and presentational skills.	es and logical thinking a and results to draw		
	B 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 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 appropriate conclusions. 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 Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes 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 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 Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes 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 skills and techniques Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimall effective or ineffective.						
		Misuse of data and results			ence of little or lack of skills and techniques		
Course Type	Lecture wi	Misuse of data and results	and/or unable to draw appropriate cond		ence of little or lack on skills and techniques		
Course Teaching	Lecture wi	Misuse of data and results effective or ineffective. rith laboratory componer	and/or unable to draw appropriate cond		ence of little or lack on skills and techniques		
Course Teaching	-	Misuse of data and results effective or ineffective. rith laboratory componer	and/or unable to draw appropriate cond nt course		ence of little or lack o skills and techniques nal skills are minimall		
Course Teaching	Activities	Misuse of data and results effective or ineffective. rith laboratory componers	and/or unable to draw appropriate cond nt course		ence of little or lack of skills and techniques anal skills are minimall No. of Hours		
Course Teaching	Activities Lectures	Misuse of data and results effective or ineffective. rith laboratory componers	and/or unable to draw appropriate cond nt course		ence of little or lack of skills and techniques on al skills are minimall No. of Hours 24		
Course Teaching	Activities Lectures Laborator Tutorials	Misuse of data and results effective or ineffective. rith laboratory componers	and/or unable to draw appropriate cond nt course		ence of little or lack of skills and techniques on al skills are minimall No. of Hours 24 24		
Course Teaching & Learning Activities Assessment Methods	Activities Lectures Laborator Tutorials	Misuse of data and results effective or ineffective. rith laboratory componer s ry / Self study	and/or unable to draw appropriate cond nt course		No. of Hours 24 24 6 100 Assessment Methods		
Course Teaching & Learning Activities Assessment Methods	Activities Lectures Laborator Tutorials Reading /	Misuse of data and results effective or ineffective. rith laboratory componer s ry / Self study	and/or unable to draw appropriate cond nt course Details	clusions. Órganization and presentation	No. of Hours 24 24 6 100 Assessment		
Course Teaching & Learning Activities Assessment Methods	Activities Lectures Laborator Tutorials Reading / Methods	Misuse of data and results effective or ineffective. irith laboratory componer is effective. / Self study ents	and/or unable to draw appropriate cond nt course Details	Weighting in final course grade (%)	No. of Hours 24 24 6 100 Assessment Methods to CLO Mapping		
Course Teaching & Learning Activities Assessment Methods	Activities Lectures Laborator Tutorials Reading / Methods Assignme Examinati	Misuse of data and results effective or ineffective. irith laboratory componer is ry / Self study ents tion	and/or unable to draw appropriate cond nt course Details	Weighting in final course grade (%)	No. of Hours 24 24 6 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5 CLO 1,2,3,4,5		
Course Teaching & Learning Activities Assessment Methods and Weighting	Activities Lectures Laborator Tutorials Reading / Methods Assignme Examinati Laborator	Misuse of data and results effective or ineffective. irith laboratory componer is ry / Self study ents tion ry reports	and/or unable to draw appropriate cond nt course Details	Weighting in final course grade (%)	No. of Hours 24 24 6 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5		
Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended reading and	Activities Lectures Laborator Tutorials Reading / Methods Assignme Examinati Laborator Core Text 1. Simpso Reference 1. Teachii	Misuse of data and results effective or ineffective. rith laboratory componer is ry / Self study ents tion ry reports thooks on, B.B. & M.C. Ogorzal es and Online Materials ing Tools in Plant Biolog	and/or unable to draw appropriate condition to course Details Details Details ly. 2014. Economic Botany: Plan gy: http://www.plantcell.org/site/te/	Weighting in final course grade (%) 15 70 15 ats in our World. McGraw-Hill.	No. of Hours 24 24 6 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5 CLO 1,2,3,4,5		
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended reading and online materials	Activities Lectures Laborator Tutorials Reading / Methods Assignme Examinati Laborator Core Text 1. Simpso Reference 1. Teachi 2. Levetin	Misuse of data and results effective or ineffective. rith laboratory componer is ry / Self study ents tion ry reports thooks on, B.B. & M.C. Ogorzal es and Online Materials ing Tools in Plant Biolog in E. & McMahon, K. 201	and/or unable to draw appropriate conditions to course Details Details Details Ly. 2014. Economic Botany: Plan	Weighting in final course grade (%) 15 70 15 ats in our World. McGraw-Hill.	No. of Hours 24 24 6 100 Assessment Methods to CLO Mappin: CLO 1,2,3,4,5 CLO 1,2,3,4,5		
Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended reading and	Activities Lectures Laborator Tutorials Reading / Methods Assignme Examinati Laborator Core Text 1. Simpso Reference 1. Teachi 2. Levetin http://moo	Misuse of data and results effective or ineffective. irith laboratory componer is ry / Self study ents tion ry reports tbooks on, B.B. & M.C. Ogorzal es and Online Materials ing Tools in Plant Biolog n E. & McMahon, K. 201 odle.hku.hk	and/or unable to draw appropriate condition to course Details Details Details ly. 2014. Economic Botany: Plan gy: http://www.plantcell.org/site/te/	Weighting in final course grade (%) 15 70 15 15 ats in our World. McGraw-Hill.	No. of Hours 24 24 6 100 Assessment Methods to CLO Mappin: CLO 1,2,3,4,5 CLO 1,2,3,4,5		

BIOL2409	Biotechnology industry and entrepreneurship (6 credits)	Academic Year	2019

Offering Department		l Sciences		Quota	40		
Course Co-ordinator		Lim, Biological Scien	, ,				
Teachers Involved	(Dr Ng,G	or K W Y Yuen,School of Biological Sciences) or Ng,Guest Lecture) or W B Lim,School of Biological Sciences)					
Course Objectives	The cours	e course will give an overview of the innovative developments in biotech industry and provide the students with eful tools in learning how an exciting research idea can be turned into a viable business.					
Course Contents				eneurial process with a focus on t	he biotechnology		
& Topics	industry. entreprento develo firm. Topi covered a be preser Topics:	!					
	2. IP right 3. Licensi 4. Techno 5. How to 6. Agrobio 7. Drug d	ts: Patent application ing of IP rights (3 hou blogy Transfer Office oraise fund for startu otechnology and Gre evelopment and clini	and HKSTP (3 hours) p companies (3 hours)? een Tech (Monsanto, Novozym ical trials (Gilead Sciences, Wi	Ŏ, PCT (6 hours)			
	9. Compa 10. Comp	ostics business (BGI, any analysis (3 hours pany Visit pany analysis	Diagcor, etc) (4.5 hours)				
Course Learning			his course, students should be	able to:			
Outcomes	CLO 2 u	nderstand and demo	nstrate how discoveries and ir	lopment and management of bio eventions are commercialized a biotechnology derived product:	<u> </u>		
	CLO 4 gain technical and business knowledge of the biotechnology and bioprocessing industries CLO 5 participate and contribute to the business side of scientific enterprises						
Pre-requisites	Pass in 1	•	due to the business side of sci	enunc enterprises			
(and Co-requisites and Impermissible combinations)		students who have pa	assed in BIOL3409.				
Offer in 2019 - 2020	Y 2nd	d sem Offer in 202	0 - 2021 · Y	Examinatio	n No Exam		
Grade Descriptors	A	Students acquire excep	ptional skills and knowledge from the	course and are capable of independently			
(A+ to F)	В	technological developments of various biotechnology ventures. Students demonstrate a broad and in-depth understanding of the current developments in biotechnology industry and a capable of analyzing the business and technological developments of various biotechnology ventures under guidance.					
	С	Students demonstrate	a broad and in-depth understanding o	f the current developments in biotechnolo	gy industry.		
	D	Students demonstrate	a moderate understanding of the curre	ent developments in biotechnology indust	ry.		
	Fail	Students fail to demons	strate a moderate understanding of th	e current developments in biotechnology	industry.		
Course Type	Lecture-b	ased course					
Course Teaching	Activitie	S	Details		No. of Hours		
Learning Activities	Lectures						
=	Field wor						
	Group we	ork	Presentation	Presentation			
		/ Self study					
	Assessm	,			60		
Assessment Methods and Weighting	Methods	3	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments			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 online materials	McGraw I	Hill annual reports	Dorf, Andrew J. Nelson (2011) Technology Ventures: From Ide	a to Enterprise 3rd ed		
Course Website		odle.hku.hk/					
Additional Course	This cour	s course will be offered subject to a minimum enrollment number and availability of teachers. ority will be given to students majoring or minoring in MBB					

BIOL3101	Animal behaviour (6 credits)	Academic Year	2019		
Offering Department	Biological Sciences	Quota	30		
Course Co-ordinator	Dr S Sin, Biological Sciences (sinyw@hku.hk)				
Teachers Involved	(Dr S Sin,School of Biological Sciences)				
Course Objectives	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	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 stud	lents a unique perspectiv	e on the natural world ar	nd our own spec	cies.	
Course Learning	On succe	essful completion of this	course, students should I	be able to:		
Outcomes	CLO 1 le	earn and appreciate the	mechanism, function, dev	velopment, and	evolution of animal be	haviour
	CLO 2 t	understand the complexit	y of interactions between	natural and se	xual selection and ani	mal behaviour
	CLO 3 a	appreciate current theorie	es that form basis for mod	dern understand	ling of animal behavio	ur
	CLO 4	earn the scientific reason	ning and methodology in t	the field of Anim	nal Behaviour	
		hink analytically, based ι he natural world and our	ipon ecological and evolution own specie	utionary principl	es, to explain the beh	aviours observed in
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in B	BIOL2306				
Offer in 2019 - 2020	Y 1s	st sem Offer in 2020 - 2	021 : Y		Examination	Dec
Grade Descriptors (A+ to F)	A	excellent use of named exa of fundamental concepts to	asp of the subject in a broader amples and case studies. Evide draw insightful and logical con s with excellent analytical argur	ence of independen aclusions. Show eac	t critical thought with excell gerness to learn, great abilit	ent use of a broad range ies of independent work
	В					
	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.					
Course Type	Lecture v	with laboratory componer	nt course			
Course Teaching	Activitie	•	Details		No. of Hours	
& Learning Activities	Lectures	3			24	
_	Laborate	orv	Lab work, field trips, or debates/presentations		24	
	Tutorials	•				6
	Reading	/ Self study				100
Assessment Methods and Weighting	Method	•	Details		Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignm	nents			50	CLO 1,2,3,4,5
	Examina	ation			50	CLO 1,2,3,4,5
Required/recommended reading and	D. R. Ru 2018.	benstein & J. Alcock. Ar	nimal Behavior: An Evolu	tionary Approac	ch. Oxford University	Press; 11th edition
online materials	N. B. Da	vies, J. R. Krebs & S. A.	West. An Introduction to	Behavioural Ec	ology. Wiley-Blackwel	l; 4th edition; 2012.
Course Website		odle.hku.hk				
Additional Course Information	This cou	rse will be offered subjec	et to a minimum enrollme	nt number and a	availability of teachers	

BIOL3105	Animal physiology and environmental adaptation (6 credits)	Academic Year	2019			
Offering Department	Biological Sciences	logical Sciences Quota 60				
Course Co-ordinator	Prof A O L Wong, Biological Sciences (olwong@hku.hk)					
Teachers Involved	(Dr W Y Lui,Biological Sciences) (Prof A O L Wong,Biological Sciences) (Prof A S T Wong,Biological Sciences)					
Course Objectives	habitats. Stress will be given to the functional interactions between animals mechanisms by which animals obtain resources for survival from the envir	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	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 metabolism.					
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 have a broad understanding on functional interactions between animals and their environment					
	CLO 2 appreciate the role of the environment in shaping the evolution of animal structures & functions					
	CLO 3 comprehend a wide range of physiological adaptations (both structurally & functionally) in coping with environmental stress and environmental changes					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BIOL2103 or BIOL2220 or BIOC2600 or MEDE2301					
Offer in 2019 - 2020	N Offer in 2020 - 2021 : Y	Examination				
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge outcomes. Show strong analytical and critical abilities and logical thinking, with					

			of complex, familiar and unfamiliar situ ormed, thoughtful intellectual engagemer		
	В	Demonstrate substantial co- outcomes. Show evidence of	mmand of a broad range of knowledge of analytical and critical abilities and logi Apply effective organizational skills. Wr	required for attaining at least mo- cal thinking, and ability to apply k	st of the course learning nowledge to familiar and
	С	evidence of some analytical Apply moderately effective	complete command of knowledge require and critical abilities and logical thinking organizational skills. Writings mostly in sufficient depth, breadth or understandin	, and ability to apply knowledge to dicate informed, intellectual engag	most familiar situations.
	D	evidence of some coherent knowledge to solve proble	ited command of knowledge required for and logical thinking, but with limited a ems. Apply limited or barely effective or theories but mostly at a superficial leve	nalytical and critical abilities. Sho organizational skills. Writings ind	w limited ability to apply
	Fail	analytical and critical abilitie	idence of command of knowledge requipments, logical and coherent thinking. Show white the control of the contro	ery little or no ability to apply know	rledge to solve problems.
Course Type	Lecture-b	pased course	·		
Course Teaching	Activities		Details		No. of Hours
& Learning Activities	Lectures				36
	Tutorials				12
	Reading / Self study				100
Assessment Methods and Weighting	Methods	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Examina	ation		70	CLO 1,2,3
	Test		test & continual assessment	30	CLO 1,2,3
Required/recommended reading and online materials	Christopher D. Moyes & Patricia M. Schulte (2015), Principles of Animal Physiology, Pearson. Richard W. Hill, Gordon A. Wyse & Margaret Anderson (2012), Animal Physiology, Sinauer Associate. E. N. Marieb (2012), Essentials of Human Anatomy & Physiology. Benjamin Cummings.				sociate.
Course Website	http://mo	odle.hku.hk/		-	
Additional Course Information		teefer to the Website of School of Biological Sciences. his course will be offered subject to a minimum enrollment number and availability of teachers.			

BIOL3107	Plant ph	ysiology (6 cr	redits)	Acade	mic Year	2019	
Offering Department	Biological	Sciences		Quota		30	
Course Co-ordinator	TBC, Biol	ogical Sciences (()				
Teachers Involved	(TBC,Biol	ogical Sciences)					
Course Objectives	To give a mechanis	,	g of plant processes such a	as plant growth and developr	nent and	I their regulatory	
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 succe	ssful completion	of this course, students should	be able to:			
Outcomes	CLO 1	understand the st	tudy of plant biology using mu	tants in model plant Arabidopsis	;		
				nanipulating plant gene expressi			
	CLO 3	understand the re	egulation of plant growth and c	development by various plant ho	rmones		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in B	IOL2103					
Offer in 2019 - 2020	N Off	er in 2020 - 2021	: N	Examiı	nation		
Grade Descriptors (A+ to F)	A In written examination: Exceptionally good organization and presentation, the discussion would be very clearly written and show evidence of originality. In practical sessions: excellent insight in to the practical aims; submit good reports.						
(11.101)	B In written examination: coherent organization and clear presentation, the discussion would be a complete and critical response to questions. In practical sessions: full understanding of the practical aims; submit accurate reports.						
	C 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.						
	In written examination and practical sessions: Some knowledge of the material is evident, but there are serious deficiencies in understanding, organization, clarity or accuracy. Write-ups that are unduly brief would fall into this category.						
	Fail		ation and practical sessions: Poor kanswers are largely irrelevant.	nowledge and understanding of the	subject, a I	lack of coherent and	
Course Type	Lecture w	ith laboratory con	mponent course				
Course Teaching	Activities	•	Details			No. of Hours	
& Learning Activities	Lectures					24	
	Laborator	ry				24	
	Tutorials	•				6	
	Reading	/ Self study				100	
Assessment Methods and Weighting	Methods		Details	Weighting in to	(%)	Assessment Methods to CLO Mapping	
	Examination			75		CLO 1,2,3	
	Laboratory reports 25				CLO 3		
Required/recommended	P. J. Davis: Plant Hormones: Physiology, Biochemistry and Molecular Biology (Martinus 2nd ed.) P.J. Davis: Plant Hormones: Biosynthesis, Signal Transduction, Action! (Springer Nether Lecturing materials and journal articles will be posted on HKU Moodle.			,	•		
•		materials and iou	urnal articles will be posted on	HKU Moodle.			
reading and online materials Course Website	Lecturing	materials and jou odle.hku.hk/	urnal articles will be posted on	HKU Moodle.			

BIOL3108	Microbial physiology (6 credits)			Academic Yea	r 2019		
Offering Department	Biological			Quota	50		
Course Co-ordinator	Dr A Yan,	Dr A Yan, Biological Sciences (ayan8@hku.hk)					
Teachers Involved	(Dr A Yan,Biological Sciences)						
Course Objectives	pharmaceumolecular foundation: Upon com	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					
Course Contents & Topics	organized these thre including: microbes', metabolism	able to relate knowledge to various microbial applications. Serving as a fundamental course for the understanding of the world of microorganisms, Microbial Physiology is organized and presented in three themes: 'Microbial Rules', 'Microbial Breath', and 'Microbial Adaption'. 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 'Regulation and control of metabolic Activities'. Topics are taught in a coherent manner with a highly interactive tutorial session following each of the topics such that students will achieve a high quality,					
Course Learning	On succes	sful completion of this	course, students should be	able to:			
Outcomes Pre-requisites	CLO 2 cc CLO 3 re CLO 4 de	omprehend the principle elate knowledge to prac	les underlying the dynamic r ctical application of microbe and assess scientific literati	•	sponses		
(and Co-requisites and Impermissible combinations)			o. 5.00000 1				
Offer in 2019 - 2020	N Offe	er in 2020 - 2021 : N		Examination			
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. C 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 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. 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.						
Course Type	Lecture-ba	ased course	•				
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures				36		
	Tutorials				12		
	Project wo	ork			2		
		Self study			100		
Assessment Methods and Weighting	Methods	·	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme			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	Primary Text Book: Prescott, Harley, and Klein's Microbiology, by Joanne M. Willey, Linda M. Sherwood, and Christopher Woolverton, published by McGraw-Hill Supplementary Reading: On-line textbook of Bacteriology: Kenneth Tobar, U. of Wisconsin-Madison, Department of Bacteriology. UR						
		0,	•				
Course Website	(http://www	v.textbookofbacteriolog	•				
	(http://www http://mood	v.textbookofbacteriolog dle.hku.hk/	gy.net/)	, ' '			
Course Website Additional Course Information	(http://www http://mood	v.textbookofbacteriolog dle.hku.hk/	gy.net/)	number and availability of teachers.			

BIOL3109	Environmental microbiology (6 credits)	Academic Year	2019			
Offering Department	Biological Sciences	Quota	40			
Course Co-ordinator	Dr J D Gu, Biological Sciences (jdgu@hku.hk)					
Teachers Involved	(Dr J D Gu,Biological Sciences)					
Course Objectives	To familiarize students with the role of various microorganisms in natural process which affect our environment, such as cycling of chemical elements, interactions with plants and animals, and the way in which they carry out biodegradation of environmentally important pollutants. Selective groups of microorganism will be examined in detail for their biochemical processes. Key concepts are illustrated with known examples and cases					
Course Contents & Topics	Advanced aspects of microbial diversity, ecology and growth Contribution of microbial metabolism to biogeochemical processes important in cycling of nutrients Microbial interactions with plants and animals Microbial metabolism of organic compounds, metals and man-made polymers Training in laboratory and field microbiological research technique					
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 understand a range of microorganisms in the environment in terms of their roles and function as well as biochemical capability and host range					

	CLO 2 k	now the specific bioch	nemical processes, en	nzymes involved and reactions ca	rried by selective		
	microorganisms and their distribution in the environment						
	CLO 3 a	pply the appropriate tech	nniques in environmenta	l and microbial research			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	BIOL2103					
Offer in 2019 - 2020	Y 2n	7 2nd sem Offer in 2020 - 2021 : Y Examination May					
Grade Descriptors (A+ to F)	A	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	outcomes. Substantial gras	p of the subject. Show eviden	and skills required for attaining at least mos ice of analytical and critical abilities and logice s to draw appropriate conclusions. Apply effo	I thinking. Apply effective		
	С	but incomplete grasp of the effective lab skills and tech	e subject. Evidence of some	Is required for attaining most of the course lea analytical and critical abilities and logical th me erroneous use of data and results to draw anal skills.	inking. Apply moderately		
	D	limited grasp, with retention limited analytical and critical	of some relevant information, al abilities. Partially effective la	quired for attaining some of the course learni of the subject. Evidence of some coherent an ab skills and techniques. Limited ability to use organizational and presentational skills.	d logical thinking, but with		
	Fail	Little or no evidence of com or no grasp of the knowledge and coherent thinking. Mini	tle or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Evidence of little no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logica d coherent thinking. Minimally effective or ineffective lab skills and techniques. Misuse of data and results and/or unable to aw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.				
Course Type	Lecture v	vith laboratory componer	•	•			
Course Teaching	Activitie		Details		No. of Hours		
& Learning Activities	Lectures				24		
_	Laboratory				24		
	Field work				2		
	Project work				2		
	Tutorials				4		
	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		
	Examina			50	CLO 1,2,3		
	Laborato	ory reports		25	CLO 1,2,3		
	Presenta		including report	10	CLO 1,2,3		
	Test			5	CLO 1,2,3		
Required/recommended reading and online materials	M.T. Madigan, J. M. Martinko, P.V. Dunlap and D.P. Clark: Brock Biology of Microorganisms (Pearson/Benjamin Cummings, 2009, 12th ed.) R.M. Atlas and R. Bartha: Microbial Ecology: Fundamentals and Applications (Benjamin Cummings, 1998, 4th ed.) References Molecular Biology of the Cell - Fifth Edition by Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, Peter Walter (December 2007) R. Mitchell and JD. Gu: Environmental Microbiology (Wiley-Blackwell, 2009, 2nd ed.)						
Course Website		odle.hku.hk/	Tiorital Wildiobiology (VVII	big bigonwoll, 2000, 211g cg.)			
Additional Course Information			t to a minimum enrollme	ent number and availability of teachers	S.		

BIOL3110	Environmental toxicology (6 credits)	Academic Year	2019					
Offering Department	Biological Sciences	Quota	60					
Course Co-ordinator	Dr J D Gu, Biological Sciences (jdgu@hku.hk)							
Teachers Involved	(Dr J D Gu,Biological Sciences)							
Course Objectives	To introduce students to the basic principles of environmental and ecological toxicology by analysis of the fate of pollutants in lithosphere, hydrosphere, atmosphere and biosphere. Mechanisms of toxicity as dose-response will be analyzed through adsorption, metabolism, toxicity and elimination. Major metabolic processes and enzymest involved will be highlighted. Specific cases of toxicity will be presented and discussed.							
Course Contents & Topics	Environmental chemistry of pollutants and their toxicity and factors governi biomagnification Partitioning and transformation of environmental pollutants Quantitative toxicology using dose-response approaches Emerging endocrine-disrupting chemicals and carcinogens at molecular levents. Elimination of pollutants from the environments Elaboratory testing of toxicity and review various adsorption isotherm models.	els	accumulation and					
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 analysis CLO 3 understand mechanism of toxicity from specific pollutants of choice CLO 4 understand specific biochemical processes and enzymes involved in pollutants transformation and mineralization CLO 5 understand appropriate techniques in environmental cleaning up							
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BIOL2103 or CHEM3141 or ENVS3042							
Offer in 2019 - 2020	Y 2nd sem Offer in 2020 - 2021 : Y	Examination	May					
Grade Descriptors	A Thorough mastery at an advanced level of extensive knowledge and skills required	for attaining all the cours	se learning outcomes					

(A+ to F)		original thought. Apply high	ect matter. Show very strong analytical and critic ly effective lab skills and techniques. Critical use ffective organizational and presentational skills.				
	В						
	С	but incomplete grasp of the effective lab skills and tech	mmand of knowledge and skills required for attain e subject. Evidence of some analytical and crit niques. Mostly correct but some erroneous use of organizational and presentational skills.	ical abilities and logical thinki	ing. Apply moderately		
	D	limited grasp, with retention limited analytical and critical	nd of knowledge and skills required for attaining of some relevant information, of the subject. Evic al abilities. Partially effective lab skills and technic pply limited or barely effective organizational and	dence of some coherent and lo ques. Limited ability to use da	gical thinking, but with		
	Fail	Little or no evidence of cor or no grasp of the knowled and coherent thinking. Min	nmand of knowledge and skills required for attain ge and understanding of the subject. Evidence of imally effective or ineffective lab skills and techn ns. Organization and presentational skills are min	ning the course learning outco little or lack of analytical and iiques. Misuse of data and re	critical abilities, logical		
Course Type	Lecture	with laboratory componer	nt course	•			
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures			24			
-	Laboratory		laboratory, assignment; and seminar		36		
	Reading / Self study				100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Examination			60	CLO 1,2,3,4,5		
	Laboratory reports		student-based assessment includes laboratory report, assignment, presentations or other forms	40	CLO 1,2,3,4,5		
Required/recommended reading and online materials	W. Stum	D.G. Crosby: Environmental Toxicology and Chemistry (Oxford, 1998) W. Stumm, J.J. Morgan: Aquatic Chemistry: Chemical Equlibria and Rates in Natural Waters (Wiley, 1995, 3rd ed.) R. Mitchell and JD. Gu: Environmental Microbiology (Wiley-Blackwell, 2009, 2nd ed.)					
Course Website	http://mo	odle.hku.hk/		,			
Additional Course Information	This cou	p.//moodie.hkd.hk/ iis course will be offered subject to a minimum enrollment number and availability of teachers.					

BIOL3201	Food ch	nemistry (6 credits)		Academic Year	2019		
Offering Department	Biologica	l Sciences		Quota	30		
Course Co-ordinator	Dr J C Y	Dr J C Y Lee, Biological Sciences (jettylee@hku.hk)					
Teachers Involved	(Dr J C Y	Lee, School of Biologic	al Sciences)				
	(TBC,Sch	nool of Biological Science	ces)				
Course Objectives		de a basic understandi food science and nutrit	ing of chemistry in food systems, and tion.	to provide practical train	ning in chemistry		
Course Contents & Topics	compone properties reactions methods	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. A series of laboratory sessions will cover analysis of food components, protein chemistry, lipid oxidation, properties of sugars and starches, enzymatic and non-enzymatic browning reactions, and sensory analysis of foods.					
Course Learning	On succe	essful completion of this	course, students should be able to:				
Outcomes	CLO 1 u	nderstand the functions	and properties of major and minor food	components			
	CLO 2 u	nderstand the basic che	emistry behind food processing	•			
	CLO 3 have integrated their knowledge of biological and chemical principles into a food science and nut						
5	C	ontext		•			
(and Co-requisites and Impermissible	Pass in B	ontext BIOC2600 or BIOL2103	or BIOL2220 or MEDE2301; and NOT for admitted in 2016-2017 or before.	•			
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020	Pass in B This cour	ontext BIOC2600 or BIOL2103	or BIOL2220 or MEDE2301; and NOT fo admitted in 2016-2017 or before.	•			
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020	Pass in B This cour	context BIOC2600 or BIOL2103 Is e is only for students a t sem Offer in 2020 - 2 Demonstrate thorough gra and can readily apply this and insightful conclusions. Demonstrate substantial g	or BIOL2220 or MEDE2301; and NOT for admitted in 2016-2017 or before. 2021: Y asp of the subject matter covered. Show extensive knowledge. Critically use lab skills and techniques grasp of the subject matter covered. Show thorough	Examination knowledge and understanding and analysis of data and result	Dec of the topics covered s to draw appropriate of the content and a		
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Pass in B This cour	se is only for students a t sem Offer in 2020 - 2 Demonstrate thorough grand can readily apply this and insightful conclusions. Demonstrate substantial ghigh level of competence	or BIOL2220 or MEDE2301; and NOT for admitted in 2016-2017 or before. 2021: Y asp of the subject matter covered. Show extensive knowledge. Critically use lab skills and techniques in the topics covered and able to apply this knowle	Examination knowledge and understanding and analysis of data and result h knowledge and understanding and analysis of other situation and situation begins and situation when the situation and situation are situation and situation and situation and situation are situation are situation and situation are situation and situation are situation and situation are situation are situation and situation are situation and situation are situation are situation and situation are situat	Dec of the topics covered s to draw appropriate g of the content and a		
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Pass in B This cour	ontext BIOC2600 or BIOL2103 se is only for students a t sem Offer in 2020 - 2 Demonstrate thorough gra and can readily apply this and insightful conclusions. Demonstrate substantial g high level of competence techniques and analysis o Demonstrate general but understanding of the mair	or BIOL2220 or MEDE2301; and NOT for admitted in 2016-2017 or before. 2021: Y asp of the subject matter covered. Show extensive knowledge. Critically use lab skills and techniques grasp of the subject matter covered. Show thorough	Examination knowledge and understanding and analysis of data and result in knowledge and understanding edge and skills to most situation inclusions. gred. The student has a soulevel of competence in the top	Dec of the topics covered s to draw appropriate g of the content and ans. Use lab skills and		
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Pass in B This cour Y 1st A B C	bontext BIOC2600 or BIOL2103 Se is only for students a t sem Offer in 2020 - 2 Demonstrate thorough graand can readily apply this and insightful conclusions. Demonstrate substantial ghigh level of competence techniques and analysis of Demonstrate general but understanding of the mair skills and techniques and in Demonstrate partial but lik knowledge and understand and techniques and analysis and techniques and	or BIOL2220 or MEDE2301; and NOT for admitted in 2016-2017 or before. 2021: Y asp of the subject matter covered. Show extensive knowledge. Critically use lab skills and techniques in the topics covered and able to apply this knowlef data and results to draw generally appropriate cort incomplete grasp of the subject matter covered and as achieved an adequate analysis of data and results to draw moderately appropriate grasp, with retention of some relevant inform ding of the content and has achieved a limited leve sis of data and results to draw appropriate conclusi	Examination knowledge and understanding and analysis of data and result h knowledge and understanding edge and skills to most situation inclusions. Iteration to the subject matter competence in the top propriate conclusions. mation of the subject matter competence in the topics of competence in the topics of some personal to the subject matter competence in the topics of some occasionally.	Dec of the topics covered s to draw appropriate g of the content and a ns. Use lab skills and lind knowledge and lics covered. Use lab wered. Show a basic overed. Use lab skills		
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Pass in B This cour Y 1st A B	ontext BIOC2600 or BIOL2103 se is only for students a t sem Offer in 2020 - 2 Demonstrate thorough gra and can readily apply this and insightful conclusions. Demonstrate substantial g high level of competence techniques and analysis o Demonstrate general bu understanding of the mair skills and techniques and i Demonstrate partial but lir knowledge and understan and techniques and analys Demonstrate little or no knowledge and understan knowledge and understan	or BIOL2220 or MEDE2301; and NOT for admitted in 2016-2017 or before. 2021: Y asp of the subject matter covered. Show extensive knowledge. Critically use lab skills and techniques in the topics covered and able to apply this knowlef data and results to draw generally appropriate cort incomplete grasp of the subject matter cover a reas of content and has achieved an adequate analysis of data and results to draw moderately appropriate grasp, with retention of some relevant informiding of the content and has achieved a limited leve sis of data and results to draw appropriate conclusi grasp, with retention of little relevant information, adding in few areas of the content and has achieven ding of the areas of the content and has achieven ding of the areas of the content and has achieven ding of the contiques and analysis of data and results in	Examination knowledge and understanding and analysis of data and result in knowledge and understanding edge and skills to most situation inclusions. Ired. The student has a soulevel of competence in the top propriate conclusions. mation of the subject matter coel of competence in the topics of consoccasionally. of the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited very	Dec of the topics covered s to draw appropriate g of the content and a ns. Use lab skills and ind knowledge and oics covered. Use lab wered. Show a basic overed. Use lab skills d. Show elementary n some of the topics		
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	Pass in B This cour Y 1st A B C D	bontext BIOC2600 or BIOL2103 se is only for students a t sem Offer in 2020 - 2 Demonstrate thorough graand can readily apply this and insightful conclusions. Demonstrate substantial ghigh level of competence techniques and analysis oo Demonstrate general but understanding of the mair skills and techniques and in Demonstrate partial but lik knowledge and understand techniques and analyse Demonstrate little or no knowledge and understan covered. Use lab skills and selections and analyse the selection of the selec	or BIOL2220 or MEDE2301; and NOT for admitted in 2016-2017 or before. 2021: Y asp of the subject matter covered. Show extensive knowledge. Critically use lab skills and techniques in the topics covered and able to apply this knowlef data and results to draw generally appropriate cort incomplete grasp of the subject matter cover a areas of content and has achieved an adequate analysis of data and results to draw moderately apprinted grasp, with retention of some relevant informiding of the content and has achieved a limited leve sis of data and results to draw appropriate conclusi grasp, with retention of little relevant information, uding in few areas of the content and has achieven and techniques and analysis of data and results in ions.	Examination knowledge and understanding and analysis of data and result in knowledge and understanding edge and skills to most situation inclusions. Ired. The student has a soulevel of competence in the top propriate conclusions. mation of the subject matter coel of competence in the topics of consoccasionally. of the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited very	Dec of the topics covered s to draw appropriate g of the content and a ns. Use lab skills and ind knowledge and oics covered. Use lab wered. Show a basic overed. Use lab skills d. Show elementary n some of the topics		
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	Pass in B This cour Y 1st A B C D	bontext BIOC2600 or BIOL2103 Se is only for students at sem Offer in 2020 - 2 Demonstrate thorough gram and can readily apply this and insightful conclusions. Demonstrate substantial high level of competence techniques and analysis of Demonstrate general but understanding of the mair skills and techniques and substantial but linknowledge and understant and techniques and analys Demonstrate little or no knowledge and understant covered. Use lab skills at usually erroneous conclus with laboratory componers.	or BIOL2220 or MEDE2301; and NOT for admitted in 2016-2017 or before. 2021: Y asp of the subject matter covered. Show extensive knowledge. Critically use lab skills and techniques in the topics covered and able to apply this knowlef data and results to draw generally appropriate cort incomplete grasp of the subject matter cover a areas of content and has achieved an adequate analysis of data and results to draw moderately apprinted grasp, with retention of some relevant informiding of the content and has achieved a limited leve sis of data and results to draw appropriate conclusi grasp, with retention of little relevant information, uding in few areas of the content and has achieven and techniques and analysis of data and results in ions.	Examination knowledge and understanding and analysis of data and result in knowledge and understanding edge and skills to most situation inclusions. Ired. The student has a soulevel of competence in the top propriate conclusions. mation of the subject matter coel of competence in the topics of consoccasionally. of the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited very	Dec of the topics covered s to draw appropriate g of the content and a ns. Use lab skills and ind knowledge and oics covered. Use lab wered. Show a basic overed. Use lab skills d. Show elementary n some of the topics		
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching	Pass in B This cour Y 1st A B C D Fail	se is only for students at sem Offer in 2020 - 2 Demonstrate thorough gra and can readily apply this and insightful conclusions. Demonstrate substantial high level of competence techniques and analysis of Demonstrate general but understanding of the mair skills and techniques and analysis of Demonstrate partial but lis knowledge and understand techniques and analys Demonstrate little or no knowledge and understand techniques and analys Demonstrate little or no knowledge and understand techniques and analys Demonstrate little or no knowledge and understand usually erroneous conclusions with laboratory componers	or BIOL2220 or MEDE2301; and NOT for admitted in 2016-2017 or before. 2021: Y asp of the subject matter covered. Show extensive knowledge. Critically use lab skills and techniques frasp of the subject matter covered. Show thorough in the topics covered and able to apply this knowledge feat and results to draw generally appropriate cort incomplete grasp of the subject matter cover a areas of content and has achieved an adequate analysis of data and results to draw moderately apprinted grasp, with retention of some relevant informiting of the content and has achieved a limited leve sis of data and results to draw appropriate conclusing grasp, with retention of little relevant information, inding in few areas of the content and has achieved and techniques and analysis of data and results in itions.	Examination knowledge and understanding and analysis of data and result in knowledge and understanding edge and skills to most situation inclusions. Ired. The student has a soulevel of competence in the top propriate conclusions. mation of the subject matter coel of competence in the topics of consoccasionally. of the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited very	Dec of the topics covered s to draw appropriate g of the content and a ns. Use lab skills and ind knowledge and icis covered. Use lab wered. Show a basic overed. Use lab skills d. Show elementary n some of the topics to inappropriate and		
Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching & Learning Activities	Pass in B This cour Y 1st A B C D Fail Lecture w Activitie	bontext BIOC2600 or BIOL2103 Ise is only for students at sem Offer in 2020 - 2 Demonstrate thorough gra and can readily apply this and insightful conclusions. Demonstrate substantial go high level of competence techniques and analysis on Demonstrate general but understanding of the mair skills and techniques and analystomand techniques and understand techniques and analystom Demonstrate little or no knowledge and understand covered. Use lab skills at usually erroneous conclus vith laboratory componens	or BIOL2220 or MEDE2301; and NOT for admitted in 2016-2017 or before. 2021: Y asp of the subject matter covered. Show extensive knowledge. Critically use lab skills and techniques frasp of the subject matter covered. Show thorough in the topics covered and able to apply this knowledge feat and results to draw generally appropriate cort incomplete grasp of the subject matter cover a areas of content and has achieved an adequate analysis of data and results to draw moderately apprinted grasp, with retention of some relevant informiting of the content and has achieved a limited leve sis of data and results to draw appropriate conclusing grasp, with retention of little relevant information, inding in few areas of the content and has achieved and techniques and analysis of data and results in itions.	Examination knowledge and understanding and analysis of data and result in knowledge and understanding edge and skills to most situation inclusions. Ired. The student has a soulevel of competence in the top propriate conclusions. mation of the subject matter coel of competence in the topics of consoccasionally. of the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited competence in the subject matter covere ved very limited very	Dec of the topics covered s to draw appropriate g of the content and a ns. Use lab skills and und knowledge and dics covered. Use lab wered. Show a basic overed. Use lab skills d. Show elementary n some of the topics to inappropriate and		

	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
	Examination		50	CLO 1,2,3
	Test		20	CLO 1,2,3
Required/recommended reading and online materials	Fennema OR, Food Chemistry (M Belitz HD, Grosch W, Schieberle,			
Course Website	http://moodle.hku.hk/			
Additional Course Information	This course will be offered subject	to a minimum enrollme	ent number and availability of teachers	

BIOL3202	Nutritio	nal biochemistry (6 o	credits)	Academic Yea	r 2019		
Offering Department	Biological	Sciences	·	Quota	90		
Course Co-ordinator	Dr C B CI	nan, 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 approach in discussing the interactions					
•	between diet and intermediary metabolism.						
Course Contents	Essential	Essential nutrients and their requirement;					
& Topics	Metabolio	control of macronutrient	utilization;				
	Metabolis	m of micronutrients					
	Nutritiona	I impacts of hexoses, I	ong chain polyunsaturated fatty	acid, cholesterol, amino ad	cids, vitamins and		
	minerals						
Course Learning			ourse, students should be able to:				
Outcomes			ins coordinate to achieve metaboli				
	CLO 2	inderstand the metabolic	pathways of cholesterol and polyu	ınsaturated fatty acids			
	CLO 3 L	inderstand the theoretica	I constructs of nitrogen requirement	nt and the importance of the	urea cycle		
	CLO 4	inderstand the biochemic	cal roles of micronutrient in human	health			
	CLO 5	explain the biochemical of	utcomes of nutrient deficiency/exc	ess			
Pre-requisites	Pass in B	IOC2600 or BIOL2220 or	r MEDE2301				
(and Co-requisites							
and Impermissible							
combinations)							
Offer in 2019 - 2020		sem Offer in 2020 - 20		Examination	Dec		
Grade Descriptors	Α		sp of the subject matter covered. Show				
(A+ to F)	identification and solving. Show outstanding ability to critically analyze and interpret scientific data and draw appropriate conclusions. Demonstrate highly effective organization / writing skills.						
	В		asp of the subject matter covered. Show f	ull ability on knowledge integration	, problem identification		
	and solving. Show reasonable ability to critically analyze and interpret scientific data and draw appropriate conclusions.						
		Demonstrate effective organ		rod Might show misunderstanding	of the meterials. Show		
	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 adequate organization / writing 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.						
	Solving. Use elementary approaches to analyze and interpret scientific data and draw sometimes erroneous conclusions. Demonstrate basic organization / writing skills.						
	Fail Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of coher and logical thinking, and minimal competence in problem solving. Fail to integrate information and identify problems. Seriou						
			nimal competence in problem solving. Fall and interpret scientific data and draw cond				
Course Type	Lecture-h	ased course	and interpret selectants data and draw conte	sidolono. Demonorado podr organiza	ation / writing okino.		
Course Teaching	Activitie		Details		No. of Hours		
& Learning Activities	Lectures	•	Details		36		
	Tutorials				12		
		/ Self study			100		
Assessment Methods	Methods	•	Details	Weighting in final	Assessment		
and Weighting	wiethods	•	Details	Weighting in final course grade (%)	Assessment Methods		
and Weighting				course grade (70)	to CLO Mapping		
	Examination			60	CLO 1,2,3,4,5		
	Test	шоп		40	CLO 1,2,3,4,5		
Required/recommended		C C C Cmith I I Advan	and Nutritian and Human Matabali				
reading and	Gropper S.S. & Smith J. L. Advanced Nutrition and Human Metabolism. Cengage Learning, 2016 Frayn K.N. Metabolic regulation: A Human Perspective. Wiley-Blackwell, 2010						
online materials			ier D.R. Lippincott's Illustrated Rev		off 2008		
online materials			che H.M. Nutrition & Metabolism. I		Ju, 2000		
Course Website		odle.hku.hk/	ono i mini i tadinion a metabolisili. I	2000, 2000			
Additional Course			to a minimum enrollment number	and availability of teachers			
Information	. 1110 0001	oo wiii bo oncrea sabject	to a minimum omonimont number	and availability of todollers			
o.manon							

BIOL3203	Food microbiology (6 credits) Academic Year 20						
Offering Department	Biological Sciences	Quota	80				
Course Co-ordinator	Dr H S El-Nezami, Biological Sciences (elnezami@hku.hk)						
Teachers Involved	(Dr H S El-Nezami,Biological Sciences)						
Course Objectives	This course provides the key concepts and principles of food microbiology with between microorganisms and food., microbial food spoilage and foodborne disease.						
Course Contents & Topics	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 Outcomes	On successful completion of this course, students should be able to: CLO 1 describe methods for evaluating microorganisms and their products in foods						

		CLO 2 demonstrate an understanding of the causes of food spoilage, and predict response of a microorga that can spoil a given food					
	CLO 3 de	CLO 3 develop and implement appropriate measures to control the spoilage and pathogenic m food					
	CLO 4 demonstrate the ability to work in a team to investigate and solve problems in food microbiology						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BIOC2600 or BIOL2220 or MEDE2301						
Offer in 2019 - 2020		I sem Offer in 2020 -	2021 : Y	Examination	n May		
Grade Descriptors (A+ to F)	A	evidence of creative abilit analysis of data and resul team-based organizational		roblem solving. Critically use lab usions to real-world problems. De	skills and techniques and emonstrate highly effective		
	В	thinking with some eviden	grasp of the subject matter covered. Sho ce of competence in professional-level pro w generally appropriate conclusions to lational skills.	bblem solving. Use lab skills and t	echniques and analysis of		
	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.						
Course Type	Lecture wi	ith laboratory compone	ent course				
Course Teaching	Activities	3	Details		No. of Hours		
& Learning Activities	Lectures				24		
	Laborator	У			24		
	Tutorials				12		
	Reading /	Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents	seminars & continuous assessment	40	CLO 2,4		
	Examinat	ion		40	CLO 1,2		
	Laborator	y reports	Laboratory & research reports	20	CLO 1,3		
Required/recommended reading and online materials	Food Microbiology: An Introduction, 2005, Thomas J. Montville and Karl Matthews, American Society for Microbiology (ASM) Press, Washington, DC Food Microbiology: Fundamentals and Frontiers, 2007, Edited by Michael P. Doyle, Larry R. Beuchat, and Thoma J. Montville, 3rd edition, American Society for Microbiology (ASM) Press, Washington, DC						
Course Website	http://moo	tp://moodle.hku.hk/ nis course will be offered subject to a minimum enrollment number and availability of teachers					

BIOL3204	Nutritio	n and the life cycle (6 credits)	Acade	emic Year	2019		
Offering Department	Biologica	l Sciences	Quota	l	70		
Course Co-ordinator	Dr J C Y	Lee, Biological Sciences (jettylee@hku.hk)					
Teachers Involved		′ Lee,Biological Sciences) ang,Biological Sciences)					
Course Objectives	essential	al needs vary throughout different stages of the life cycle macro- and micro-nutrients and highlight the nutritionent, and aging.					
Course Contents & Topics	issues: n influence	Teaching and learning will take place through an evidence-based approach and will be organized around key issues: needs of macro- and micronutrients, as well as the physiological and psychological determinants that influence nutrient requirements at different stages of the human life cycle. Socio-economic factors that influence dietary habit and nutritional status will also be covered.					
Course Learning Outcomes	CLO 1 CLO 2	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 the life cycle CLO 2 relate the concept of requirement to physiological needs CLO 3 understand the impact of socio-cultural factors on nutritional status					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in B	BIOL2220 or BIOC2600 or BIOL3202					
Offer in 2019 - 2020	Y 2n	d sem Offer in 2020 - 2021 : Y	Exami	ination	May		
Grade Descriptors (A+ to F)	Α	Demonstrate thorough grasp of the subject matter covered. Si identification and solving. Show outstanding ability to critically conclusions. Demonstrate highly effective team-based organization	analyze and interpret sciel and presentation skills.	ntific data an	d draw appropriate		
	В	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.					
	С	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 son Misunderstanding of the materials is not uncommon. Show limiter solving. Use elementary approaches to analyze and interpret s Demonstrate team-based organization and presentation skills of lim	d ability on knowledge integ cientific data and draw so	gration, proble	em identification and		
	Fail	Demonstrate little or no grasp, with retention of little relevant infor	mation, of the subject matte	er covered. Sh	now lack of coherent		

		ntify problems. Seriously nization and presentation					
Course Type	Lecture-based course						
Course Teaching & Learning Activities	Activities	Details	Details				
	Lectures						
	Tutorials	student-centered learning	student-centered learning				
	Reading / Self study			100			
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignments		20	CLO 1,2			
	Examination		50	CLO 1,2,3			
	Test	Mid term test	30	CLO 1,2,3			
Required/recommended reading and online materials Course Website Additional Course							

BIOL3205	Human physiology (6 credits)			Academic Yea	ır 2019		
Offering Department	1 3 03 \			Quota	135		
Course Co-ordinator	Dr W Y Lui, Biological Sciences (wylui@hku.hk)						
Teachers Involved	(Dr C B Chan,Biological Sciences) (Dr Philip C N Chiu,Obstetrics & Gynaecology) (Dr W Y Lui,Biological Sciences)						
Course Objectives	The course covers major aspects of the physiology of the human body using an integrated approach. After completing this course, students will have acquired fundamental principles of how the body works. Students interested in nutrition and human biology will find this course most useful.						
Course Contents & Topics	Overview of the physiological systems and homeostasis; Neural and hormonal communication; Nervous system physiology; The digestive system; Cardiac physiology, the blood vessels and blood pressure; The respiratory system; The urinary system; The skeletal & muscular system; Sensory mechanisms; Biological rhythms; Centra peripheral communication in energy homeostasis.						
Course Learning)·			
Outcomes	On successful completion of this course, students should be able to: CLO 1 comprehend the essence of how the body meets changing conditions while maintaining a relatively constant internal environment						
		derstand the functions o					
	CLO 3 explain normal body functions 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 2019 - 2020	Y 1st s	sem Offer in 2020 - 20	21 : Y	Examination	Dec		
Grade Descriptors (A+ to F)	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 all knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational 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 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.						
	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. 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.						
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		
	Examinati	on		70	CLO 1,2,3		
	Test			30	CLO 1,2,3		
Required/recommended reading and online materials	Silverthorn D. U.: Human Physiology: An integrated Approach (Pearson, 2008) Sherwood L.: Human Physiology: From Cells to Systems (Thomson, 2007) Johnson M. D.: Human Biology (Pearson, 2006) Siegel G. J. et al.: Basic Neurochemistry (Academic Press, 2006)						
Course Website	Mulroney S.E. & Myers A.K. Netter's Essential Physiology (Saunders, 2009)						
Additional Course	http://moodle.hku.hk/ This course will be offered subject to a minimum enrollment number and availability of teachers.						
Information	This course will be offered subject to a minimum emoliment number and availability of teachers.						

BIOL3206	Clinical nutrition (6 credits)	Academic Year	2019
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 associated with diet and basic dietetics, specifically to:					
			ween diet and disease.	on of common chronic disease	s such as diabetes	
	obesity an	d anorexia, cardiova	scular disease, cancer, immune		o dudir do diabolos	
			influence dietary choice. postoperative nutritional support	for hospitalized patients		
Course Contents & Topics	The basics	s of nutrition for healt of chronic disease	th and fitness and medical nutries such as cancer, diabetes, o	tion therapy. The role of diet in to besity and anorexia as well a on and immune function. Medica	as bulimia nervosa	
			ce. Nutrition in pregnancy and la		i numuon merapy ic	
Course Learning		•	is course, students should be al			
Outcomes	CLO 1 dis	scuss the different rel	lationships between diet and dis	ease		
	CLO 3 cle	rdiovascular disease early differentiate and	, cancer, immune deficiency, an I interpret risk factors that influe	nce dietary choice	sity and anorexia,	
			for postoperative nutritional sup	port for hospitalized patients		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BI	OL3202 or BIOL3203	3 or BIOL3204 or BIOL3205			
Offer in 2019 - 2020	N Offe	er in 2020 - 2021 : N		Examination		
Grade Descriptors	Α		mastery at an advanced level of exter	nsive knowledge and skills required for	attaining all the cours	
(A+ to F)	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.					
	В	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. C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning					
		outcomes. General but incomplete grasp of the subject. 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 laboratory / 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					
	Fail	or no grasp of the known thinking. Show very little effective or ineffective.	wledge and understanding of the subjector no ability to apply knowledge to solty Apply minimally effective or ineffective	d skills required for attaining the course ect. Lack of analytical and critical abiliti eve problems. Organization and presenta laboratory / fieldwork skills and techniq attion and presentational skills are minima	es, logical and coherer tional skills are minimal ues. Misuse of data an	
Course Type Course Teaching	Activities		Details		No. of Hours	
Learning Activities	Lectures		Details	Details		
•	Tutorials				36 12	
	Reading / Self study					
Assessment Methods and Weighting	Methods	·	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme			20	CLO 1,2	
	Examination			60	CLO 1,2,3,4	
	Presentat			20	CLO 1,2,3,4	
Required/recommended reading and online materials	S. Rodwe	ll Williams: Nutrition	available on the class website. and Diet Therapy (7th ed.) Sui rdon: Perspectives in Nutrition (tor & Hunter: Nutrition: Principle 2nd ed.)	s and Application i	
Course Website		dle.hku.hk/				
Additional Course	This cours	e will be offered subj	ect to a minimum enrollment nu	mber and availability of teachers	5.	
Information						

BIOL3207	Principles of toxicology (6 credits)	Academic Year	2019			
Offering Department	Biological Sciences	Quota	80			
Course Co-ordinator	Dr H S El-Nezami, Biological Sciences (elnezami@hku.hk)					
Teachers Involved	(Dr H S El-Nezami, Biological Sciences)					
Course Objectives	To introduce students to methods used in assessing the toxicity of food contaminants, and to develop their confidence in the handling and interpretation of toxicological data. Students will also be introduced to the basic concepts behind toxicological evaluation, and the criteria for setting guidance values for dietary and nondietary exposure to chemicals. Students will understand the role of biochemical, metabolic and toxicokinetic studies in toxicological evaluation. This course aims to equip students with basic skills in conducting food toxicological studies.					
Course Contents & Topics	Topics include a discussion on exposure and entry routes, fates of toxic substances in the body (toxicokinetics), concepts in experimental toxicology, the dose response relationship, actions of toxic substances, target organ effects, the actions and types of carcinogens. A survey of the health effects of common classes of toxic substances is also presented.					
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 demonstrate an understanding of the processes involved in absorpt excretion of toxicants, including an understanding of the toxicokinetic bell					

	CLO 2 de	emonstrate an understa	nding of the various effects induce	ed after exposure to toxica	ants		
	CLO 3 demonstrate an understanding of the factors which underlie species differences in response to potential toxicants						
		emonstrate the ability to Iman health	work in a team to investigate an	d solve toxicological prob	lems of importance in		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Bl	OC2600 or BIOL2220 o	or BIOL3205 or MEDE2301				
Offer in 2019 - 2020	Y 2nd	sem Offer in 2020 - 2	2021 : Y	Examination	on May		
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	thinking with some evidence	rasp of the subject matter covered. Sho the of competence in professional-level proy generally appropriate conclusions to ational skills.	blem solving. Use lab skills and	techniques and analysis of		
	С						
	D						
	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.						
Course Type	Lecture wi	th laboratory componer	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		
	Assignments		seminars & continuous assessment	40	CLO 2,4		
	Examinati	ion		40	CLO 1,2,3		
	Laboratory reports		Laboratory & research reports	20	CLO 1,2,3		
Required/recommended reading and online materials	S. S. Desh	S. S. Deshpande: Handbook of Food Toxicology (Marcel Dekker Inc., NY, 2002)					
Course Website	http://moo	dle.hku.hk/					
Additional Course		p://moodle.hku.hk/ is course will be offered subject to a minimum enrollment number and availability of teachers.					

BIOL3208	Food sa	afety and qua	ality manageme	ent (6 credits)		Academic Year	2019
Offering Department		I Sciences		•		Quota	45
Course Co-ordinator	Dr O Habi	oimana, Biologio	al Sciences (ohab	im @hku.hk)			
Teachers Involved			,	,			
Course Objectives	succeed i		ace. To introduce		ed to produce safe sis and problem-sol		
Course Contents & Topics	- Basic co - Statistica - Quality F - Quality r - Develop food safet - Role of 6 - Intellectu - Religious	oncepts in TQM cal Process Con Function Deploy management st coment and imple sty managemen environmental r tual Property iss us, ethical, and o	trol yment andards (ISO 900) ementation of a Ha system/ supply ch nanagement syste ues in the food inc cultural food choice	azard Analysis Crit nain approach) ems (ISO 14000) ir lustry es	ical Control Point (I	,, , ,	nin an ISO 22000
Course Learning Outcomes	CLO 1 ur CLO 2 be CLO 3 be	inderstand the he re familiar with a	istorical developm set of manageme	nt techniques app	able to: regulation of food licable in the food ir ke recommendatior	ndustry	prove quality and
Pre-requisites (and Co-requisites and Impermissible combinations)		Pass in BIOL3201 or BIOL3203					
Offer in 2019 - 2020	N Off	fer in 2020 - 20	21 : N			Examination	
Grade Descriptors (A+ to F)	Α	evidence of createchniques and	ative ability and compe analysis of data and re	tence in professional-l	Show strong analytical al evel problem solving. C ate and insightful conclu skills.	ritically use quality ma	anagement skills and
	В	thinking with sor	ne evidence of compet	ence in professional-le	ed. Show evidence of vel problem solving. Use the conclusions to real-w	e quality management	skills and techniques

		based organizational and pro	esentational 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 limit evidence of coherent and management skills and tec	ited grasp, with retention of some r l logical thinking, but lacking cor chniques and analysis of data and	elevant information, of the subject mat npetence in professional-level proble d results to draw sometimes appropri- ganizational and presentational skills of	m solving. Use quality ate but often erroneous			
	Fail	Demonstrate little or no gradual and logical thinking, and rechniques and analysis of contractions.	instrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack gical thinking, and minimal competence in professional-level problem solving. Use quality management ques and analysis of data and results ineffectively, leading generally to inappropriate and usually erroneous country of problems. Demonstrate ineffectiveness team-based organizational and presentational skills.					
Course Type	Lecture-ba	ased course						
Course Teaching	Activities		Details	No. of Hours				
& 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			
	Examinat	ion		60	CLO 1,2,3			
	Project re	ports	including presentation	30	CLO 2,3			
Required/recommended reading and online materials	Mortimore	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://moo	dle.hku.hk/	· · · · · · · · ·	•				
Additional Course Information	This cours	e will be offered subject	to a minimum enrollment nu	mber and availability of teachers	S.			

BIOL3209	Food an	d nutrient analysis	s (6 credits)	Academic Y	ear 2019		
Offering Department	Biological	Sciences	•	Quota	80		
Course Co-ordinator		ee, Biological Science					
Teachers Involved		Lee,Biological Science ⁄ang,Biological Science					
Course Objectives	understan	d the principles behind		g in food and nutrient analysis. d in food analysis. To train stude s.			
Course Contents				ndustry context will be introduc-	ed. Basic analytical		
& Topics	adulterant discussed	techniques for macronutrients (e.g. protein, carbohydrate and fats), micronutrients (vitamins and minerals) and adulterants in food will be covered. A variety of classical and instrumental techniques used in food analysis will be discussed: rheology and texture measurement, thermal analysis, color, spectroscopy, chromatography and electrophoresis.					
Course Learning	On succes	sful completion of this	course, students should be	able to:			
Outcomes	CLO 1 un	derstand the basic prin	nciples of food and nutrient a	analysis			
			of classical and instrumenta	· · · · · · · · · · · · · · · · · · ·			
			s behind analytical instrume				
			owledge and laboratory ski nutrient of food products	lls in novel situations to measu	e and analyze the		
	CLO 5 be able to select and justify an appropriate analytical technique to solve practical food analysis problems						
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020	Y 1st	sem Offer in 2020 - 2	2021 · Y	Examination	Dec		
Grade Descriptors	A 15t						
(A+ to F)	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	thinking with some evidence of competence in professional-level problem solving. Use lab skills and techniques and analysi data and results to draw generally appropriate conclusions to real-world problems. Demonstrate effective team-base organizational and presentational skills.					
	С	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						
	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.						
Course Type		th laboratory compone	ent course				
Course Teaching	Activities		Details		No. of Hours		
Learning Activities	Lectures				24		
	Laborator	у			24		
	Tutorials	0 15 1 1			6		
		Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods		

				to CLO Mapping
	Assignments	practical work & assignment	30	CLO 1,2,3,4,5
	Examination		70	CLO 1,2,3,4,5
Required/recommended reading and online materials	Y. Pomeranz and C.E. Meloan: Fo S. S. Nielsen: Introduction to the C	od Analysis: Theory and Practice (Chemical Analysis of Foods (Jones		
Course Website	http://moodle.hku.hk/			
Additional Course Information	This course will be offered subject	to a minimum enrollment number a	and availability of teache	rs.

BIOL3210	Grain pr	roduction and	utilization (6 credits)	Academic Ye	ear 2019		
Offering Department	Biological	Sciences		Quota	40		
Course Co-ordinator	Prof H Corke, Biological Sciences (harold@hku.hk)						
Teachers Involved							
Course Objectives		e a broad underst ealth and nutrition.	standing of the utilization and significe.	cance of the major grains in the	food industry and ir		
Course Contents		rain production ar	•				
& Topics		en Revolution and	d its aftermath				
		onal grain trade		da a a a a a de la companione de la comp			
			h rheology, the baking process, bak roducts including steamed bread an				
		small-scale tests f	S .	a floodics			
			onsumer preferences, milling, qualit	y, quality testing, products			
	- Maize: p	roducts of wet mil	illing, animal feed development				
		focusing on bioetl					
			studies on the grain processing ind				
Course Learning Outcomes			of this course, students should be all		ili-ation of avaia		
Outcomes			ajor production, import, and export path Shnology behind the production of gr		ilization of grain		
			ope and nature of professional level				
			straints to global food sufficiency	quality testing for grain products	•		
		• •	cal issues behind the diversion of gr	rain into meat and biofuel produc	ction		
Pre-requisites		ny level 2 BIOL co	-	'			
(and Co-requisites		•					
and Impermissible							
combinations)							
Offer in 2019 - 2020		fer in 2020 - 2021		Examination			
Grade Descriptors	Α		ugh grasp of the subject matter covered. She we ability and competence in professional-le				
(A+ to F)	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						
	Ь		zational and presentational skills.	Show evidence of analytical and cri	tical abilities and logical		
	В	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					
	С	organizational and presentational skills. Demonstrate general but incomplete grasp of the subject matter covered. Show some evidence of analytical and critical abilitie					
		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	Fail Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of cohere					
	and logical thinking, and minimal competence in professional-level problem solving. Use lab skills and techniques and anal data and results ineffectively, leading generally to inappropriate and usually erroneous conclusions to real-world problem.						
			ctiveness team-based organizational and pre-		<u>'</u>		
Course Type		ased course					
Course Teaching	Activities		Details		No. of Hours 36		
& Learning Activities	Lectures						
	Tutorials	/ Calf atualy			12		
Accessment Methods	_	/ Self study	Detelle	Weinbein nin fin al	100		
Assessment Methods and Weighting	Methods	ı	Details	Weighting in final course grade (%)	Assessment Methods		
and Weighting				course grade (%)	to CLO Mapping		
	Examination			70	CLO 1,2,3,4,5		
	Project reports		including presentation	30	CLO 2,3		
Required/recommended			ence, edited by Wrigley CW, Corke				
reading and		Oxford. (selected			, ,		
reauring ariu	Other read	dings to be provid	led				
		Other readings to be provided					
online materials Course Website	http://moo		ttp://moodle.hku.hk/				
online materials	http://moo		subject to a minimum enrollment nu	mber and availability of teachers	S.		

BIOL3211	Nutrigenomics (6 credits) Academic Year 2019					
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 understand underpinning the science of nutrition and the relation between genes and diet-rof nutrition at the molecular level and the concepts of nutrigenomics and nutrige	ing of the biochemelated diseases. It	nical mechanisms			

Course Contents & Topics Course Learning	Regulation Overview Relevance Epigenetic predispos Polyunsat pathways; Inborn err	Concepts of nutrigenomics, nutrigenetics, metabolomics and nutritional biochemistry. Regulation of gene expression; Single Nucleotide Polymorphisms and relation to diseases. Overview of lipid metabolism; cholesterol metabolic pathway; hyperlipidaemia, LDL receptor mutations. Relevance of folate, vitamin B12; hyperhomocysteinemia and gene polymorphisms in diseases. Epigenetics, Barker s hypothesis, influence of maternal nutrition in fetal gene expression. Obesity, genetic predisposition, candidate genes like leptin, FTO and other hormones involved in the control of appetite Polyunsaturated fatty acid and their roles in the control of gene expression example lipogenesis and lipid oxidation pathways; Inborn errors of metabolism in the context of genetic mutations and personalized diet therapy On successful completion of this course, students should be able to:					
Outcomes	CLO 2 de	emonstrate understa sease		c pathways in relationship to diet, o	,		
	CLO 4 ex	plain the relationshi	p between genotype, epigene	e role of genes in nutrient-related o tics and diet-related diseases			
			•	utrition based on individual genetic	variation		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Bl	IOC2600 or BIOL22	20 or MEDE2301				
Offer in 2019 - 2020	Y 1st	sem Offer in 2020) - 2021 : Y	Examination	n Dec		
Grade Descriptors (A+ to F)	A Demonstrate thorough grasp of the subject matter covered. Show extensive ability of knowledge integration and problem solving skills. Show excellent ability to critically analyze and interpret complex scientific data and draw appropriate conclusions. Demonstrate highly effective organization and writing skills.						
	B Demonstrate substantial grasp of the subject matter covered. Show substantial ability of knowledge integration and problem solving skills. Show substantial ability to critically analyze and interpret scientific data and draw appropriate conclusions. Demonstrate effective organization and writing skills.						
	Demonstrate general and acceptable grasp of the subject matter covered. Show acceptable ability of knowledge integration and problem solving skills. Show moderate ability to analyze and interpret scientific data and draw proper conclusions. Demonstrate moderate organization and writing skills.						
	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. 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.						
Course Type	Lactura h	ased course	nterpret scientific data and draw conc	iusions. Demonstrate poor organization and	a writing skills.		
Course Type Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures	5	Details	Details			
a Learning Activities	Tutorials		atudant contared learnin	aturdont contour discussive			
		Self study	Student-centered learning	student-centered learning			
Assessment Methods	Methods	•	Details	Waighting in final	100		
and Weighting	Wethous		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents		20	CLO 1,2,3,4,5		
	Examinat	ion		60	CLO 1,2,3,4,5		
	Test			20	CLO 1		
Required/recommended reading and online materials	Ordovas: Brigelius-f Rimbach,	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		dle.hku.hk/	a biology and ocholos				
Additional Course			hiect to a minimum enrollment	number and availability of teacher	·c		
Information	17110 COURS	o bo oncred su		than bor and availability of teacher	. .		

BIOL3215	Principles of dietary assessment (6 credits)	Academic Year	2019					
Offering Department	Biological 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	This course examines the various methods used to measure dietary intake how to assess these measurements against international standards, arimprovement.							
Course Contents & Topics	use of food composition databases, nutrition screening tools and the pla	Topics covered will include the validity and reliability of different methods, estimations of energy requirements, the use of food composition databases, nutrition screening tools and the planning and use of national surveys for monitoring and evaluation. Students will conduct project work and produce and present professional-level reports						
Course Learning	On successful completion of this course, students should be able to:							
Outcomes	CLO 1 understand the principles of dietary assessment methods, and the strengths 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 BIOL2102							
Offer in 2019 - 2020	N Offer in 2020 - 2021 : N	Examination						
Grade Descriptors (A+ to F)	A Demonstrate thorough grasp of the subject matter covered. Show strong analy evidence of creative ability and competence in professional-level problem solv							

		and analysis of data and results to draw appropriate and insightful conclusions to real-world problems. De						
	В	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 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 in and logical thinking with I analysis of data and resu	ncomplete grasp of the subject matte limited competence in professional-	er covered. Show some evidence of ana level problem solving. Use practical sl but sometimes erroneous conclusions nd presentational skills.	kills and techniques and			
	D	•						
	Fail	and logical thinking, and ranalysis of data and resul	minimal competence in professional	nformation, of the subject matter covere I-level problem solving. Use practical so inappropriate and usually erroneous anal and presentational skills.	kills and techniques and			
Course Type	Laborato	ry and workshop course		·				
Course Teaching	Activities		Details	No. of Hours				
& Learning Activities	Workshops							
	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			30	CLO 1,2,3,4			
	Test	•		20	CLO 1,2,3,4			
Required/recommended	Required	l:		· ·				
reading and	Lee RD a	and Nieman DC, Nutrition	nal Assessment 6th Ed. McG	raw Hill				
online materials	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							
			for Nutrients. http://www.ncb	i.nlm.nih.gov/books/NBK45182/				
Course Website		odle.hku.hk						
Additional Course	This cour	rse will be offered subjec	ະt to a minimum enrollment nເ	ımber and availability of teachers	S			
Information								

BIOL3216	Food waste	management (6 credits) Academi	c Year	2019				
Offering Department	Biological Scien			30				
Course Co-ordinator	Dr O Habimana	a, Biological Sciences (ohabim@hku.hk)						
Teachers Involved	(Dr O Habiman	(Dr O Habimana, School of Biological Sciences)						
Course Objectives	To allow students to develop an understanding of the propagation, treatment and disposal of food waste relevant within the farm to table chain. To allow students to critically evaluate food waste management and resource recovery potential in Hong Kong in comparison to other countries in Asia/Worldwide.							
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 expected to increase by 70% to meet food demand. However, our current world food supply is instead declining, with 1/4 to 1/3 of all food produced for human consumption lost or wasted. This amounts to a staggering 1 to 2 billion metric tons 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 identified by presenting relevant facts and figures and case studies embodying agricultural, industrial and consumer waste types. Basic waste management concepts will also be covered, examining current waste management in Hong Kong compared to other countries in Asia, while providing the basis for examining our own personal waste 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: Food Industrial waste -Case studies: Food consumer waste -Waste Management in Hong Kong vs other countries in Asia -Individual waste footprint: from awareness to legislation in Hong Kong							
Course Learning Outcomes	CLO 1 underst footprin CLO 2 be able	completion of this course, students should be able to: tand and define the various types of waste as well as create an awaren at. to define the 3 R's in waste management (reduce, reuse, recycle), and be in Hong Kong compared to other countries in Asia /Worldwide.						
	CLO 3 be able to describe current and novel technologies for treating waste, as well as transforming waste into value added resources. CLO 4 to develop written and oral presentation skills necessary to effectively convey technical, economic, and							
	social information related to waste management.							
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BIOL2101 or BIOL3201							
Offer in 2019 - 2020	Y 2nd sem	Offer in 2020 - 2021 : Y Examina	tion	May				
Grade Descriptors (A+ to F)	A Dem evide tech	nonstrate thorough grasp of the subject matter covered. Show strong analytical and critical absence of creative ability and competence in professional-level problem solving. Critically use niques and analysis of data and results to draw appropriate and insightful conclusions to really effective team-based organizational and presentational skills.	quality m	d logical thinking, with anagement skills and				

	В	thinking with some evidend	ce of competence in professional-level	. Show evidence of analytical and cri I problem solving. Use quality managen	nent skills and techniques		
		and analysis of data and results to draw generally appropriate conclusions to real-world problems. Demonstrate effect based organizational and presentational skills.					
	С	and logical thinking with lin	nited competence in professional-leve	r covered. Show some evidence of ana I problem solving. Use quality managen e but sometimes erroneous conclusion d presentational skills.	nent skills and techniques		
	D						
	Fail	Demonstrate little or no gr and logical thinking, and techniques and analysis of	asp, with retention of little relevant in minimal competence in professional data and results ineffectively, leading	formation, of the subject matter covere al-level problem solving. Use quality g generally to inappropriate and usually rganizational and presentational skills.	d. Show lack of coherent management skills and		
Course Type	Lecture	-based course					
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures				36		
	Tutorials		including presentation		12		
	Group work				30		
	Reading / Self study				100		
Assessment Methods and Weighting	Metho	ds	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assign	ments		10	CLO 1,2,3		
	Examination			60	CLO 1,2,3,4		
	Project reports		including presentation	30	CLO 2,3,4		
Course Website		oodle.hku.hk	<u> </u>				
Additional Course Information			ct to a minimum enrolment nun	nber and availability of teachers	i.		

BIOL3217	Food, er	nvironment and health (6 credits)	Academic Year	2019				
Offering Department	Biological	Sciences	Quota	50				
Course Co-ordinator	Dr T. Sob	ko, Biological Sciences (tsobko@hku.hk)						
Teachers Involved	(Dr T Sob	ko,School of Biological Sciences)						
Course Objectives	of food sy our diet. T food resor	A cross-disciplinary exploration of the environmental, socio-economic, public health and personal nutrition contexts of food systems. To focus on how our food choices influence the environment and how the environment impacts our diet. To examine the interactions among environment (e.g. pollution, soil and water quality, climate change), food resources (growth, production, consumption, processing, distribution and disposal) and health.						
Course Contents & Topics	consumpt becoming consumpt can improduce approach health. To sources o increased decisions environme evaluate understan healthy in	onment, human well-being and the functioning of society ion. Are we destroying the environment as we struggle to increasingly toxic for our health? The course will consider on the environment; 2) The impact of environment on the environment; 2) The impact of environment on over these interactions, through evidence-based case e will be used with emphasis on 'real-life' cases connecting pics will include impacts of certain dietary habits and demonstrated for the calories, rise of meat consumption, demand for year-rour fertilizers' use. We will consider how toxins, known as xer are influenced by the environment. The holistic approach the sociocultural, socio-behavioural, ethical and econor definition of the production dividual, environment and overall society.	a feed growing populations? Is sist of three blocks: 1) The in food and human health, and examples. A Problem Based human nutrition, well-being a hands on food systems (e.g. ound luxury foods) and the dependence of the problem of the students to ablic and private. Students will be mic aspects of food and even and high quality food being	the environment offluence of food of 3) What actions Learning (PBL) and environmental demand for cheap olletion of soil and and how sensory navigate complex learn to critically environment and				
Course Learning Outcomes	CLO 1 To CLO 2 To CLO 3 To ww CLO 4 To fu	sustainable environment and vironmental and food sectors roduction, policy initiatives) louding food production, consureaknesses of political, social ucators to communicate the is	cally, in Asia and mption, and the l, and economic					
	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)		IOL 2101 or ENVS2001 or ENVS2002 or BIOL3201						
Offer in 2019 - 2020	Y 2nd	d sem Offer in 2020 - 2021 : Y	Examination	No Exam				
Grade Descriptors (A+ to F)	A	Demonstrate thorough grasp of the subject matter covered. Show stro evidence of creative ability and competence in professional-level prot techniques and analysis of data and results to draw appropriate and in highly effective team-based organizational and presentational skills.	blem solving. Critically use quality manning to real-world properties.	anagement skills and oblems. Demonstrate				
	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 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 cover and logical thinking with limited competence in professional-level proble and analysis of data and results to draw moderately appropriate but Demonstrate moderately effective team-based organizational and pres	em solving. Use quality management sometimes erroneous conclusions to entational skills.	skills and techniques real-world problems.				
	D	Demonstrate partial but limited grasp, with retention of some relevan evidence of coherent and logical thinking, but lacking competen management skills and techniques and analysis of data and resul conclusions to real-world problems. Demonstrate team-based organiza	nce in professional-level problem s Its to draw sometimes appropriate	solving. Use quality but often erroneous				

	Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of coherer 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.						
Course Type	Lecture-based course						
Course Teaching	Activities	Details		No. of Hours			
& Learning Activities	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	Tutorial assessment (40%); Group project and presentation (50%) and Critical review (10%)	100	CLO 1,2,3,4,5			
Required/recommended reading and online materials	There is no course textbo	There is no course textbook. Most of the reading material will be provided on Moodle or distributed during lectures.					
Course Website	http://moodle.hku.hk						

BIOL3218	Food hy	giene and quality	control (6 credits)	Academic Yea	r 2019		
Offering Department		l Sciences	(Quota	30		
Course Co-ordinator			ences (ohabim@hku.hk)	140000			
eachers Involved		Or O Habimana, School of Biological Sciences)					
Course Objectives	To provid	le exposure to some	key management, microbiology a introduce students to analysis ar				
Course Contents & Topics	- Basic co - Statistic - Quality - Quality - Develop food safe - Role of - A review - Religiou	oncepts in TQM all Process Control Function Deployment management standar ment and implement ty management syste environmental manag or of microbiology in a lis, ethical, and cultural	ds (ISO 9000) ation of a Hazard Analysis Critica m/ supply chain approach) lement systems (ISO 14000) in th food safety context	al Control Point (HACCP) plan (w ne food industry	rithin an ISO 2200		
Course Learning Outcomes	CLO 1 u CLO 2 b CLO 3 b	nderstand the basic n e familiar with a set o	is course, students should be abl nicrobiological and food processir f management techniques applica d production problems and make	ng concepts in food safety able in the food industry for prom			
Pre-requisites and Co-requisites and Impermissible combinations)	Not for st	Pass in BIOL2101 or BIOL3201 or BIOL3203 Not for students who have passed in BIOL3208					
Offer in 2019 - 2020	Y 1st	t sem Offer in 2020	- 2021 : Y	Examination	Dec		
Grade Descriptors (A+ to F)	 A Demonstrate thorough grasp of the subject matter covered. Show strong analytical and critical abilities and logical think evidence of creative ability and competence in professional-level problem solving. Critically use quality management is techniques and analysis of data and results to draw appropriate and insightful conclusions to real-world problems. Den 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 thinking with some evidence of competence in professional-level problem solving. Use quality management skills and te and analysis of data and results to draw generally appropriate conclusions to real-world problems. Demonstrate effect based organizational and presentational skills. C Demonstrate general but incomplete grasp of the subject matter covered. Show some evidence of analytical and critica and logical thinking with limited competence in professional-level problem solving. Use quality management skills and te and analysis of data and results to draw moderately appropriate but sometimes erroneous conclusions to real-world poemonstrate 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 evidence of coherent and logical thinking, but lacking competence in professional-level problem solving. Use management skills and techniques and analysis of data and results to draw sometimes appropriate but often et conclusions to real-world problems. Demonstrate team-based organizational and presentational skills of limited effective. Fail Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Show lack of and logical thinking, and minimal competence in professional-level problem solving. Use quality management skills a				management skills an problems. Demonstrat cal abilities and logica nt skills and technique iconstrate effective teal cical and critical abilitie nt skills and technique to real-world problems r covered. Show som solving, Use quality but often erroneou mited effectiveness. Show lack of coherei lanagement skills an		
Course Type		ased course	Detelle		No of U		
Course Teaching	Activitie		Details		No. of Hours		
Learning Activities	Lectures						
	Group w						
	Project work				30		
		/ Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin		
	Assignm			20	CLO 2		
	Examina	tion		50	CLO 1,2,3		
	Examination Project reports						
	Project re	eports		30	CLO 2,3		

Information

	Marine I	biology (6 credits)		Academic Year	2019		
Offering Department		Sciences		Quota	40		
Course Co-ordinator	Dr M Yası	uhara, Biological Scienc	ces (yasuhara@hku.hk)				
Teachers Involved		sell,Biological Sciences					
	,	suhara,Biological Scien	,				
Course Objectives	-	nnicii,Biological Science	,	marina hialagy, including the fa	socinatina diversit		
Course Objectives	of marine from mari	develop a basic understanding and appreciation of the field of marine biology, including the fascinating diversity narine life, their function, ecology and inter-relationships. Contemporary issues including the benefits we derive n marine biological resources and threats to their long-term sustainability will also be discussed with case dies highlighting key issues.					
Course Contents	The topics						
& Topics	 The p temperatu Importa and marin Major n Exploita 	The physical and chemical environments (e.g., light, current, atmospheric -ocean interactions, salinity, neperature, 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) d 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					
Course Learning	On succe	ssful completion of this	course, students should be able	to:			
Outcomes	CLO 1 de	emonstrate a basic und	erstanding of the diversity and fu	inction of marine biota			
			s of marine biota and their enviro				
			ce of marine ecosystems and the	ne threats of human activities o	on their long-term		
Pre-requisites		ustainability as well as p IOL2306 or ENVS2002					
(and Co-requisites and Impermissible combinations)	Fass III D	IOLZ300 OF ENV3200Z					
Offer in 2019 - 2020	Y 1st	sem Offer in 2020 - 2		Examination	Dec		
Grade Descriptors (A+ to F)	Α	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 c learning outcomes. Show and some unfamiliar situati	ommand of a broad range of knowledge evidence of analytical and critical abilities ions. Apply effective organizational and p	s and logical thinking, and ability to apply presentational skills.	ist most of the course knowledge to familian		
	С	Demonstrate substantial c learning outcomes. Show a and some unfamiliar situal Demonstrate general but outcomes. Show evidence familiar situations. Apply m	evidence of analytical and critical abilities ions. Apply effective organizational and proceedings of the command of knowledge are of some analytical and critical abilities to decrately effective organizational and pr	s and logical thinking, and ability to apply presentational skills. nd skills required for attaining most o and logical thinking, and ability to app esentational skills.	ist most of the course knowledge to familiar f the course learning ly knowledge to most		
		Demonstrate substantial clearning outcomes. Show e and some unfamiliar situations. Demonstrate general but outcomes. Show evidence familiar situations. Apply m Demonstrate partial but lin Show evidence of some cknowledge to solve problet Demonstrate little or no ev	evidence of analytical and critical abilities ions. Apply effective organizational and proceeding of knowledge are of some analytical and critical abilities to derately effective organizational and properties of knowledge and skills otherent and logical thinking, but with limitims. Apply limited or barely effective organidence of command of knowledge and s	s and logical thinking, and ability to apply presentational skills. nd skills required for attaining most or and logical thinking, and ability to appresentational skills. required for attaining some of the cour- ted analytical and critical abilities. the danalytical and presentational skills. kills required for attaining the course least	ist most of the course knowledge to familiar f the course learning ly knowledge to most se learning outcomes. limited ability to apply arning outcomes. Lack		
	C D	Demonstrate substantial clearning outcomes. Show e and some unfamiliar situati Demonstrate general but outcomes. Show evidence familiar situations. Apply m Demonstrate partial but lin Show evidence of some coknowledge to solve problet Demonstrate little or no ev of analytical and critical a	evidence of analytical and critical abilities ions. Apply effective organizational and a incomplete command of knowledge e of some analytical and critical abilities ioderately effective organizational and pr nited command of knowledge and skills sherent and logical thinking, but with limit ms. Apply limited or barely effective orga	and logical thinking, and ability to apply oresentational skills. In a skills required for attaining most of and logical thinking, and ability to app esentational skills. required for attaining some of the cour- ted analytical and critical abilities. Show nizational and presentational skills. kills required for attaining the course lead Show very little or no ability to apply	ist most of the course knowledge to familiar f the course learning ly knowledge to most se learning outcomes. limited ability to apply arning outcomes. Lack		
	C D Fail	Demonstrate substantial clearning outcomes. Show e and some unfamiliar situati Demonstrate general but outcomes. Show evidence familiar situations. Apply m Demonstrate partial but lin Show evidence of some coknowledge to solve problet Demonstrate little or no ev of analytical and critical a	evidence of analytical and critical abilities ions. Apply effective organizational and procomplete command of knowledge and of some analytical and critical abilities ioderately effective organizational and pritted command of knowledge and skills otherent and logical thinking, but with limitms. Apply limited or barely effective organidence of command of knowledge and sabilities, logical and coherent thinking depresentational skills are minimally effective organidence.	and logical thinking, and ability to apply oresentational skills. In a skills required for attaining most of and logical thinking, and ability to app esentational skills. required for attaining some of the cour- ted analytical and critical abilities. Show nizational and presentational skills. kills required for attaining the course lead Show very little or no ability to apply	ist most of the course knowledge to familiar f the course learning ly knowledge to most se learning outcomes. limited ability to apply arning outcomes. Lack		
Course Teaching	C D Fail	Demonstrate substantial clearning outcomes. Show e and some unfamiliar situati Demonstrate general but outcomes. Show evidence familiar situations. Apply m Demonstrate partial but lin Show evidence of some coknowledge to solve problet Demonstrate little or no ev of analytical and critical a problems. Organization an rith laboratory compone	evidence of analytical and critical abilities ions. Apply effective organizational and procomplete command of knowledge and of some analytical and critical abilities ioderately effective organizational and pritted command of knowledge and skills otherent and logical thinking, but with limitms. Apply limited or barely effective organidence of command of knowledge and sabilities, logical and coherent thinking depresentational skills are minimally effective organidence.	and logical thinking, and ability to apply oresentational skills. In a skills required for attaining most of and logical thinking, and ability to app esentational skills. required for attaining some of the cour- ted analytical and critical abilities. Show nizational and presentational skills. kills required for attaining the course lead Show very little or no ability to apply	is t most of the course is knowledge to familiar if the course learning ly knowledge to most see learning outcomes. Lack if knowledge to solve in the course is the course in the course is the course in the course is the course in the course in the course is the course in the course in the course in the course is the course in the course		
Course Teaching	C D Fail Lecture w Activities Lectures	Demonstrate substantial clearning outcomes. Show e and some unfamiliar situation Demonstrate general but outcomes. Show evidence familiar situations. Apply m Demonstrate partial but lin Show evidence of some coknowledge to solve problem Demonstrate little or no evidence of analytical and critical a problems. Organization an it laboratory compone s	evidence of analytical and critical abilities ions. Apply effective organizational and price incomplete command of knowledge at of some analytical and critical abilities ioderately effective organizational and pritied command of knowledge and skills oherent and logical thinking, but with limitms. Apply limited or barely effective organidence of command of knowledge and sbillities, logical and coherent thinking, depresentational skills are minimally effective organidence.	and logical thinking, and ability to apply presentational skills. Ind skills required for attaining most of and logical thinking, and ability to app esentational skills. required for attaining some of the coun- ted analytical and critical abilities. Show nizational and presentational skills. kills required for attaining the course lest Show very little or no ability to apply ctive or ineffective.	is t most of the course of knowledge to familiar of the course learning ly knowledge to most see learning outcomes. Lack with the knowledge to solve the course of the knowledge to solve the knowledge		
Course Type Course Teaching & Learning Activities	C D Fail Lecture w Activities Lectures Field wor	Demonstrate substantial clearning outcomes. Show e and some unfamiliar situation Demonstrate general but outcomes. Show evidence familiar situations. Apply m Demonstrate partial but lin Show evidence of some or knowledge to solve problet Demonstrate little or no evidence of analytical and critical a problems. Organization an it laboratory compone sk	evidence of analytical and critical abilities ions. Apply effective organizational and princomplete command of knowledge are of some analytical and critical abilities inderately effective organizational and pritted command of knowledge and skills otherent and logical thinking, but with limitms. Apply limited or barely effective organidence of command of knowledge and sabilities, logical and coherent thinking depresentational skills are minimally effecting to the course	and logical thinking, and ability to apply presentational skills. Ind skills required for attaining most of and logical thinking, and ability to app esentational skills. required for attaining some of the coun- ted analytical and critical abilities. Show nizational and presentational skills. kills required for attaining the course lest Show very little or no ability to apply ctive or ineffective.	ist most of the course of knowledge to familiar of the course learning led knowledge to most see learning outcomes limited ability to apply arning outcomes. Lacky knowledge to solve No. of Hours 24 30		
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BIOL3302	Systematics and phylogenetics (6 credits)	Academic Year	2019		
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 I the integration of	oiology (including a wide range of		
Course Contents & Topics	Currrent classificatory theories: phenetic systematics (classifications based on overall resemblances) and cladistics (evolutionary reconstruction). The species concept. Sources of taxonomic data: morphology & anatomy, biochemistry, chemistry, molecular biology, cytology, and ethology. Causes of taxonomies complexity: environmental factors; hybridization; breeding systems. Principles of nomenclature. Laboratory sessions will be aimed at illustrating taxonomic procedures and problems; students will not be expected to memorize large numbers of scientific names.				
Course Learning	On successful completion of this course, students should be able to:				
Outcomes	CLO 1 explain taxon concepts (with particular reference to species) and show h	ow multivariate st	atistical methods		

	ca	an be applied below the s	species level				
	CLO 2 de	escribe the principles be	ehind maximum parsim	ony methods of phylogene nomoplasy and the assessr			
	CLO 3 ev	valuate the diversity of so	ources of taxonomic data	, and explain the important	ce of specifi	c data sources	
	CLO 4 re	cognise the main causes	s of taxonomic complexi	y, and identify appropriate	solutions		
		CLO 5 understand the principles of nomenclature in order to interpret the previous application of scientific na are validly publish new names					
Pre-requisites (and Co-requisites and Impermissible combinations)		ss in BIOL1309; and v level 2 BIOL course					
Offer in 2019 - 2020	Y 1st	sem Offer in 2020 - 20	021 : Y	Exa	mination	Dec	
Grade Descriptors (A+ to F)	A	learning outcomes, with evi- critical abilities and logical t	dence of extensive backgrour thinking. Apply highly effective	extensive knowledge required for d reading and use of named exa presentation skills. Demonstrate nce of integration of a wide range	mples. Show effective use	evidence of significant of data and results to	
	В	·					
	С						
	D						
	Fail						
Course Type	Lecture w	ith laboratory componen	t course				
Course Teaching	Activities	S	Details			No. of Hours	
& Learning Activities	Lectures					24	
_	Laborator	rv				24	
	Project w	•				12	
		/ Self study				100	
Assessment Methods and Weighting	Methods	•	Details	Weighting course gra	de (%)	Assessment Methods to CLO Mapping	
	Assignme	ents		15		CLO 1,3,4,5	
	Examination			70		CLO 1,2,3,4,5	
				15		CLO 1,2,3,4,3	
Required/recommended	, ·,			OLO 1,0			
reading and		id et al.: Plant Systematic	cs - A Phylogenetic Appr	oach (Sinauer, 1999)			
reading and online materials Course Website	TBC	odle.hku.hk	cs - A Phylogenetic Appr	oach (Sinauer, 1999)			

BIOL3303	Conservation biology (6 credits)	Academic Year	2019					
Offering Department	Biological Sciences	Quota	100					
Course Co-ordinator	Dr T C Bonebrake, Biological Sciences (tbone @hku.hk)							
Teachers Involved	(Dr J G Gaitan-Espitia,Biological Sciences) (Dr L A Ashton,Biological Sciences) (Dr T C Bonebrake,Biological Sciences)							
Course Objectives	To introduce students to the theory and practice of conservation and to provide students with a thorough understanding of practical, economic and management skills required for proficiency in conservation biology. Our ultimate aim is to promote an understanding of the natural biodiversity, the threats to it, and the best ways to manage them. We hope these will be your aims too, and that you will be able to use the skills and knowledge you learn from the course to reduce the local, regional and global loss of biodiversity.							
Course Contents & Topics	Among the many environmental issues, the most serious is the increasingly rapid loss of biodiversity. This loss is irreversible on a human timescale and will reduce the options available to all future human generations. Conservation Biology/Ecology is the science of preserving biological diversity. This course also provides insights to the many benefits and services that nature offers and explores strategies for management options to sustain ecological integrity and production. It is an inexact, applied, mission-orientated, multidisciplinary science which, like medicine, has built-in values: to a conservation biologist, as to a doctor, it matters whether the patient lives or dies. It is also a very new science, bringing together elements from ecology, environmental science, forestry, resource management and many other fields.							
	The course is designed to provide the knowledge, theories, and rese teaching focuses on biodiversity conservation, conservation issues theoretical underpinning of biodiversity conservation and an introducti We emphasis on the integration of knowledge, skills and abilities the problem based learning approach will require students to actively debate by researching.	s associated with climate on to conservation legislation at are required to practice of	change, the key n and economics. conservation. Our					
Course Learning	On successful completion of this course, students should be able to:							
Outcomes	CLO 1 develop a framework for critical thinking about biodiversity, environment and human interaction							
	CLO 2 understand why species are becoming extinct and predict which ones will be most vulnerable							
	CLO 3 understand the importance of the threat of tropical deforest habitat fragmentation in species extinction, and explain the ma							
	CLO 4 understand the principles of population viability analysis, management and the role of ex situ conservation, ecological r	the basis of single-specie	es conservation					

Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) A Demonstrate thorough mastery at an advanced levoutcomes. Show strong analytical and critical ability and synthesize information, and ability to apply knighly effective presentational skills. Strong evidene B Demonstrate substantial command of a broad ran learning outcomes. Show evidence of analytical and apply knowledge to familiar and some unfamilial attention to thoughtful and reflective thinking. C Demonstrate general but incomplete command of a broad ran learning outcomes. Show evidence of some analytical and familiar situations. Apply moderately effective presentations. Show evidence of some analytical and familiar situations. Apply moderately effective presentations. Show evidence of some coherent and logical the integration. Show windence of some coherent and logical the integration. Show limited ability to apply knowledge attention to thoughtful and reflective transfer. Fail Demonstrate partial but limited command of know Show evidence of some coherent and logical the integration. Show limited ability to apply knowledge attention to thoughtful and reflective transfer. Fail Demonstrate little or no evidence of command of know Show evidence of some coherent and logical the integration. Show limited ability to apply knowledge attention to thoughtful and reflective transfer. Fail Demonstrate partial but limited command of know Show evidence of some coherent and logical the integration. Show evidence of some coherent and logical the integration. Show evidence of some coherent and logical the integration of thoughtful and reflective transfer. Fail Demonstrate partial but limited command of know Show evidence of some coherent and logical the integration. Show evidence of some coherent and logical the integration of the particular shows and the integration and presentational skills. Fail Demonstrate little or no evidence of command of know Show evidence of some analytical and co	CLO 5 outline the legal and administrative basis for conservation in Hong Kong and the world						
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Presentation group presentation Test Required/recommended reading and R. B. Primack: Essentials of Conservation Biology (SV. D. Fred: Conservation biology [electronic resource	20	CLO 1,2,3,4,5,6					
Test Required/recommended R. B. Primack: Essentials of Conservation Biology (Sereding and V. D. Fred: Conservation biology [electronic resource	60	CLO 1,2,3,4,5,6					
Test Required/recommended R. B. Primack: Essentials of Conservation Biology (Sereding and V. D. Fred: Conservation biology [electronic resource	10	CLO 1,2,3,5,6					
Required/recommended R. B. Primack: Essentials of Conservation Biology (S reading and V. D. Fred: Conservation biology [electronic resource	10	CLO 1,2,3					
	R. B. Primack: Essentials of Conservation Biology (Sinauer, 2006, 4th ed.) V. D. Fred: Conservation biology [electronic resource]: foundations, concepts, applications (Springer, 2008) M.L. Hunter and J.P. Gibbs: Fundamentals of Conservation Biology (Blackwell, 2007, 3rd Ed) William J. Sutherland: The Conservation Handbook: Research, Management and Policy (Blackwell Science, 2008)						
Course Website http://moodle.hku.hk							

BIOL3305	Tropical and temperate marine ecology field course (6 credits)	Academic Year	2019				
Offering Department	Biological Sciences	Quota	15				
Course Co-ordinator	Dr B Russell, Biological Sciences (brussell@hku.hk)						
Teachers Involved	(Dr B Russell,Biological Sciences) (Dr S Cannicci,Biological Sciences)	(Dr S Cannicci, Biological Sciences)					
Course Objectives	This course uses a field-based approach to provide students with estuarine ecology in both tropical and temperate regions. Students and then apply them to compare these ecosystems in Australia, expecuarse culminates with students developing field-based research proceedings and innovative thinking to overcome problems for successful	will learn scientific technique riencing their similarities and rojects to answer ecological	ies in Hong Kong d differences. The				
Course Contents & Topics	The course will cover the structure and function of mangrove forests, reefs (coral and rocky), and algal forests in both tropical and temperate regions. Students will be introduced to the concepts in the course through a series of lectures and field trips in Hong Kong before travelling to northern and southern Australia to experience the ecosystems in the field. The lectures will provide students with background knowledge about the ecosystems which they will encounter, the structure and function of the systems and how human activities degrade them, sampling techniques, logical experimental design, and good report writing practices. These concepts will be drawn together in the field with students quantifying species richness, observing system structure and testing hypotheses with experiments that they design themselves.						
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 demonstrate an understanding of the complexity and function of marine ecosystems.						
	CLO 2 explain the role of physical and biological processes in shaping the similarities and differences among 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.						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in "C" or above in BIOL2306 or BIOL3301 or BIOL3303 or ENVS2001						
Offer in 2019 - 2020	N Offer in 2020 - 2021 : Y	Examination					
Grade Descriptors (A+ to F)	A Evidence of a thorough grasp of the subject and relevant research tech familiarity with relevant background reading and case studies. Exemplar skills. Ample evidence of independent critical thought with excellent us comparative perspective to draw insightful and logical conclusions. Signesentation skills with excellent analytical argumentation. Excellent or	ry handling of field data collection a e of a broad range of fundamental now outstanding abilities of indepe	nd excellent analytical concepts and broader endent work, effective				

		level.						
	В	Evidence of a good grasp of the subject and relevant research techniques. Interest in learning and good-to-moderate fam with relevant background reading and case studies. Good handling of field data collection and commendable analytical Good evidence of critical thought (although not always independent), with an appreciable use of fundamental concept consideration of broader comparative perspective in drawing logical conclusions. Good abilities of independent work, eff presentation skills with logical and analytical argumentation. Work more than sufficient for what is required at degree level.						
	С	Demonstrate an adequate, but incomplete grasp of the subject and relevant research techniques. Moderate fa relevant background reading and case studies, but no interest in learning beyond the adequate average level. Evide critical thinking (although not always independent), with mostly good use of fundamental concepts to draw logical Fair presentation skills, with mostly correct argumentation, but limited (or no) abilities to integrate broader con 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 no	ninimum grasp of the subject and the roof familiarity with any relevant examples a ation skills with poor argumentation and it	nd case studies. Inadequate evi	dence of coherent logical			
Course Type	Field cam	os						
Course Teaching	Activities	•	Details		No. of Hours			
& Learning Activities	Lectures		Pre-course lectures and field trip	s	20			
	Field work		80 hourse + travel time	80				
	Reading /	Self study		40				
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignme	ents	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 v	will be directed to releva	nt scientific literature and websites	;				
Course Website	http://moo	dle.hku.hk						
Additional Course Information	week on including abundance. There will costs. Enrollment Enrollment.	Orpheus Island (tropica working in contact with e of biting insects (mosque be extra costs involved the procedure: to the forthis course will clos	field course to Australia, one we al region). Students will be exponseawater, potentially cold and juitos and sand flies). If the course, including but not be at the end of the add/drop perion be booked in advance.	sed to some harsh envir rainy weather. Orpheus : limited to airfares, accor	ronmental conditions Island can have an mmodation and meal			

BIOL3313	Freshwater ecology (6 credits)	Academic Year	2019
Offering Department	Biological Sciences	Quota	30
Course Co-ordinator	Prof D Dudgeon, Biological Sciences (ddudgeon@hku.hk)		
Teachers Involved	(Prof D Dudgeon, School of Biological Sciences)		
Course Objectives	This course introduces freshwater science by integrating the physical a drainage basins in the context of sustaining human livelihoods and bio lakes and maintenance of water quality are considered also. Case striver science and human use of drainage basins. Emphasis will be biodiversity in Asia in the context of increasing human modification of scarcity.	diversity. Conservation and udies are used to illustrate e placed upon conservation	d management of the principles of on of freshwater
Course Contents & Topics	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 diffluctuations, 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 ver the land. The range of organisms associated with Asian fresh wate explained, and students will become familiar with some common Hon sessions. The dependence of humans on freshwater ecosystems and explained, together with the causes and consequences of human modifor conservation of aquatic biodiversity. Finally the range of manage human impacts on freshwater ecosystems and maintain water quality is	% since 1950 and is growing in the course introduces the drainage basins, as well are along rivers and their flowers to the transfer of material resus energy derived from divers is introduced and their growing species in field trighther role they play in sustain iffication of fresh waters, an ment strategies used to re-	ng faster than the physicochemical is their seasonal odplains. Energy Is between water etrital inputs from functional roles and laboratory ning livelihoods is d the implications
Course Learning	On successful completion of this course, students should be able to:		
Outcomes	CLO 1 describe the global water cycle, the main sources and path influence of land-water interactions on aquatic productivity CLO 2 describe the composition of the freshwater biota (major gro	,	,
	ecosystems, and identify some of the common animals that occ CLO 3 describe the results of modification of freshwater ecosyste freshwater biodiversity in Asia, explain why freshwater biota are the management strategies used to reduce or mitigate them	ms by humans, list the	main threats to
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BIOL2102 and BIOL2306		
Offer in 2019 - 2020	N Offer in 2020 - 2021 : Y	Examination	
Grade Descriptors	Evidence of original logical (or coherent) thought, strong analytical (or cr	itical) abilities and a thorough gra	en of the cubiect as

(A+ to F)	A	analytical skills and/or lab/fie		f named (organism) examples. Show ε ge of general freshwater biodiveristy or se level.		
	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 knowledge of general freshwater biodiversity or selected taxa. Work more than sufficient for what is required at degree level.				
	С	Evidence of some analytical (or critical) abilities and logical (or coherert) thinking with an adequate (but incomplete) grasp of the subject, but little or no evidence of original thinking, with limited background reading and use of named (organism) examples. Show fair presentational, analytical and/or lab/field skills, and some knowledge of general freshwater biodiversity or selected taxa. Work sufficient for what is required for degree level.				
	D	organizational, analytical or	presentational skills. Shows insuf	of the subject (i.e. knowledge is very i ficient evidence of background reading, o barely (D) adequate for what is required a	or familiarity with lab/field	
	Fail	Evidence of poor or inadeque excessive irrelevancy. Little	ate knowledge and understanding	g of the subject, and a lack of coherence, with relevant reading material and lab/fi	poor organization and/or	
Course Type	Lecture wi	th laboratory component	t course			
Course Teaching	Activities		Details		No. of Hours	
I	Lectures				26	
	Laboratory		project and laboratory work; field trips to local streams and wetlands		40	
	Reading /	Self study			100	
Assessment Methods and Weighting	Methods	·	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents		30	CLO 2	
	Examinat			60	CLO 1,2,3	
	Laborator	y reports		10	CLO 3	
Required/recommended reading and online materials	Allan, J.D. The Meko An online information health.	& Castillo, M.M. (2007). ng River Awareness Kit training tool develope n on the physical and b	d by an international teal iological features of rivers,	ing.org/RAK/html/rak_frameset.htm (including the course coordin and shows how human livelihoo or each lecture on the course webs	ator) that contains ods depend on river	
Course Website	http://moo	dle.hku.hk				
Additional Course Information		ternate year from 2017-2 se will be offered subject		umber and availability of teachers	i.	

BIOL3314	Plant s	tructure and evolution (6 credits)	Academic Year	2019		
Offering Department	Biologica	al Sciences	Quota	30		
Course Co-ordinator	Prof R M	K Saunders, Biological Sciences (saunders@hku.hk)				
Teachers Involved	(Prof R N	M K Saunders, Biological Sciences)				
Course Objectives		ey the form and function of the vascular plant body, with nee of structures. This course forms a basis for understanding netics.				
Course Contents & Topics	explanati Informati taxonom	irse will investigate various cell, tissue and organ types in ions for their diversity and discussions of the value of such knion on plant structure will be integrated with our current undic relationships derived from molecular phylogenetic research induction, growth and development, pollination, fertilization, fruissed.	owledge in understanding erstanding of developmer n. Topics such as food s	plant phylogeny. ntal genetics and storage, strength,		
Course Learning Outcomes	CLO 1 r	essful completion of this course, students should be able to: ecognise the main plant cell types and explain how cells are 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 integrate knowledge of the genetic control of floral development with the evolution of organ diversity					
	CLO 6	describe the structure of fruits from a functional perspective, derived from the flower explain how seeds develop after fertilization of the ovule, and he germination patterns				
Pre-requisites (and Co-requisites and Impermissible combinations)		BIOL1309; and I 2 BIOL course				
Offer in 2019 - 2020	Y 2n	nd sem Offer in 2020 - 2021 : N	Examination	May		
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive knowle learning outcomes, with evidence of extensive background reading and us critical abilities and logical thinking. Apply highly effective presentation ski draw appropriate and insightful conclusions.	se of named examples. Show e	vidence of significant		
	В	Demonstrate substantial command of knowledge required for attaining most of the course learning outcomes, with evidence some background reading and use of named examples. Show evidence of critical abilities and logical thinking. Apply effect presentation skills. Demonstrate use of data and results to draw appropriate and insightful conclusions.				
	С	C 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.				
	D	Demonstrate partial but limited command of knowledge and skills required with insufficient evidence of background reading and use of named exar logical thinking. Apply limited presentation skills. Demonstrate limited abi insightful conclusions.	nples. Show evidence of limited	d critical abilities and		
	Fail	Demonstrate little or no evidence of command of knowledge and skills req no evidence of background reading or use of named examples. Show little				

	Presentational skil	Is are minimally effective or ineffective.	Misuse of data and results to draw appropriate	e conclusions.			
Course Type	Lecture with laboratory component course						
Course Teaching	Activities	Details		No. of Hours			
& Learning Activities	Lectures			24			
	Laboratory			36			
	Reading / Self study			100			
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Examination		70	CLO 1,2,3,4,5,6			
	Laboratory reports		30	CLO 1,2,3,4,5,6			
Required/recommended reading and online materials	P.H. Raven, R.F. Évert & S	wering Plants, 3rd ed. Cambridg S.E. Eichhorn: Biology of Plants material will be provided during	, 7th ed. Freeman (2005)				
Course Website	http://moodle.hku.hk	, ,					
Additional Course Information	Offer in alternative year from This course will be offered		nt number and availability of teachers	S.			

BIOL3318	Experin	nental intertidal eco	ology (6 credits)	Academic Ye	ar 2019	
Offering Department	Biologica	l Sciences		Quota	20	
Course Co-ordinator	Prof G A	Williams, Biological Scient	ences (hrsbwga@hku.hk)			
Teachers Involved		Williams,School of Biol				
Course Objectives	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	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 Outcomes	On successful completion of this course, students should be able to: CLO 1 describe the physical environmental factors (e.g., waves, tides) shaping the intertidal environment and hot they interact with geographic features to produce different kinds of shores (e.g., sandy shores, mangrove cLO 2 understand the factors limiting species distribution patterns on the vertical intertidal gradient an appreciate methods to measure and investigate these patterns 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 processe (e.g., herbivory, competition) in intertidal areas CLO 5 explain the role of biological processes (e.g., predation, succession) and their interaction with the physic 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		BIOL2102 or BIOL3301		·		
combinations)						
Offer in 2019 - 2020	N Of	fer in 2020 - 2021 : Y		Examination		
Grade Descriptors (A+ to F) Course Type	Evidence of original, logical (or coherent) thought, strong analytical and critical abilities and a thorough grasp of the s demonstrated by background reading and excellent use of named (organism) examples. Show excellent prese analytical skills and/or lab/field skills, and demonstrate substantial knowledge of general intertidal ecology and experimental design and analysis skills. B Evidence of analytical (or critical) abilities and logical (or coherent), but not necessarily original, thinking, a good grass subject as demonstrated by background reading and use of named (organism) examples. Show good presentational, and/or lab/field skills, and demonstrate knowledge of general intertidal ecology and good experimental design and analy Evidence of some analytical (or critical) abilities and logical (or coherent) thinking with an adequate (but incomplete) grassubject, but little or no evidence of original thinking, limited background reading and use of named (organism) example fair presentational, analytical and/or lab/field skills, and demonstrates some knowledge of general intertidal ecology and demonstrates some knowledge is very incomplete), with organizational, analytical or presentational skills. Show insufficient evidence of background reading, or familiarity with techniques. Poor knowledge of general intertidal ecology and misunderstanding of experimental design and analysis. Fail Evidence of poor or inadequate knowledge and understanding of the subject, and a lack of coherence, poor organizational intertidal ecology, and misuse of experimental design and analysis skills.				excellent presentational, ecology and excellent ing, a good grasp of the presentational, analytica esign and analysis skills. incomplete) grasp of the ganism) examples. Show I intertidal ecology and incomplete), with limited in familiarity with lab/field and analysis.	
Course Type Course Teaching	Activitie	vith laboratory compone			No. of Hours	
Learning Activities	Lectures		Details		No. of Hours	
- Louining Activities			field trin/project work		28	
	Field work Project work		field trip/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	
	Assignm	ents		40	CLO 1,2,3,4,5,6	
	Examina			60	CLO 1,2,3,4,5	
			shore Ecology of Hong Kong (H	ong Kong University Press 10		

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 enrollment number and availability of teachers.

BIOL3319	Tropical	terrestrial ecolo	gy (6 credits)	Academ	ic Year 2019	
Offering Department	Biological	Sciences		Quota	30	
Course Co-ordinator	Dr B Guer	nard, Biological Scier	nces (bguenard@hku.hk)			
Teachers Involved	(Dr B Gue	nard,Biological Scie	nces)			
Course Objectives	To enable ecology.	motivated students	s to acquire the knowledge a	nd skills needed to solve rea	al problems in terrestria	
Course Contents & Topics	and region their roles functional emphasis terrestrial successio The practi will partici and write literature discussion	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. The practical component of the course will introduce students to basic field techniques used in ecology. Students will participate to a group project, collecting and analysing their own data involving both field and laboratory work, and write a short scientific paper. Particular emphasis will be given on how to efficiently read and write scientific literature and present data efficiently. Attendance and participation in class are encouraged through series of discussions to stimulate critical thinking on chosen topics in terrestrial ecology. Assessment includes problem based learning exercise, group presentation, a final term paper and a final examination covering the content of the				
Course Learning		ssful completion of th	nis course, students should be	able to:		
Outcomes	CLO 1 un dif CLO 2 un	derstand evolution ferent geographic ar derstand the current	of biodiversity patterns and	shaping processes within to sity in their pristine form and o	disturbed state	
	the	e impacts of those th	reats			
			eline study of terrestrial biodive			
	CLO 5 de	velop the skill to be	an active learner through the p	problem-based learning exerc	ises	
Pre-requisites (and Co-requisites	Pass in BI	OL1309 and BIOL23	306			
-						
combinations)	Y 2nd	sem Offer in 2020) - 2021 : Y	Examina	ation May	
combinations) Offer in 2019 - 2020	В	Demonstrate thorough outcomes. Show strong and synthesize informa highly effective presents Demonstrate substantia learning outcomes. Sho apply knowledge to fa attention to thoughtful a	mastery at an advanced level of externations and level of externation, and abilities and let iton, and ability to apply knowledge to attenual skills. Strong evidence of clear all command of a broad range of know evidence of analytical and critical miliar and some unfamiliar situation and reflective thinking.	nsive knowledge and skills required orgical thinking, with evidence of original authority of a wide range of complex, familiar attention to thoughtful and reflective wledge and skills required for attainiabilities and logical thinking, integrals. Demonstrate effective presentations	for attaining all course learning inal thought, ability to integrate and unfamiliar situations. Apply thinking. ing at least most of the course atton of materials and ability to ional skills. Evidence of clear	
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combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	A B C D	Demonstrate thorough outcomes. Show strong and synthesize informatighly effective presents of the properties of the prop	mastery at an advanced level of extery analytical and critical abilities and lot iton, and ability to apply knowledge to tational skills. Strong evidence of clear all command of a broad range of know evidence of analytical and critical miliar and some unfamiliar situation nd reflective thinking. Dut incomplete command of knowlednec of some analytical and critical at y moderately effective presentational the coherent and logical thinking, but a builty to apply knowledge to solve produced to the coherent and logical thinking, but a builty to apply knowledge to solve produced to command of knowledge and reflective thinking. evidence of command of knowledge all abilities, logical and coherent thin and presentational skills are minimally	nsive knowledge and skills required orgical thinking, with evidence of original thinking, with evidence of original attention to thoughtful and reflective wledge and skills required for attaining abilities and logical thinking, integrals. Demonstrate effective presentating and skills required for attaining and skills required for attaining skills. Little evidence of clear attent skills required for attaining some of the with limited analytical and critical problems. Apply limited effectiveness and skills required for attaining the ciking. Show very little or no ability	for attaining all course learning inal thought, ability to integrate and unfamiliar situations. Apply thinking. Ing at least most of the course sition of materials and ability to ional skills. Evidence of clear most of the course learning to to apply knowledge to most ion to thoughtful and reflective the course learning outcomes. I abilities and little attempt at in presentational skills. Lack o course learning outcomes. Lack course learning outcomes. Lack	
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Course Type Course Teaching	B C D Fail Lecture wi Activities Lectures Laborator Tutorials	Demonstrate thorough outcomes. Show strong and synthesize informa highly effective present. Demonstrate substantial learning outcomes. Sho apply knowledge to fa attention to thoughtful a Demonstrate general butcomes. Show evide familiar situations. Appl thinking. Demonstrate partial but Show evidence of son integration. Show limite attention to thoughtful a Demonstrate little or no of analytical and critical problems. Organization ith laboratory compositions.	mastery at an advanced level of extery analytical and critical abilities and lc tion, and ability to apply knowledge to attional skills. Strong evidence of clear all command of a broad range of know ow evidence of analytical and critical miliar and some unfamiliar situation and reflective thinking. Out incomplete command of knowlednee of some analytical and critical at ly moderately effective presentational thimited command of knowledge and the coherent and logical thinking, but disability to apply knowledge to solve professional thinking, and reflective thinking, evidence of command of knowledge all abilities, logical and coherent thin and presentational skills are minimally nent course Details	nsive knowledge and skills required orgical thinking, with evidence of original thinking, with evidence of original attention to thoughtful and reflective wledge and skills required for attaining abilities and logical thinking, integrals. Demonstrate effective presentating and skills required for attaining and skills required for attaining skills. Little evidence of clear attent skills required for attaining some of the with limited analytical and critical problems. Apply limited effectiveness and skills required for attaining the ciking. Show very little or no ability	for attaining all course learning inal thought, ability to integrate and unfamiliar situations. Apply thinking. Ing at least most of the course sition of materials and ability to ional skills. Evidence of clear to most of the course learning to to apply knowledge to most ion to thoughtful and reflective the course learning outcomes a abilities and little attempt at in presentational skills. Lack o course learning outcomes. Lack to apply knowledge to solve to apply knowledge to solve to apply knowledge to solve 24 24 24 14	
Course Type Course Teaching & Learning Activities	B C D Fail Lecture with Activities Lectures Laborator Tutorials Reading //	Demonstrate thorough outcomes. Show strong and synthesize informa highly effective presents Demonstrate substantial learning outcomes. Sho apply knowledge to fa attention to thoughtful a Demonstrate general boutcomes. Show evide familiar situations. Appl thinking. Demonstrate partial but Show evidence of son integration. Show limite attention to thoughtful a Demonstrate little or no of analytical and critic problems. Organization the laboratory composition of the strong outcomes. Show strong of the strong of the strong of the strong outcomes of the strong outcomes of the strong outcomes.	mastery at an advanced level of extery analytical and critical abilities and lot iton, and ability to apply knowledge to tational skills. Strong evidence of clear all command of a broad range of know evidence of analytical and critical miliar and some unfamiliar situation and reflective thinking. But incomplete command of knowledge to some analytical and critical at ly moderately effective presentational at limited command of knowledge and the coherent and logical thinking, but ability to apply knowledge to solve professional critical at limited command of knowledge and reflective thinking. Evidence of command of knowledge all abilities, logical and coherent thin and presentational skills are minimally nent course Details Laboratory & field work	nsive knowledge and skills required of cigical thinking, with evidence of origical thinking, with evidence of origical attention to thoughtful and reflective attention to thoughtful and reflective wledge and skills required for attain abilities and logical thinking, integras. Demonstrate effective presentating and skills required for attaining skills. Little evidence of clear attent skills required for attaining some of twith limited analytical and critical problems. Apply limited effectiveness and skills required for attaining the cking. Show very little or no ability y effective or ineffective.	for attaining all course learning inal thought, ability to integrate and unfamiliar situations. Apply thinking. Ing at least most of the course atton of materials and ability to ional skills. Evidence of clear in most of the course learning by to apply knowledge to most ion to thoughtful and reflective the course learning outcomes a abilities and little attempt at in presentational skills. Lack o course learning outcomes. Lack to apply knowledge to solve to apply knowledge to solve 24 24 14 100	
Course Type Course Teaching & Learning Activities Assessment Methods	B C D Fail Lecture wi Activities Lectures Laborator Tutorials Reading / Methods	Demonstrate thorough outcomes. Show strong and synthesize informa highly effective presents Demonstrate substantial learning outcomes. Sho apply knowledge to fa attention to thoughtful a Demonstrate general is outcomes. Show evide familiar situations. Appl thinking. Demonstrate partial but Show evidence of son integration. Show limite attention to thoughtful a Demonstrate little or no of analytical and critical problems. Organization ith laboratory composite the study.	mastery at an advanced level of extery analytical and critical abilities and lc tion, and ability to apply knowledge to attional skills. Strong evidence of clear all command of a broad range of know ow evidence of analytical and critical miliar and some unfamiliar situation and reflective thinking. Out incomplete command of knowlednee of some analytical and critical at ly moderately effective presentational thimited command of knowledge and the coherent and logical thinking, but disability to apply knowledge to solve professional thinking, and reflective thinking, evidence of command of knowledge all abilities, logical and coherent thin and presentational skills are minimally nent course Details	nsive knowledge and skills required gical thinking, with evidence of origic a wide range of complex, familiar a attention to thoughtful and reflective wledge and skills required for attainia abilities and logical thinking, integras. Demonstrate effective presentating and skills required for attaining sittles and logical thinking, and abilities with skills. Little evidence of clear attent skills required for attaining some of the with limited analytical and critical problems. Apply limited effectiveness and skills required for attaining the ciking. Show very little or no ability of effective or ineffective. Weighting in fir course grade (9)	for attaining all course learning inal thought, ability to integrate and unfamiliar situations. Apply thinking. Ing at least most of the course learning at least most of the course it conal skills. Evidence of clear ty to apply knowledge to most ion to thoughtful and reflective the course learning outcomes. I abilities and little attempt at in presentational skills. Lack o course learning outcomes. Lack to apply knowledge to solve No. of Hours	
Course Type Course Teaching & Learning Activities Assessment Methods	B C D Fail Lecture wi Activities Lectures Laborator Tutorials Reading / Methods Assignment	Demonstrate thorough outcomes. Show strong and synthesize informatingly effective presents Demonstrate substantial learning outcomes. Shot apply knowledge to fattention to thoughtful a Demonstrate general but outcomes. Show evide familiar situations. Appl thinking. Demonstrate partial but Show evidence of son integration. Show limite attention to thoughtful a Demonstrate little or no of analytical and critical problems. Organization ith laboratory composite the study.	mastery at an advanced level of extery analytical and critical abilities and lot iton, and ability to apply knowledge to tational skills. Strong evidence of clear all command of a broad range of know evidence of analytical and critical miliar and some unfamiliar situation and reflective thinking. But incomplete command of knowledge to some analytical and critical at ly moderately effective presentational at limited command of knowledge and the coherent and logical thinking, but ability to apply knowledge to solve professional critical at limited command of knowledge and reflective thinking. Evidence of command of knowledge all abilities, logical and coherent thin and presentational skills are minimally nent course Details Laboratory & field work	nsive knowledge and skills required gical thinking, with evidence of origical thinking, with evidence of origical thinking, with evidence of origin a wide range of complex, familiar a attention to thoughtful and reflective wledge and skills required for attainia abilities and logical thinking, integrals. Demonstrate effective presentatings and skills required for attaining silities and logical thinking, and abilistilistilistilistilistilistilistilis	for attaining all course learning inal thought, ability to integrate and unfamiliar situations. Apply thinking. Ing at least most of the course learning at least most of the course it conal skills. Evidence of clear to the course learning to the course learning to the course learning to the course learning out to apply knowledge to most it in presentational skills. Lack of the course learning outcomes. It is abilities and little attempt at in presentational skills. Lack of the course learning outcomes. Lack to apply knowledge to solve to apply knowledge to apply knowledge to solve to apply knowledge to apply knowledge to apply knowledge to solve to apply knowledge to apply knowled	
Combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching & Learning Activities Assessment Methods	B C D Fail Lecture with Activities Lectures Lect	Demonstrate thorough outcomes. Show strong and synthesize informating highly effective presents Demonstrate substantial learning outcomes. Shot apply knowledge to fattention to thoughtful a Demonstrate general but outcomes. Show evide familiar situations. Appl thinking. Demonstrate partial but Show evidence of son integration. Show limite attention to thoughtful a Demonstrate little or no of analytical and critical problems. Organization ith laboratory composite the standard of the standa	mastery at an advanced level of extery analytical and critical abilities and lot iton, and ability to apply knowledge to tational skills. Strong evidence of clear all command of a broad range of know evidence of analytical and critical miliar and some unfamiliar situation and reflective thinking. But incomplete command of knowledge to some analytical and critical at ly moderately effective presentational at limited command of knowledge and the coherent and logical thinking, but ability to apply knowledge to solve professional critical at limited command of knowledge and reflective thinking. Evidence of command of knowledge all abilities, logical and coherent thin and presentational skills are minimally nent course Details Laboratory & field work	nsive knowledge and skills required orgical thinking, with evidence of original thinking, with evidence of original attention to thoughtful and reflective wledge and skills required for attainiabilities and logical thinking, integrals. Demonstrate effective presentatings and skills required for attaining and skills required for attaining skills. Little evidence of clear attent skills required for attaining some of the with limited analytical and critical problems. Apply limited effectiveness and skills required for attaining the cking. Show very little or no ability of effective or ineffective. Weighting in fire course grade (9)	for attaining all course learning inal thought, ability to integrate and unfamiliar situations. Apply thinking. Ing at least most of the course learning at least most of the course it onal skills. Evidence of clear ing ty to apply knowledge to most it to thoughtful and reflective the course learning outcomes. It abilities and little attempt at in presentational skills. Lack of to apply knowledge to solve to apply knowledge to ap	
Course Type Course Teaching & Learning Activities Assessment Methods	B C D Fail Lecture wi Activities Lectures Laborator Tutorials Reading / Methods Assignme Examinat Presentat	Demonstrate thorough outcomes. Show strong and synthesize informatingly effective presents Demonstrate substantial learning outcomes. Sho apply knowledge to fa attention to thoughtful a Demonstrate general boutcomes. Show evider familiar situations. Appl thinking. Demonstrate partial but Show evidence of son integration. Show limite attention to thoughtful a Demonstrate little or no of analytical and critical problems. Organization ith laboratory composite that the strong of the strong	mastery at an advanced level of extery analytical and critical abilities and lot iton, and ability to apply knowledge to tational skills. Strong evidence of clear all command of a broad range of know evidence of analytical and critical miliar and some unfamiliar situation and reflective thinking. But incomplete command of knowledge to some analytical and critical at ly moderately effective presentational at limited command of knowledge and the coherent and logical thinking, but ability to apply knowledge to solve professional critical at limited command of knowledge and reflective thinking. Evidence of command of knowledge all abilities, logical and coherent thin and presentational skills are minimally nent course Details Laboratory & field work	nsive knowledge and skills required gical thinking, with evidence of origi a wide range of complex, familiar a attention to thoughtful and reflective wledge and skills required for attain abilities and logical thinking, integras. Demonstrate effective presentating and skills required for attaining skills. Little evidence of clear attent skills required for attaining skills. Little evidence of clear attent skills required for attaining some of twith limited analytical and critical problems. Apply limited effectiveness and skills required for attaining the cking. Show very little or no ability offective or ineffective. Weighting in fir course grade (9) Weighting in fir course grade (9) 10 40 25	for attaining all course learning inal thought, ability to integrate and unfamiliar situations. Apply thinking. Ing at least most of the course ston of materials and ability to ional skills. Evidence of clear in most of the course learning by to apply knowledge to most ion to thoughtful and reflective the course learning outcomes a abilities and little attempt at in presentational skills. Lack o course learning outcomes. Lack to apply knowledge to solve to apply knowledge to apply knowledge to solve to apply knowledge to a	
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combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended reading and	A B C D Fail Lecture wi Activities Lectures Laborator Tutorials Reading / Methods Assignme Examinat Presentat Project re Corlett R. Dudgeon	Demonstrate thorough outcomes. Show strong and synthesize informa highly effective presents Demonstrate substantial learning outcomes. Sho apply knowledge to fa attention to thoughtful a Demonstrate general toutcomes. Show evide familiar situations. Appl thinking. Demonstrate partial but Show evidence of son integration. Show limite attention to thoughtful a Demonstrate little or no of analytical and critic problems. Organization ith laboratory composite the strong of the	mastery at an advanced level of extery analytical and critical abilities and lot iton, and ability to apply knowledge to a too work of the analytical and critical allow one work of an analytical and critical miliar and some unfamiliar situation and reflective thinking. Limited command of knowledge and the coherent and logical thinking, but a builty to apply knowledge to solve professibility to apply knowledge to solve professibilities, logical and coherent thing and reflective thinking. Limited command of knowledge and the coherent and logical thinking, but ability to apply knowledge to solve professibilities, logical and coherent thin and presentational skills are minimally nent course Details Details Details	nsive knowledge and skills required gical thinking, with evidence of original thinking, with evidence of original attention to thoughtful and reflective attention to thoughtful and reflective wledge and skills required for attaining abilities and logical thinking, integras. Demonstrate effective presentating and skills required for attaining sillities and logical thinking, and abilities with skills. Little evidence of clear attent skills required for attaining some of the with limited analytical and critical problems. Apply limited effectiveness and skills required for attaining the ciking. Show very little or no ability offective or ineffective. Weighting in fire course grade (9) 10 40 25 25 rersity Press, 2009).	for attaining all course learning inal thought, ability to integrate and unfamiliar situations. Apply thinking. Ing at least most of the course stion of materials and ability to ional skills. Evidence of clear to most of the course learning by to apply knowledge to most ion to thoughtful and reflective the course learning outcomes a abilities and little attempt at in presentational skills. Lack o course learning outcomes. Lack to apply knowledge to solve to apply knowledge to apply knowled	
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended reading and online materials	B C D Fail Lecture wi Activities Lectures Laborator Tutorials Reading / Methods Assignme Examinat Presentat Project re Corlett R. Dudgeon To be prov	Demonstrate thorough outcomes. Show strong and synthesize informa highly effective present. Demonstrate substantial learning outcomes. Sho apply knowledge to fa attention to thoughtful a Demonstrate general it outcomes. Show evide familiar situations. Appl thinking. Demonstrate partial but Show evidence of son integration. Show limite attention to thoughtful a Demonstrate little or no of analytical and critic problems. Organization ith laboratory composite the strong of the	mastery at an advanced level of extery analytical and critical abilities and lot iton, and ability to apply knowledge to tational skills. Strong evidence of clear all command of a broad range of know evidence of analytical and critical miliar and some unfamiliar situation and reflective thinking. Dut incomplete command of knowledness of some analytical and critical at ly moderately effective presentational thimited command of knowledge and the coherent and logical thinking, but distributed to apply knowledge to solve professibilities, logical and coherent thin and presentational skills are minimally nent course Details Details Details Tropical East Asia (Oxford University of the proposal prop	nsive knowledge and skills required gical thinking, with evidence of original thinking, with evidence of original attention to thoughtful and reflective attention to thoughtful and reflective wledge and skills required for attaining abilities and logical thinking, integras. Demonstrate effective presentating and skills required for attaining sillities and logical thinking, and abilities with skills. Little evidence of clear attent skills required for attaining some of the with limited analytical and critical problems. Apply limited effectiveness and skills required for attaining the ciking. Show very little or no ability offective or ineffective. Weighting in fire course grade (9) 10 40 25 25 rersity Press, 2009).	for attaining all course learning inal thought, ability to integrate and unfamiliar situations. Apply thinking. Ing at least most of the course sition of materials and ability to ional skills. Evidence of clear to most of the course learning to to apply knowledge to most ion to thoughtful and reflective the course learning outcomes. It abilities and little attempt at in presentational skills. Lack o course learning outcomes. Lack to apply knowledge to solve to apply knowledge to	
combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended reading and	B C D Fail Lecture wi Activities Lectures Laborator Tutorials Reading / Methods Assignme Examinat Presentati Project re Corlett R. Dudgeon To be pro- http://moo	Demonstrate thorough outcomes. Show strong and synthesize informatingly effective presents Demonstrate substantial learning outcomes. Sho apply knowledge to fa attention to thoughtful a Demonstrate general be outcomes. Show evide familiar situations. Appl thinking. Demonstrate partial but Show evidence of son integration. Show limite attention to thoughtful a Demonstrate little or no of analytical and critical problems. Organization ith laboratory composite the strong of t	mastery at an advanced level of extery analytical and critical abilities and lot iton, and ability to apply knowledge to tational skills. Strong evidence of clear all command of a broad range of know evidence of analytical and critical miliar and some unfamiliar situation and reflective thinking. Dut incomplete command of knowledness of some analytical and critical at ly moderately effective presentational thimited command of knowledge and the coherent and logical thinking, but distributed to apply knowledge to solve professibilities, logical and coherent thin and presentational skills are minimally nent course Details Details Details Tropical East Asia (Oxford University of the proposal prop	nsive knowledge and skills required rigical thinking, with evidence of origical thinking, with evidence of origical thinking, with evidence of original attention to thoughtful and reflective wledge and skills required for attaining abilities and logical thinking, integrates. Demonstrate effective presentating and skills required for attaining sittles and logical thinking, and abilities and logical thinking, and logic	for attaining all course learning inal thought, ability to integrate and unfamiliar situations. Apply thinking. Ing at least most of the course learning at least most of the course learning to tonal skills. Evidence of clear to most of the course learning by to apply knowledge to most into thoughtful and reflective the course learning outcomes. It abilities and little attempt at in presentational skills. Lack of the apply knowledge to solve to apply knowledge t	

BIOL3320	The biology of marine mammals (6 credits)	Academic Year	2019
Offering Department	Biological Sciences	Quota	30
Course Co-ordinator	, Biological Sciences ()		
Teachers Involved			
Course Objectives	Few other groups of animals have captured the public's imagination the way m	arine mammals, e	especially whales

Course Website Additional Course Information	http://mod This cour	odle.hku.hk se is offered in alterna	·		·	
Required/recommended reading and online materials	Reynolds Perrin Wi	JÈ & Rommel SA (ed F, Wursig B & Thewiss	al biology: An evolutionary approads). Biology of marine mammals (Seen JGM (eds). Encyclopedia of mater Whitehead H (eds). Cetacean so	mithsonian Institution Press´1 arine mammals (Academic Pr	ess 2008)	
	Assignme Examina		including active participation/continuous assessment/presentation	55 45	CLO 1,2,3,4,5	
Assessment Methods and Weighting	Methods	•	Details including active	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Project w Reading	/огк / Self study	project work review		8 60	
	Laboratory		research techniques, interactiv	including field trips, research site vists, demonstration of research techniques, interactive classroom debates		
Learning Activities	Lectures		including field trips research site viets described.		24	
Course Teaching	Activitie		Details		No. of Hours	
Course Type	Lecture w		ation and no abilities to draw meaningful co			
	Fail	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. No evidence of basic minimum knowledge and understanding of the subject. No evidence of background reading and infamiliarity with any relevant examples and case studies. Inadequate evidence of coherent logical thought; ineffective presentations.				
	C	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. D Demonstrate some grasp of the subject, but partial and limited to the most basic concepts, examples, and limited (or none) case				
	В	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.				
(A+ to F)		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.				
Offer in 2019 - 2020 Grade Descriptors	N Off	fer in 2020 - 2021 : N	grasp of the subject in a broader comparati	Examination	ackground reading an	
Pre-requisites and Co-requisites and Impermissible combinations)	Pass in B	HOL2306				
	CLO 4 a CLO 5 th w	ppreciate the socio-ec nink analytically in tern orld	our, population structure and demo ological diversity and behavioural on ns of marine mammal ecology and	omplexity of marine mammal		
	CLO 3 u	cosystem nderstand and apprec	iate the complexity of interactions	between environmental selec		
Course Learning Outcomes	CLO 1 a	ppreciate marine mam	s course, students should be able t Imal diversity and biogeography nals adapt and function in an ag		role in the maring	
Saura Lagreia	undertake skills in co	e independent literatur onceptual and analytic	c research, innovative research to re-searches and will discuss their all approaches to science.	projects during classroom de		
	of human and a re- knowledg of marine	influences on the fate view of conservation to of population ecologies mammal populations	e of marine mammals, examples of and management strategies; our gy, behaviour and behavioural ecol s. This course is designed for 3n	of critically endangered speci- emphasis is on the importar logy in ensuring long-term eff d and 4th year students; it	es and populations nce of applying th fective conservation includes field trips	
& Topics	of the var discusses highlightin followed ranging b	rious adaptations that s the life history, rep ng the similarities and by sessions on beha pehaviour, foraging st	have evolved to meet the challend productive strategies, ecology ar differences between species in thi aviour and behavioural ecology; have trategies, ecology of group living that guide the daily lives of these	ges of the marine environment of population dynamics of s taxonomically diverse group ere we discuss animal mov- and social behaviour, beha	nt. Next, the cours marine mammals o of animals. This rement, diving an vioural complexity	
Course Contents	(sirenians environm threats to	s) and sea otters. St ent, their role in the m these animals in the h	udents will learn to understand narine ecosystem, their behavioura numan-dominated world. rview of marine mammal species a	the ecology of mammalian all complexity and socio-ecolo	life in the aquatings, and the currer	
	mammals	s: whales, dolphins an	e covers the evolutionary biology, id porpoises (cetaceans), seals an	d walruses (pinnipeds), man	atees and dugong	

BIOL3322	Marine invertebrate zoology (6 credits)	Academic Year	2019		
Offering Department	Biological Sciences	Quota	30		
Course Co-ordinator	Dr S Cannicci, Biological Sciences (cannicci@hku.hk)				
Teachers Involved	(Dr S Cannicci,Biological Sciences)				
Course Objectives	This course introduces the students to the diversity, biology and ecology of ma introduced to various aspects of the systematics, anatomy, physiology and func				

	benthic ar most dive	nd pelagic ecosystems. rse marine systems in th	The course will particularly for the world.	and ecological roles these ar ocus on the South East Asian	seas, which are the	
Course Contents & Topics	environme worms), C the seas. of all man relatives. This cour structure relationsh pathways, students v of the fun Asian sea	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 elationships and the body plans of marine invertebrates groups, together with the associated evolutionary and the students will be described to provide students with an evolutionary grand tour of life on Earth. In the second particular the mechanisms underpinning the ecological functions of marine ecosystems, through the students will learn the mechanisms underpinning the ecological functions of marine ecosystems, through the students will 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 itself trips and laboratory sessions.				
Course Learning		•	course, students should be abl	le to:		
Outcomes	CLO 1 id	entify major taxa of mar	ine invertebrates			
	CLO 3 de	escribe the composition identify common species	of the invertebrates communit es and taxa typical of Hong Ko	•	osystems, and learn	
	CLO 4 ur	logical functioning of				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in B	OL2306				
Offer in 2019 - 2020	Y 2nd	l sem Offer in 2020 - 2	2021 : N	Examination	May	
Grade Descriptors	Α			ch techniques. Eagerness and enthusia		
(A+ to F)		skills. Ample evidence of in comparative perspective to	ndependent critical thought with excell o draw insightful and logical conclusion	cemplary handling of field data collection lent use of a broad range of fundamer ons. Show outstanding abilities of inc illent or outstanding work relative to w	ital concepts and broade ependent work, effective	
	В	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, 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 no thought; ineffective present reach degree level.	o familiarity with any relevant examp tation skills with poor argumentation	the minimum relevant research tech les and case studies. Inadequate evid and no abilities to draw meaningful of	dence of coherent logical	
Course Type		ith laboratory componer				
Course Teaching	Activities	3	Details		No. of Hours	
& Learning Activities	Lectures				26	
	Laborator	,			24 12	
	Field wor Project w					
					12 100	
Assessment Methods		Self study	Deteile	Mojahtina in fir!	· .	
and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignments			30	01.0.0.4	
					CLO 2,4	
	Examinat			50	CLO 1,2,4	
	Examinat Laborator	y reports	D. I. W. Oliver, D. M. O. I.''	20		
Required/recommended reading and online materials	Examinat Laborator R. S. K. B The Invert Ruppert, I 2004. Beli	ry reports arnes, Peter P. Calow, tebrates: A Synthesis, 3 Edward E.; Fox, Richard mont, CA: Thomas-Broc	oks/Cole.	20 J. I. Spicer. 2001 brate Zoology: A Functional Ev	CLO 1,2,4 CLO 1,3	
reading and	Examinat Laborator R. S. K. B The Invert Ruppert, I 2004. Beli Students	ry reports arnes, Peter P. Calow, tebrates: A Synthesis, 3 Edward E.; Fox, Richard mont, CA: Thomas-Brod will be directed to releva	rd Edition, Wiley-Blackwell. I S.; Barnes, Robert D. Inverte	20 J. I. Spicer. 2001 brate Zoology: A Functional Ev	CLO 1,2,4 CLO 1,3	
reading and	Examinat Laborator R. S. K. B The Invert Ruppert, I 2004. Bell Students http://moo	ry reports arnes, Peter P. Calow, tebrates: A Synthesis, 3 Edward E.; Fox, Richard mont, CA: Thomas-Broc	rd Edition, Wiley-Blackwell. d S.; Barnes, Robert D. Inverte bks/Cole. ant scientific literature and web	20 J. I. Spicer. 2001 brate Zoology: A Functional Ev	CLO 1,2,4 CLO 1,3	

BIOL3328	Nearshore marine and estuarine ecology (6 credits)	Academic Year	2019				
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 environmental gradients which define the intertidal zone, and the sp communities.	Using a comparative approach between Hong Kong and South African shores, students will learn to identify the relevant 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 habitats					

Course Contents & Topics			d biotic factors that structure in uth African intertidal communiti	0	0 , 0
а. гориос	(1) Interti	dal biodiversity and spec	cies interactions	oo: oouuou, opooo to	p. 66
		es distribution patterns o			
		es interactions and beha	iviour ectivity between local terrestrial	and marine communities	
			freshwaters to marine systems		
	HKU Stu South Afr	dents will work in group rica to collect data; desig	s with students from the Unive gn and carry out experiments; p	rsity of Johannesburg and No	•
		n the different topics.	o in different years and are wee	ther dependent	
Course Learning			e in different years and are wea course, students should be able	•	
Outcomes	CLO 1 c	•	e shallow water coastal envir		the Eastern Cape
	CLO 2 id	dentify a range of species	s and their roles and relationshi	ps in the intertidal zone	
	d	istribution of species over	conditions defining the interticer relevant environmental gradic	ents	and interpret the
			yse experiments to investigate		
	CLO 6 a	•	c interactions to determine patte esent data using a variety of i	•	
Pre-requisites		BIOL2306 or BIOL3301			
(and Co-requisites and Impermissible					
combinations) Offer in 2019 - 2020	N Of	fer in 2020 - 2021 : Y		Examination	
Grade Descriptors	A		asp of the subject. Strong analytical an		with 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				
	В	fieldwork skills and techni- presentational skills.	ques. Correct use of data of results	to draw appropriate conclusions. G	Good organizational and
	С		grasp of the subject. Evidence of som chniques. Mostly correct but some error sentational skills.		
	D	with limited analytical and or results to draw appropriate	on of some relevant information, of the critical abilities. Barely adequate lab / conclusions. Barely satisfactory organi.	fieldwork skills and techniques. Limite zational and presentational skills.	ed ability to use data and
	Fail	thinking. Inadequate lab /	edge and understanding of the subject fieldwork skills and techniques. Miss panization and poor presentational skills	use of data and results and/or unal	
Course Type	Field can	nps			
Course Teaching	Activitie	s	Details		No. of Hours
& Learning Activities	Lectures		Pre-course modules		8
	Field wo				60
	Tutorials		Pre-course assignments		10
Accessment Methods		/ Self study	Deteile	Majahtina in final	50
Assessment Methods and Weighting	Methods	6	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignm	ents	Group presentation	30	CLO 3,4,5,6
	Report			60	CLO 1,2,3,4,5,6
	Test		Pre-course	10	CLO 1,2,6
Required/recommended reading and online materials	Students	will be directed to releva	ant scientific literature, websites	and appropriate teaching mate	erials.
Course Website	http://mo	odle.hku.hk			
Additional Course			18 will be at an advantage.		
Information	Students South Afr second I contribute	will join undergraduate rica on a residential field Reading Week (Second e to daily camp activities	students from the University camp at Tsitsikamma (Storms Semester). Students will be as well as conduct fieldwork in	River Camp, Eastern Province expected to live in tented a potentially harsh environmen	, South Africa) in the accommodation and tal conditions. Extra
		y be involved in the cour ica are covered by Soutl	rse, which may include airfares. h African hosts.	Accommodation, meal costs	and internal travel in

BIOL3401	Molecular biology (6 credits)	Academic Year	2019
Offering Department	Biological Sciences	Quota	130
Course Co-ordinator	Dr K W Y Yuen, Biological Sciences (kwyyuen@hku.hk)		
Teachers Involved	(Dr C B Chan,Biological Sciences) (Dr K W Y Yuen,Biological Sciences) (Dr Y L Zhai,Biological Sciences)		
Course Objectives	To provide students with recent knowledge in molecular biology with special structure and function at the molecular level.	l emphasis on th	e study of gene
Course Contents & Topics	The course includes a detailed account of the molecular processes in eukaryo replication, RNA transcription, protein translation, to post-translational modifica regulation of prokaryotic and eukaryotic gene expression. Recently developed oligonucleotide synthesis, DNA sequencing, complementary screening a mutagenesis, polymerase chain reaction and transgenic technology will also be	tions with special I biochemical tech and DNA clonin	emphasis on the niques including
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 know the basic structures of DNA, RNA and protein, and how DNA is pacells CLO 2 understand the biochemical processes involved in DNA replication,		,

	l u	anslational modifications	s in prokaryotes and eukaryotes				
			regulation of gene transcription in p	rokaryotes and eukaryotes	3		
	CLO 4 demonstrate knowledge and understanding of the underlying concepts associated with recently developed techniques including PCR, site-directed mutagenesis, DNA sequencing						
Due vervieltee			or BIOL2220 or MEDE2301	equencing			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in B	NOC2600 OF BIOL2103 C	OF BIOL2220 OF MEDE2301				
Offer in 2019 - 2020	Y 1st	t sem Offer in 2020 - 2	021 : Y	Examination	Dec		
Grade Descriptors (A+ to F)	A	outcomes. Show strong and knowledge to a wide range	stery at an advanced level of extensive k alytical and critical abilities and logical think of complex, familiar and unfamiliar situation draw appropriate and insightful conclusions	ing, with evidence of original those. Apply highly effective lab skill	bught, and ability to apply s and techniques. Critica		
	В	outcomes. Show evidence some unfamiliar situations	ommand of a broad range of knowledge re of analytical and critical abilities and logica . Apply effective lab skills and technique organizational and presentational skills.	al thinking, and ability to apply k	nowledge to familiar and		
	С	evidence of some analytica Apply moderately effective	complete command of knowledge required all and critical abilities and logical thinking, a lab skills and techniques. Mostly correct ply moderately effective organizational and	and ability to apply knowledge to but some erroneous use of d	most familiar situations		
	D	Demonstrate partial but lin evidence of some coheren knowledge to solve probler	nited command of knowledge required for it and logical thinking, but with limited ana ms. Apply partially effective lab skills and te pply limited or barely effective organizational	attaining some of the course lealytical and critical abilities. Sho echniques. Limited ability to use	w limited ability to apply		
	Fail	analytical and critical abilitie	vidence of command of knowledge require es, logical and coherent thinking. Show very r ineffective lab skills and techniques. Misus	y little or no ability to apply know			
			and presentational skills are minimally effecti				
Course Type	Lecture w		and presentational skills are minimally effecti				
	Lecture w	conclusions. Organization a vith laboratory componer	and presentational skills are minimally effecti				
Course Teaching		conclusions. Organization a vith laboratory componer s	and presentational skills are minimally effecti nt course		nable to draw appropriate		
Course Teaching	Activitie Lectures	conclusions. Organization a vith laboratory componer s	and presentational skills are minimally effecti nt course		No. of Hours		
Course Teaching	Activitie	conclusions. Organization a vith laboratory componer s	and presentational skills are minimally effecti nt course		No. of Hours 24		
Course Teaching	Activitie Lectures Laborato Tutorials	conclusions. Organization a vith laboratory componer s	and presentational skills are minimally effecti nt course		No. of Hours 24 20		
Course Teaching & Learning Activities Assessment Methods	Activitie Lectures Laborato Tutorials	conclusions. Organization a vith laboratory componer s vry / Self study	and presentational skills are minimally effecti nt course		No. of Hours 24 20 6		
Course Teaching & Learning Activities Assessment Methods	Activitie Lectures Laborato Tutorials Reading	conclusions. Organization a vith laboratory componer s vry / Self study	and presentational skills are minimally effecti nt course Details	we or ineffective. Weighting in final	No. of Hours 24 20 6 100 Assessment Methods		
Course Teaching & Learning Activities Assessment Methods	Activitie Lectures Laborato Tutorials Reading Methods	conclusions. Organization a vith laboratory componer s ory / Self study ents	and presentational skills are minimally effecting course Details Details	Weighting in final course grade (%)	No. of Hours 24 20 6 100 Assessment Methods to CLO Mapping		
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended reading and online materials	Activitie Lectures Laborato Tutorials Reading Methods Assignm Examina R. Weave J. Watsor B. Lewin:	conclusions. Organization a vith laboratory componer s ory / Self study ents tion er: Molecular Biology (M	Details Details	Weighting in final course grade (%) 20 80	No. of Hours 24 20 6 100 Assessment Methods to CLO Mapping CLO 1,2,4		

BIOL3402	Cell biol	ology	and cell	l techno	logy	(6 credi	ts)			Academic Year	2	019
Offering Department	Biological	al Scier	nces			•	•			Quota	1	20
Course Co-ordinator	Prof A S 7	T Wor	ng, Biologi	ical Scien	ces (a	wong1@l	nku.hk)					
Teachers Involved	(Dr Julian (Dr W Y L (Prof A S	Lui,Bic T Wo	ological So ong,Biolog	ciences) ical Scien	ces)							
Course Objectives	To provide cell culture								f cells, an	d the principles a	nd	applications of
Course Contents	I. Cell Bio	ology										
& Topics	Membrane interaction II. Technic Mammalia formulatio cryoprese III. Technic III. Technic III. Technic III.	ne pot ons. iques i ian ce on, gro ervatio	in animal of the state of the s	action pot cell culture cure. Prim ors and de	entials e ary ar esign c	s. Cell ju	nctions. (uous cell free medi	Extracellula	ar Matrix. Il types a Iab facilit	nnels. Protein an Cell-cell interac nd cell growth pa ies and sterilization	tior ara	ns. Cell-matrix
Course Learning	On succes						•		,			
Outcomes	CLO 1							and cell ted	chnology			
	CLO 2		nonstrate						- 0,			
	CLO 3							gy and cel	I technolo	qv		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in B						1EDE2301	1		-		
Offer in 2019 - 2020	Y 1st		Offer in							Examination		ec
Grade Descriptors (A+ to F)	В	outc know cons	omes. Show wledge to a sistently dem	strong anal wide range onstrate info	lytical ar of comp ormed, the	nd critical a plex, familia houghtful in	oilities and le r and unfan tellectual en	ogical thinkin niliar situation gagement wi	ig, with evidens. Apply his th broad ran	quired for attaining al ence of original though ghly effective organiz- ge of relevant concep aining at least most of	ht, a atior ts.	and ability to apply nal skills. Writings
		outc	omes. Show	evidence of situations.	of analyt Apply e	tical and cri effective org	tical abilities anizational s	and logical	thinking, and	d ability to apply know emonstrate informed,	vled	ge to familiar and

	С	evidence of some analytical Apply moderately effective	complete command of knowledge required in and critical abilities and logical thinkin organizational skills. Writings mostly is sufficient depth, breadth or understandi	ng, and ability to apply knowledge to ndicate informed, intellectual engag	most familiar situations.
	D	evidence of some coherent knowledge to solve proble	ited command of knowledge required t and logical thinking, but with limited ems. Apply limited or barely effective or theories but mostly at a superficial lev	analytical and critical abilities. Show organizational skills. Writings inc	w limited ability to apply
	Fail	analytical and critical abilitie	ridence of command of knowledge reces, logical and coherent thinking. Show nimally effective or ineffective. Writings levant or superficial.	very little or no ability to apply know	rledge to solve problems.
Course Type	Lecture wit	h laboratory componen	t course		
Course Teaching	Activities		Details		No. of Hours
& Learning Activities	Lectures				24
	Laboratory	1			24
	Tutorials				12
	Reading /	Self study			100
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignmer	nts	assessment of practical work	30	CLO 1,2,3
	Examination	on		70	CLO 1,3
Required/recommended reading and online materials	Mather, J.	et al.: Molecular Biolog P.: Introduction to Cell a A. & Edwards, G.S.: Pla	y of the Cell (Garland, 2014, 6th and Tissue Culture, Theory and ant Cell Culture (Oxford: Bios Sc	Techniques (Plenum, 1998)	
Course Website	http://mood	lle.hku.hk/			

BIOL3403	Immuno	logy (6 credits)		Academi	Year	2019
Offering Department	Biological	Sciences		Quota		100
Course Co-ordinator	Dr W B L I	Lim, Biological Scier	ices (bllim@hku.hk)			
Teachers Involved		ju Zheng,Biological S				
		Lim,Biological Scier				
Course Objectives	variety of i	immunological metho	ods to research and diseas			• • •
Course Contents & Topics	properties of lymphoi and paras	of immunoglobulins id tissues. Major his ites. AIDS, Vaccina	and T-cell receptors. Divided to compatibility complex. (tion, hypersensitivity, and	lous activities in invertebrates. Sergence of antibody genes. Emer Complement pathways. Immunity autoimmunity. Immunological testiges and their application to vario	gence agains ts and	and characteristi t bacteria, viruse immunochemica
Course Learning	On succes	ssful completion of th	nis course, students should	be able to:		_
Outcomes				une molecules which are involve cytokines, MHC and complement		,
	CLO 2 de	escribe the organizat	ion of the mammalian imm	une system in terms of genes, cel	s and	tissues
	va	ccination		ed with transplant rejection, tra		
			•	ections by bacteria, viruses and pa	rasites	
			· · · · · · · · · · · · · · · · · · ·	principle of immunoassays		
Pre-requisites and Co-requisites and Impermissible combinations)	Pass in BI	OC2600 or BIOL210	03 or BIOL2220 or MEDE2	301		
Offer in 2019 - 2020	Y 2nd	sem Offer in 2020) - 2021 : Y	Examina	ion	May
Grade Descriptors (A+ to F)	A B	analysis into the scienti	fic literatures. 3. Superior writing,	prehensive understanding of the subject presentation and group communication sk of the subject matter. 2. Coherent insight	ills.	
		literatures. 3. Good writ	ing, presentation and group com	munication skills.		•
	С	literatures. 3. Adequate	writing and communication skills			
	D			anding of basic subject matter. 2. Some	ability	to use the scientific
	Fail		iting and communication skills. of subject matter. 2. Little to	no insight into use of the scientific litera	tures. 3	. Unable to write o
Course Type	Lecture wi	ith laboratory compo	nent course			
Course Teaching	Activities		Details			No. of Hours
Learning Activities	Lectures					30
	Laborator	у	during reading week			16
	Tutorials	•	9			6
	Reading /	Self study				100
Assessment Methods and Weighting	Methods	·	Details	Weighting in fin course grade (%	5)	Assessment Methods to CLO Mapping
	Examinat	ion		80		CLO 1,2,3,4,5
	Laborator	y reports		20		CLO 1,2,3,4,5
Required/recommended reading and	Benjamin	& Leskowitz: Immun	ology: A Short Course (Wi	2007-6thd ed., or 2013-7th ed.) ley-Liss, 2007, 6th edition. Or the	latest	edition)
online materials			e: Immunology (Mosby, late	est 2 editions)		
	http://mag	dle.hku.hk/				
Course Website Additional Course				ent number and availability of tead		

Information

BIOL3404	Protein s	structure and fun	iction (6 credits)	F	Academic Ye	ear 2019
Offering Department	Biological	Sciences	•	(Quota	70
Course Co-ordinator	Dr Y L Zha	ai, Biological Science	es (zhai@hku.hk)			
Teachers Involved		ian,Biomedical Scier ai,Biological Science	,			
Course Objectives		or study of both. Th	ood understanding of prote nis course provides a stron			
Course Contents & Topics	quaternary The relatic specificity; Methods for Enzymolog molecular Protein pu separation purity, opti	y structures; onship of protein stru; or protein structure d gy: enzyme nomeno mechanisms of cata urification and characa t techniques, method	cterization: various liquid ch ls of determination of molec in determination, ultracentri	lar motifs,binding and re ography and nuclear ma netics and energetics romatographical methor ular mass, activity and	recognition, e agnetic resona of binding, t ds and their i	nzyme catalysis and ance; transition state and uses in combination
Course Learning			is course, students should l	ne able to:		
Outcomes			inding of principles of protei			
			understanding of the relation		tructure and f	iunction
		esign assaying meth		omp between protein of	addiare and r	anotton
			eters of proteins or enzyme	s hy granhical technique	20	
			cicio di proteirio di crizyirio	by grapinoai tooriinqut	C 3	
		earn about the wave t	to nurify protein and the ma	ny industrial uses of pro	ntaine	
		earn about the ways to OC2600 or BIOL222	to purify protein and the ma 0 or MEDE2301	ny industrial uses of pro	oteins	
(and Co-requisites and Impermissible combinations)	Pass in Bl	OC2600 or BIOL222	0 or MEDE2301			
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020	Pass in Bl	OC2600 or BIOL222	0 or MEDE2301 0 - 2021 : Y	E	Examination	,
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Pass in Bl	OC2600 or BIOL222 sem Offer in 2020 1. Exceptionally good pr	0 or MEDE2301 0 - 2021 : Y erformance demonstrating compre	E hensive understanding of the	Examination	
Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	Pass in Bl	OC2600 or BIOL222 sem Offer in 2020 1. Exceptionally good procedure. 3. Surface department of the second performance dep	0 or MEDE2301 1 - 2021 : Y erformance demonstrating compre uperior writing and group communi emonstrating full understanding of	Ehensive understanding of the cation skills.	Examination e subject matter.	2. Critical insight into the
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Pass in Bl	OC2600 or BIOL222 sem Offer in 2020 1. Exceptionally good properitific literature. 3. St. 1. Good performance do Good writing and group 1. Satisfactory performan.	0 or MEDE2301 1 - 2021 : Y erformance demonstrating compre uperior writing and group communicemonstrating full understanding of collaboration skills. ance demonstrating adequate unicensisted.	hensive understanding of the cation skills. the subject matter. 2. Coher derstanding of the subject m	Examination e subject matter. rent insight into t	2. Critical insight into the the scientific literature. 3.
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Y 2nd A B C	OC2600 or BIOL222 sem Offer in 2020 1. Exceptionally good proper in 2000 performance do Good writing and group 1. Satisfactory performs literature. 3. Adequate w	I - 2021 : Y erformance demonstrating compre uperior writing and group communi emonstrating full understanding of collaboration skills. ance demonstrating adequate un vriting and group collaboration skill	hensive understanding of the cation skills. the subject matter. 2. Coher derstanding of the subject ms.	Examination a subject matter. rent insight into the	 Critical insight into the the scientific literature. 3. insight into the scientific
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Pass in Bloom Y 2nd A B	occ2600 or BIOL222 sem Offer in 2020 1. Exceptionally good proceedings of the scientific literature. 3. St. 1. Good performance of Good writing and group. 1. Satisfactory performatiliterature. 3. Adequate w. 1. Limited performance.	10 or MEDE2301 1 - 2021 : Y erformance demonstrating compreuperior writing and group communication skills. ance demonstrating adequate unviting and group collaboration skill demonstrating some understanding demonstrating some understanding some understanding some understanding.	hensive understanding of the cation skills. the subject matter. 2. Coher derstanding of the subject ms.	Examination a subject matter. rent insight into the	 Critical insight into the the scientific literature. 3. insight into the scientific
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Y 2nd A B C	Sem Offer in 2020 1. Exceptionally good prescientific literature. 3. St. 1. Good performance d. Good writing and group. 1. Satisfactory performaliterature. 3. Adequate w. 1. Limited performance. 3. Limited writing and gr	10 or MEDE2301 1 - 2021 : Y erformance demonstrating compreuperior writing and group communication stills. ance demonstrating adequate unvirting and group collaboration skills demonstrating some understanding outpeollaboration skills.	hensive understanding of the cation skills. the subject matter. 2. Coher derstanding of the subject m s. s. g of basic subject matter. 2. S	Examination e subject matter. rent insight into the natter. 2. Some Some ability to use	 Critical insight into the the scientific literature. 3. insight into the scientific se the scientific literature.
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	Y 2nd A B C D Fail	Sem Offer in 2020 1. Exceptionally good prescientific literature. 3. St. 1. Good performance d. Good writing and group. 1. Satisfactory performaliterature. 3. Adequate w. I. Limited performance 3. Limited writing and gr. 1. Poor understanding of the poor standing of the standing of	10 or MEDE2301 1 - 2021 : Y erformance demonstrating compreuperior writing and group communication skills. ance demonstrating adequate unviting and group collaboration skill demonstrating some understanding demonstrating some understanding some understanding some understanding.	hensive understanding of the cation skills. the subject matter. 2. Coher derstanding of the subject m s. s. g of basic subject matter. 2. S	Examination e subject matter. rent insight into the natter. 2. Some Some ability to use	 Critical insight into the the scientific literature. 3. insight into the scientific se the scientific literature.
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type	Y 2nd A B C D Fail Lecture-ba	Sem Offer in 2020 1. Exceptionally good prescientific literature. 3. St. 1. Good performance d. Good writing and group. 1. Satisfactory performaliterature. 3. Adequate w. 1. Limited performance. 3. Limited writing and group. 1. Poor understanding of ased course.	10 or MEDE2301 1 - 2021 : Y erformance demonstrating compreuperior writing and group community and group community and group community and group collaboration skills. ance demonstrating adequate unwriting and group collaboration skill demonstrating some understanding toup collaboration skills. of subject matter. 2. Little to no insignation of subject matter. 2.	hensive understanding of the cation skills. the subject matter. 2. Coher derstanding of the subject m s. s. g of basic subject matter. 2. S	Examination e subject matter. rent insight into the natter. 2. Some Some ability to use	 Critical insight into the the scientific literature. 3. insight into the scientific se the scientific literature. le to write or collaborate.
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching	Y 2nd A B C D Fail Lecture-ba Activities	Sem Offer in 2020 1. Exceptionally good prescientific literature. 3. St. 1. Good performance d. Good writing and group. 1. Satisfactory performaliterature. 3. Adequate w. 1. Limited performance. 3. Limited writing and group. 1. Poor understanding of ased course.	10 or MEDE2301 1 - 2021 : Y erformance demonstrating compreuperior writing and group communication stills. ance demonstrating adequate unvirting and group collaboration skills demonstrating some understanding outpeollaboration skills.	hensive understanding of the cation skills. the subject matter. 2. Coher derstanding of the subject m s. s. g of basic subject matter. 2. S	Examination e subject matter. rent insight into the natter. 2. Some Some ability to use	Critical insight into the the scientific literature. 3. insight into the scientific se the scientific literature. It is the scientific literature. It is to write or collaborate. No. of Hours
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching	Y 2nd A B C D Fail Lecture-ba Activities Lectures	Sem Offer in 2020 1. Exceptionally good prescientific literature. 3. St. 1. Good performance d. Good writing and group. 1. Satisfactory performaliterature. 3. Adequate w. 1. Limited performance. 3. Limited writing and group. 1. Poor understanding of ased course.	10 or MEDE2301 1 - 2021 : Y erformance demonstrating compreuperior writing and group community and group community and group community and group collaboration skills. ance demonstrating adequate unwriting and group collaboration skill demonstrating some understanding toup collaboration skills. of subject matter. 2. Little to no insignation of subject matter. 2.	hensive understanding of the cation skills. the subject matter. 2. Coher derstanding of the subject m s. s. g of basic subject matter. 2. S	Examination e subject matter. rent insight into the natter. 2. Some Some ability to use	Critical insight into the the scientific literature. 3. insight into the scientific se the scientific literature. It to write or collaborate. No. of Hours 36
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching	Y 2nd A B C D Fail Lecture-ba Activities Lectures Tutorials	OC2600 or BIOL222 I sem Offer in 2020 1. Exceptionally good proceedings of the scientific literature. 3. St. 1. Good performance of Good writing and group of the scientific literature. 3. Adequate with Limited performance 3. Limited performance 3. Limited writing and group of the scientific literature. 3. Adequate with group and group of the scientific literature. 3. Limited performance 3. Limited writing and group of the scientific literature. 3. Adequate with group of the scientific literature. 3. Adequate with group of the scientific literature. 3. Adequate with group of the scientific literature. 3. St. Adequate with group of the scientific literature. 3. St. Adequate with group of the scientific literature. 3. St. Adequate with group of the scientific literature. 3. St. Adequate with group of the scientific literature. 3. St. Adequate with group of the scientific literature. 3. St. Adequate with group of the scientific literature. 3. St. Adequate with group of the scientific literature. 3. St. Adequate with group of the scientific literature. 3. Adequate with group of	10 or MEDE2301 1 - 2021 : Y erformance demonstrating compreuperior writing and group community and group community and group community and group collaboration skills. ance demonstrating adequate unwriting and group collaboration skill demonstrating some understanding toup collaboration skills. of subject matter. 2. Little to no insignation of subject matter. 2.	hensive understanding of the cation skills. the subject matter. 2. Coher derstanding of the subject m s. s. g of basic subject matter. 2. S	Examination e subject matter. rent insight into the natter. 2. Some Some ability to use	Critical insight into the the scientific literature. 3. insight into the scientific se the scientific literature. It to write or collaborate. No. of Hours 36 12
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching & Learning Activities	Y 2nd A B C D Fail Lecture-ba Activities Lectures Tutorials Reading /	Sem Offer in 2020 1. Exceptionally good prescientific literature. 3. St. 1. Good performance d. Good writing and group. 1. Satisfactory performaliterature. 3. Adequate w. 1. Limited performance. 3. Limited writing and group. 1. Poor understanding of ased course.	20 or MEDE2301 21 - 2021 : Y erformance demonstrating compre uperior writing and group communi emonstrating full understanding of collaboration skills. ance demonstrating adequate un- vriting and group collaboration skill demonstrating some understandin roup collaboration skills. If subject matter. 2. Little to no insi	hensive understanding of the cation skills. the subject matter. 2. Coher derstanding of the subject ms. g of basic subject matter. 2. Sight into use of the scientific lite.	Examination a subject matter. rent insight into the matter. 2. Some Some ability to use	Critical insight into the the scientific literature. 3. insight into the scientific se the scientific literature. It to write or collaborate. No. of Hours 36 12 100
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching & Learning Activities Assessment Methods	Y 2nd A B C D Fail Lecture-ba Activities Lectures Tutorials	OC2600 or BIOL222 I sem Offer in 2020 1. Exceptionally good proceedings of the scientific literature. 3. St. 1. Good performance of Good writing and group of the scientific literature. 3. Adequate with Limited performance 3. Limited performance 3. Limited writing and group of the scientific literature. 3. Adequate with group and group of the scientific literature. 3. Limited performance 3. Limited writing and group of the scientific literature. 3. Adequate with group of the scientific literature. 3. Adequate with group of the scientific literature. 3. Adequate with group of the scientific literature. 3. St. Adequate with group of the scientific literature. 3. St. Adequate with group of the scientific literature. 3. St. Adequate with group of the scientific literature. 3. St. Adequate with group of the scientific literature. 3. St. Adequate with group of the scientific literature. 3. St. Adequate with group of the scientific literature. 3. St. Adequate with group of the scientific literature. 3. St. Adequate with group of the scientific literature. 3. Adequate with group of	10 or MEDE2301 1 - 2021 : Y erformance demonstrating compreuperior writing and group community and group community and group community and group collaboration skills. ance demonstrating adequate unwriting and group collaboration skill demonstrating some understanding toup collaboration skills. of subject matter. 2. Little to no insignation of subject matter. 2.	hensive understanding of the cation skills. the subject matter. 2. Coher derstanding of the subject m s. g of basic subject matter. 2. Sight into use of the scientific lite. Weighti	Examination e subject matter. rent insight into the natter. 2. Some Some ability to use	Critical insight into the the scientific literature. 3. insight into the scientific se the scientific literature. It is the scientific literature. It is to write or collaborate. No. of Hours 36 12 100 Assessment Methods
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching & Learning Activities Assessment Methods	Y 2nd A B C D Fail Lecture-ba Activities Lectures Tutorials Reading / Methods	sem Offer in 2020 1. Exceptionally good processing in the scientific literature. 3. St. 1. Good performance d. Good writing and group. 1. Satisfactory performs literature. 3. Adequate w. 1. Limited performance 3. Limited writing and gr. 1. Poor understanding of assed course.	20 or MEDE2301 21 - 2021 : Y erformance demonstrating compre uperior writing and group communi emonstrating full understanding of collaboration skills. ance demonstrating adequate un- vriting and group collaboration skill demonstrating some understandin roup collaboration skills. If subject matter. 2. Little to no insi	hensive understanding of the cation skills. the subject matter. 2. Coher derstanding of the subject ms. g of basic subject matter. 2. Synt into use of the scientific lite. Weighti course	Examination a subject matter. rent insight into the matter. 2. Some Some ability to understure. 3. Unable ing in final grade (%)	Critical insight into the the scientific literature. 3. insight into the scientific se the scientific literature. It is the scientific literature. No. of Hours 36 12 100 Assessment Methods to CLO Mapping
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching & Learning Activities Assessment Methods	Pass in Black Y 2nd A B C D Fail Lecture-ba Activities Lectures Tutorials Reading / Methods Assignme	sem Offer in 2020 1. Exceptionally good processing in the scientific literature. 3. St. 1. Good performance d. Good writing and group. 1. Satisfactory performs literature. 3. Adequate w. 1. Limited performance 3. Limited writing and gr. 1. Poor understanding of ased course. Self study	20 or MEDE2301 21 - 2021 : Y erformance demonstrating compre uperior writing and group communi emonstrating full understanding of collaboration skills. ance demonstrating adequate un- vriting and group collaboration skill demonstrating some understandin roup collaboration skills. If subject matter. 2. Little to no insi	hensive understanding of the cation skills. the subject matter. 2. Coher derstanding of the subject ms. g of basic subject matter. 2. Sight into use of the scientific lite. Weighti course	Examination e subject matter. rent insight into to matter. 2. Some Some ability to us rerature. 3. Unab	Critical insight into the the scientific literature. 3. insight into the scientific se the scientific literature. It is the scientific literature and scientific literature. It is the scientific literature and scientific litera
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	Y 2nd A B C D Fail Lecture-ba Activities Lectures Tutorials Reading / Methods Assignme Examinati	sem Offer in 2020 1. Exceptionally good processing in the scientific literature. 3. St. 1. Good performance d. Good writing and group. 1. Satisfactory performs literature. 3. Adequate w. 1. Limited performance 3. Limited writing and gr. 1. Poor understanding of assed course. Self study	20 or MEDE2301 21 - 2021 : Y erformance demonstrating compre uperior writing and group communi emonstrating full understanding of collaboration skills. ance demonstrating adequate un- vriting and group collaboration skill demonstrating some understandin roup collaboration skills. If subject matter. 2. Little to no insi	hensive understanding of the cation skills. the subject matter. 2. Coher derstanding of the subject ms. g of basic subject matter. 2. Sight into use of the scientific lite. Weighti course	Examination a subject matter. rent insight into the matter. 2. Some Some ability to understure. 3. Unable ing in final grade (%)	Critical insight into the the scientific literature. 3. insight into the scientific se the scientific literature. It is the scientific literature. No. of Hours 36 12 100 Assessment Methods to CLO Mapping
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended	Y 2nd A B C D Fail Lecture-ba Activities Lectures Tutorials Reading / Methods Assignme Examinati None pres	Sem Offer in 2020 1. Exceptionally good prescientific literature. 3. St. 1. Good performance d. Good writing and group 1. Satisfactory performs literature. 3. Adequate w. 1. Limited performance a. Limited writing and gr. 1. Poor understanding of ased course. Self study	20 or MEDE2301 21 - 2021 : Y erformance demonstrating compre uperior writing and group communi emonstrating full understanding of collaboration skills. ance demonstrating adequate un- vriting and group collaboration skill demonstrating some understandin roup collaboration skills. If subject matter. 2. Little to no insi	hensive understanding of the cation skills. the subject matter. 2. Coher derstanding of the subject ms. g of basic subject matter. 2. Sight into use of the scientific lite. Weighti course	Examination e subject matter. rent insight into to matter. 2. Some Some ability to us rerature. 3. Unab	Critical insight into the the scientific literature. 3. insight into the scientific se the scientific literature. It is the scientific literature and scientific literature. It is the scientific literature and scientific litera
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended reading and	Y 2nd A B C D Fail Lecture-ba Activities Lectures Tutorials Reading / Methods Assignme Examinati	Sem Offer in 2020 1. Exceptionally good prescientific literature. 3. St. 1. Good performance d. Good writing and group 1. Satisfactory performs literature. 3. Adequate w. 1. Limited performance a. Limited writing and gr. 1. Poor understanding of ased course. Self study	20 or MEDE2301 21 - 2021 : Y erformance demonstrating compre uperior writing and group communi emonstrating full understanding of collaboration skills. ance demonstrating adequate un- vriting and group collaboration skill demonstrating some understandin roup collaboration skills. If subject matter. 2. Little to no insi	hensive understanding of the cation skills. the subject matter. 2. Coher derstanding of the subject ms. g of basic subject matter. 2. Sight into use of the scientific lite. Weighti course	Examination e subject matter. rent insight into to matter. 2. Some Some ability to us rerature. 3. Unab	Critical insight into the the scientific literature. 3. insight into the scientific se the scientific literature. It is the scientific literature and scientific literature. It is the scientific literature and scientific litera
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended	Y 2nd A B C D Fail Lecture-ba Activities Lectures Tutorials Reading / Methods Assignme Examinati None pres To be annotate	Sem Offer in 2020 1. Exceptionally good proceedings of the scientific literature. 3. St. 1. Good performance of Good writing and group 1. Satisfactory performs literature. 3. Adequate w. 1. Limited performance 3. Limited writing and gr. 1. Poor understanding of ased course. Self study The scientific of the scienti	20 or MEDE2301 21 - 2021 : Y erformance demonstrating compre uperior writing and group communi emonstrating full understanding of collaboration skills. ance demonstrating adequate un- vriting and group collaboration skill demonstrating some understandin roup collaboration skills. If subject matter. 2. Little to no insi	hensive understanding of the cation skills. the subject matter. 2. Coher derstanding of the subject m s. g of basic subject matter. 2. Sight into use of the scientific lite. Weighticourse	Examination e subject matter. rent insight into the starter. 2. Some Some ability to use terature. 3. Unability in final grade (%) 30 70	2. Critical insight into the the scientific literature. 3. insight into the scientific se the scientific literature. See the scientific literature. It to write or collaborate. No. of Hours 36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5 CLO 1,2,3,4,5

BIOL3405	Molecular microbiology (6 credits)	Academic Year	2019
Offering Department	Biological Sciences	Quota	30
Course Co-ordinator	, Biological Sciences ()		
Teachers Involved	(,Biological Sciences)		
Course Objectives	This course is intended for biology, biotechnology and biochemistry studer modern fundamentals of microbiology. At the end of the course the sphysiological, biochemical and molecular aspects of microbiology.		
Course Contents & Topics	The basic biochemistry of microorganisms will be described. The intrinsic facin the environment will be examined. The adaptation of the microbes to the echanges and genetical alterations will be illustrated. The molecular biology of plasmids and transposable element aspect will be discussed. The use of modern technology in studying microorg	environment by mean ogy of bacteria and s and their associat	s of physiological viruses will be ion with medical
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 understand the intrinsic reorganization of microbes in response to the CLO 2 comprehend the major modes of regulation in the microbe CLO 3 explain the biology of bacteriophages and plasmids CLO 4 realize the importance of transposable elements in the survival of the CLO 5 appreciate the development of modern techniques in studying micro	e microbes	ents
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BIOL2103		

Offer in 2019 - 2020	N Off	er in 2020 - 2021 : N			Examination	
Grade Descriptors (A+ to F)	A	learning outcomes. Demons with evidence of original that appropriate and insightful co	strate thorough grasp of the nought. Apply highly effect onclusions. Apply highly ef	el of extensive knowledge and ne subject. Show strong analyti- ctive lab skills and techniques fective organizational and prese	cal and critical abilit Critical use of da entational skills.	ties and logical thinking ta and results to draw
	В	learning outcomes. Demons	strate substantial grasp of skills and techniques. Cor	of knowledge and skills require f the subject. Show evidence of rrect use of data of results to dr	f analytical and crit	ical abilities and logica
	С	outcomes. Demonstrate ger thinking. Apply moderately e	neral but incomplete grasp effective lab skills and tech	knowledge and skills required of the subject. Evidence of sor niques. Mostly correct but som- rganizational and presentational	ne analytical and cri e erroneous use of	itical abilities and logica
	D	Demonstrate partial but limit logical thinking, but with limit	ted grasp, with retention of ited analytical and critical	ge and skills required for attain f some relevant information, of t abilities. Apply partially effective Apply limited or barely effective	he subject. Evidend lab skills and tech	e of some coherent and niques. Limited ability to
	Fail	Demonstrate evidence of li analytical and critical abilitie	ittle or no grasp of the kiles, logical and coherent t	nowledge and skills required for nowledge and understanding of hinking. Apply minimally effecti propriate conclusions. Organiza	f the subject. Evidove or ineffective lab	ence of little or lack of b skills and techniques
Course Type	Lecture w	ith laboratory componen	it course			
Course Teaching	Activities	3	Details			No. of Hours
& Learning Activities	Lectures					24
	Laborator	- y				20
	Tutorials					6
	Reading /	Self study				100
Assessment Methods and Weighting	Methods		Details		ting in final e grade (%)	Assessment Methods to CLO Mapping
	Examinat	ion			70	CLO 1,2,3,4
	Laborator	y reports			20	CLO 3,4,5
	Presentat	tion			10	CLO 1,2,5
Required/recommended reading and online materials	Willey, Sh Watson, E	erwood & Woolverton: F Baker, Bell, Gann, Levine	Prescott's Principles on & Losick: Molecular	etics (Jones & Bartlett 199 of Microbiology (McGraw Biology of the Gene (CS dicroorganisms (Pearson	Hill 2009) SHL Press 2008	, 6th ed.)
Course Website	-	dle.hku.hk/	K. DIOCK DIGIOGY OF IV	iioroorganisms (r carson	2009, 12111eu.)	
Additional Course Information			t to a minimum enroll	ment number and availab	ility of teachers.	

BIOL3406	Reproduction and reproductive biotechnology (6 credits)	Academic Year	2019
Offering Department	Biological Sciences	Quota	50
Course Co-ordinator	Prof A O L Wong, Biological Sciences (olwong@hku.hk)		
Feachers Involved	(Prof A O L Wong, Biological Sciences)		
Course Objectives	To provide a comprehensive overview on modern concepts and recen reproductive biotechnology in human and animal models.	t advances in repro	ductive biology &
Course Contents & Topics	 -Basic concepts of reproduction, evolution of sex, human & animal reproduction. -Molecular mechanisms for sex determination, developmental aspects of gasineuroendocrinology of reproductive system and recent advances in kingle feedback via KNDy neuronal circuit. -Environmental endocrine disruptors and recent advances in biotechric reproduction in human. -Recent advances in embryonic stem cells & induced pluripotent stem cell medicine/therapeutic cloning. -New technology for genome editing by TALENT & CRISPR/Cas9 systems primordial germ cell transplantation in animal models. 	ametogenesis and rep sspeptin & GnRH sy nology for fertility co ls and their applicatio	roductive system stem and steroic ntrol & assisted ns in regenerativ
ourse Learning	On successful completion of this course, students should be able to:		
Outcomes	CLO 1 Have a broad understanding of reproductive biology ranging from strategies & sexual behaviors in animals to the regulatory m development of reproductive systems. CLO 2 Have an appreciation of the recent advances on neuroendocrin reproductive cycle, sexual behavior, parental care, and pregnancy models.	nechanisms for sex	determination &
	CLO 3 Have a basic understanding on the adverse effects of environmental possible causes of human infertility & treatment with assisted repro-		s on reproduction
	CLO 4 Comprehend a wide range of modern technologies for genome ed cell transplantation and the applications of embryonic stem ce regenerative medicine/therapeutic cloning.		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BIOL2103 or BIOL2220 or BIOC2600 or MEDE2301		
Offer in 2019 - 2020	N Offer in 2020 - 2021 : Y	Examination	
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge outcomes. Show strong analytical and critical abilities and logical thinking, with knowledge to a wide range of complex, familiar and unfamiliar situations. Apply use of data and results to draw appropriate and insightful conclusions. Apply skills.	evidence of original thoug highly effective lab skills a	ht, and ability to appì nd techniques. Critica
	B Demonstrate substantial command of a broad range of knowledge required foutcomes. Show evidence of analytical and critical abilities and logical thinkin some unfamiliar situations. Apply effective lab skills and techniques. Correconclusions. Apply effective organizational and presentational skills.	g, and ability to apply know	vledge to familiar and

	D Fail	Apply moderately effective appropriate conclusions. App Demonstrate partial but lim evidence of some coherent knowledge to solve problem appropriate conclusions. App Demonstrate little or no evanalytical and critical abilitie Apply minimally effective or	and critical abilities and logical thinking lab skills and techniques. Mostly corrolly moderately effective organizational atted command of knowledge required and logical thinking, but with limited as. Apply partially effective lab skills and byl limited or barely effective organizatio idence of command of knowledge rec., logical and coherent thinking. Show ineffective lab skills and techniques. Mid presentational skills are minimally effective lab skills are minimally effective.	ect but some erroneous use of d nd presentational skills. for attaining some of the course lead analytical and critical abilities. Show the techniques. Limited ability to use nal and presentational skills. uired for attaining the course lear very little or no ability to apply know issue of data and results and/or un	ata and results to draw earning outcomes. Show w limited ability to apply data and results to draw rning outcomes. Lack of ledge to solve problems.
Course Type	Lecture w	ith laboratory componen	t course		
Course Teaching	Activities	S	Details		No. of Hours
& Learning Activities	Lectures				24
	Laborato	ry			24
	Tutorials				6
	Reading	/ Self study			100
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Examinat	tion		70	CLO 1,2,3,4
	Laborato	ry reports		15	CLO 2,3,4
	Test		Test & Continuous Assessmen	t 15	CLO 1,2,3,4
Required/recommended reading and online materials	Science F 2. Human (Winner o 3. Reprod	Publishers (2016). Reproductive Biology (f 2015 Textbook Excelle luction System at a Glan	duction (e-book) by M. M. Sene 4th edition, e-Book) by R.E. Jo nce Award). ce by L.J. Heffner & D.J. Schust docrinology (e-Book) by J.F. Str	nes & Kristin H. Lopez, Aca , Wiley-Blackwell (2014).	ademic Press (2015)
Course Website		odle.hku.hk/	, ,		` '
Additional Course Information		he Website of School of I se will be offered subject	Biological Sciences to a minimum enrollment numb	er and availability of teachers	S.

BIOL3408	Geneti	ics (6 credits)		Academic Year	2019
Offering Department	Biologic	al Sciences		Quota	50
Course Co-ordinator	Dr G Y \	W Chan, Biological S	ciences (gywchan@hku.hk)		
Teachers Involved	\ \	chunter,Biological Sc W Chan,Biological S	,		
Course Objectives	This cou	urse aims to provide	students with fundamental knowledge of c	lassical, molecular and por	oulation genetics
Course Contents			production, principles and chromosomal b		
& Topics	recombi genetics	ination, DNA transpo	d definition of the gene, molecular mesition, extranuclear inheritance, developingly encouraged to take BIOL2303 Molelar genetics.	mental genetics, quantitativ	ve and population
Course Learning	On succ	cessful completion of	this course, students should be able to:		
Outcomes	CLO 1	appreciate the beaut	y of genetic organizations in nature		
	CLO 2	use different genetic	principles to explain hereditary traits obse	rved in nature and laborate	ories
		apply qualitative an population levels	d quantitative experimental methodolog	ies for genetic analysis a	at individual and
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in	BIOL1110 and BIOL	2102		
Offer in 2019 - 2020	Y 19	st sem Offer in 202	0 - 2021 : Y	Examination	Dec
Grade Descriptors (A+ to F)	A	learning outcomes. S to apply knowledge t theories, principles, e	nh mastery at an advanced level of extensive known how strong analytical and critical abilities and logice to a wide range of complex, familiar and unfamiliar vidence and techniques	al thinking, with evidence of origing situations. Integration of the full	nal thought, and abilit I range of appropriate
	В	learning outcomes. S	itial command of a broad range of knowledge and how evidence of analytical and critical abilities and lo situations. General integration of theories, principles,	ogical thinking, and ability to apply	
	С	outcomes. Show evid	I but incomplete command of knowledge and skil dence of some analytical and critical abilities and lo me partial integration of theories, principles, evidence	ogical thinking, and ability to app	
	D		out limited command of knowledge and skills require		
			me coherent and logical thinking, but with limited and roblems. Limited integration of theories, principles, e		
	Fail	knowledge to solve p Demonstrate little or of analytical and cri		vidence and techniques quired for attaining the course lea very little or no ability to apply	limited ability to applarning outcomes. Lac
		knowledge to solve p Demonstrate little or of analytical and cri	roblems. Limited integration of theories, principles, e no evidence of command of knowledge and skills re tical abilities, logical and coherent thinking. Show or inapt integration of theories, principles, evidence	vidence and techniques quired for attaining the course lea very little or no ability to apply	limited ability to applarning outcomes. Lac
Course Teaching		knowledge to solve p Demonstrate little or of analytical and cri problems. Little or no with laboratory comp	roblems. Limited integration of theories, principles, e no evidence of command of knowledge and skills re tical abilities, logical and coherent thinking. Show or inapt integration of theories, principles, evidence	vidence and techniques quired for attaining the course lea very little or no ability to apply	limited ability to applarning outcomes. Lac
Course Teaching	Lecture	knowledge to solve p Demonstrate little or of analytical and crit problems. Little or no with laboratory comp ies	roblems. Limited integration of theories, principles, e no evidence of command of knowledge and skills re to call abilities, logical and coherent thinking. Show or inapt integration of theories, principles, evidence connent course	vidence and techniques quired for attaining the course lea very little or no ability to apply	r limited ability to appl arming outcomes. Lac y knowledge to solve No. of Hours 24
Course Teaching	Lecture Activiti	knowledge to solve p Demonstrate little or of analytical and crit problems. Little or no with laboratory comp ies	roblems. Limited integration of theories, principles, e no evidence of command of knowledge and skills re to call abilities, logical and coherent thinking. Show or inapt integration of theories, principles, evidence connent course	vidence and techniques quired for attaining the course lea very little or no ability to apply	r limited ability to appl arning outcomes. Lac r knowledge to solve No. of Hours
Course Teaching	Lecture Activiti	knowledge to solve p Demonstrate little or of analytical and crit problems. Little or no with laboratory comp ies es tory	roblems. Limited integration of theories, principles, e no evidence of command of knowledge and skills re to call abilities, logical and coherent thinking. Show or inapt integration of theories, principles, evidence connent course	vidence and techniques quired for attaining the course lea very little or no ability to apply	Imited ability to apparating outcomes. Lack knowledge to solve
Course Teaching	Lecture Activiti Lecture Laborat Tutorial	knowledge to solve p Demonstrate little or of analytical and crit problems. Little or no with laboratory comp ies es tory	roblems. Limited integration of theories, principles, e no evidence of command of knowledge and skills re icial abilities, logical and coherent thinking. Show or inapt integration of theories, principles, evidence connent course Details	vidence and techniques quired for attaining the course lea very little or no ability to apply	nimited ability to apparating outcomes. Lack knowledge to solv No. of Hours 24 24
Course Teaching & Learning Activities Assessment Methods	Lecture Activiti Lecture Laborat Tutorial	knowledge to solve p Demonstrate little or of analytical and crit problems. Little or no with laboratory comp ies es tory ls g / Self study	roblems. Limited integration of theories, principles, e no evidence of command of knowledge and skills re icial abilities, logical and coherent thinking. Show or inapt integration of theories, principles, evidence connent course Details	vidence and techniques quired for attaining the course lea very little or no ability to apply and techniques Weighting in final course grade (%)	No. of Hours 24 6 100 Assessment Methods
Course Teaching & Learning Activities Assessment Methods	Lecture Activiti Lecture Laborat Tutorial Reading	knowledge to solve p Demonstrate little or of analytical and crit problems. Little or no with laboratory comp ies es tory ls g / Self study ds	roblems. Limited integration of theories, principles, e no evidence of command of knowledge and skills re icial abilities, logical and coherent thinking. Show or inapt integration of theories, principles, evidence conent course Details tutorials & laboratories	vidence and techniques quired for attaining the course lea very little or no ability to apply and techniques Weighting in final course grade (%)	No. of Hours 24 6 100 Assessment Methods
Course Teaching & Learning Activities Assessment Methods	Lecture Activiti Lecture Laborat Tutorial Reading Method	knowledge to solve p Demonstrate little or of analytical and cri problems. Little or no with laboratory comp ies story ls g / Self study dis ments	roblems. Limited integration of theories, principles, e no evidence of command of knowledge and skills re icial abilities, logical and coherent thinking. Show or inapt integration of theories, principles, evidence connent course Details	vidence and techniques quired for attaining the course lea very little or no ability to apply and techniques Weighting in final course grade (%)	No. of Hours 24 6 100 Assessment Methods to CLO Mapping
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting Course Website	Lecture Activiti Lecture Laborat Tutorial Reading Method Assignr Examin	knowledge to solve p Demonstrate little or of analytical and cri problems. Little or no with laboratory comp ies story ls g / Self study dis ments	roblems. Limited integration of theories, principles, e no evidence of command of knowledge and skills re icial abilities, logical and coherent thinking. Show or inapt integration of theories, principles, evidence connent course Details	vidence and techniques quired for attaining the course lea very little or no ability to apply and techniques Weighting in final course grade (%)	No. of Hours 24 6 100 Assessment Methods to CLO Mapping CLO 1,2,3

BIOL3409	Busines	s aspects of biote	chnology (6 credits)	Academic Yea	r 2019				
Offering Department	Biological	Sciences		Quota	40				
Course Co-ordinator	Dr W B L	Lim, Biological Science	es (bllim@hku.hk)						
Teachers Involved	(Dr K W Y	Yuen, School of Biolog	gical Science)						
		iest Lecture)							
		Lim, School of Biologic							
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	industry. entreprent to develop biotech firn be covere will be pre Topics: 1. Introduc 2. IP rights 3. Licensir 4. Techno 5. How to 6. Agrobic 7. Drug de 8. Diagnos	The course will proveurial venture. We plate of successful business means and as well. Throughout dissenting case studies a cition to Biotechnology services and plication, and of IP rights (3 hours logy Transfer Office and raise fund for startup of the chnology and Green evelopment and clinical stics business (BGI, Diny analysis (3 hours)	ide a thoughtful, practical guce a special emphasis on the control ideas, however we will also had properties, patent laws, patent the course, guest entreprene and explain their involvement in Industry: 4 P in Biotechnology Patent system, USPTO, SIPO, solution of the special explain their involvement in Industry: 4 P in Biotechnology Patent system, USPTO, SIPO, solution of the special explaints of the special explaint	PCT (6 hours) , etc) (4.5 hours)	fully launching an repreneur and how from an idea to a and fundraising wil ne biotech industry				
		any analysis							
Course Learning			s course, students should be ab	ole to:					
Outcomes	CLO 1 un	derstand and demons		ment and management of biotecl	nnology business				
				echnology derived product: from I	pench to scale-up				
		market	po aro ao roropo or a 2101	comicing, acritica producti nomi	occion, to occio ap,				
			ess knowledge of the biotechno	ology and bioprocessing industrie	s				
			e to the business side of scient						
Pre-requisites (and Co-requisites and Impermissible		•	C or BBMS course; NOT for stu admitted in 2017-2018 or befor	udents who have passed in BIOL2 e.	2409.				
combinations)	٧ ٥	011 . 0000	0004 N		N F				
Offer in 2019 - 2020	_	I sem Offer in 2020 -		Examination	No Exam				
Grade Descriptors	Α			rse and are capable of independently ana	lyzing the business and				
(A+ to 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	Students demonstrate a b	road and in-depth understanding of the	e current developments in biotechnology i	ndustry.				
	D Students demonstrate a moderate understanding of the current developments in biotechnology industry.								
	Fail	Students fail to demonstra	ate a moderate understanding of the cu	urrent developments in biotechnology indu	stry.				
Course Type	Lecture-ba	ased course							
Course Teaching	Activities	S	Details		No. of Hours				
& Learning Activities	Lectures			36					
	Field worl	k		6					
	Group wo		Presentation		12				
	Reading /	Self study			60				
	Assessme	ent	Assignment		18				
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping				
	Assignme			60	CLO 1,2,3,4,5				
	Presentat	tion		20	CLO 1,2,3,4,5				
	Test			20	CLO 1,2,3,4,5				
Required/recommended reading and	McGraw H	ill annual reports	orf, Andrew J. Nelson (2011) To	echnology Ventures: From Idea to	Enterprise 3rd ed				
online materials	O 11	ompany annual reports nline materials							
					p://moodle.hku.hk/				
Course Website	http://moo	dle.hku.hk/							
online materials Course Website Additional Course Information	http://moo This cours	dle.hku.hk/ se will be offered subje	ect to a minimum enrollment nu majoring or minoring in MBB	mber and availability of teachers.					

BIOL3419	Insect ecology: the little things that run the world (6 credits)	Academic Year	2019	
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 and 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 all species known on the planet. A diversity also reflected in the diversity of behacological interactions played at all trophic levels within ecosystems. As her	aviours, evolutiona	ary adaptations or	

Course Learning Outcomes	agents, predators, parasitoids, disease vectors or decomposers, arthropods are major components in the stabilit 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 the 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? On successful completion of this course, students should be able to: 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				
			abiotic factors that drive terrestrial a	rthropod species richness	s and abundance
			ctivities modify insect diversity		
B		· · · · · · · · · · · · · · · · · · ·	s played by insects on human activiti	es	
Pre-requisites (and Co-requisites and Impermissible combinations)		OL1309 and BIOL2306			
Offer in 2019 - 2020 Grade Descriptors		er in 2020 - 2021 : Y		Examination	
(A+ to F)	Demonstration of an excellent understanding of the biological concepts and theories developed during the course. No identification skills and use of taxonomic keys of the different groups of arthropods studied. Present an active and patitude in class. Curation and identification of the collection reaching international scientific standard as presented of course. B Demonstration of a good understanding of the biological concepts and theories developed during the course. Master in identification skills and use of taxonomic keys of the different groups of arthropods. Participation in class more limited and identification of the collection satisfactory for the course. C Demonstration of a general but incomplete understanding of the biological concepts and theories developed during the Identification skills and use of taxonomic keys of the different groups of arthropods insufficient to provide reliable ide Participation in class very limited or irrelevant. Curation and identification of the collection not reaching academic level. D Demonstration of a limited understanding of the biological concepts and theories developed during the course. Identificand use of taxonomic keys of the different groups of arthropods inadequate and mostly inaccurate. No participation in unsettling. Poor curation and identification of the collection. Fail to provide evidence of knowledge on the biological concepts and theories developed during the course. No identification and identification of the collection in class or unsettling. Curation and identification in class or unsettling. Curation and identification in class or unsettling. Curation and identification in class or unsettling.				as presented during the burse. Master most of the ss more limited. Curation loped during the course.
Course Type	Fail	and use of taxonomic keys unsettling. Poor curation an Fail to provide evidence of skills and lack of knowledg highly unsatisfactory or wor	understanding of the biological concepts and the of the different groups of arthropods inadequed identification of the collection. Knowledge on the biological concepts and the on how to use taxonomic keys. No participe	heories developed during the courage and mostly inaccurate. No heories developed during the	cademic level. ourse. Identification skills oparticipation in class or course. No identification
- · · · · · · · · · · · · · · · · · · ·	Fail Lecture w	and use of taxonomic keys unsettling. Poor curation an Fail to provide evidence of skills and lack of knowledg highly unsatisfactory or wor ith laboratory componer	understanding of the biological concepts and the of the different groups of arthropods inadequid identification of the collection. Knowledge on the biological concepts and the on how to use taxonomic keys. No participate the ontological concepts and the ontological concepts are ontological concepts and the ontological concepts are ontological concepts and the ontological concepts are ontological concepts.	heories developed during the courage and mostly inaccurate. No heories developed during the	cademic level. ourse. Identification skills participation in class or course. No identification uration and identification
Course Teaching	Fail Lecture w	and use of taxonomic keys unsettling. Poor curation an Fail to provide evidence of skills and lack of knowledg highly unsatisfactory or wor ith laboratory componer	understanding of the biological concepts and the of the different groups of arthropods inadequed identification of the collection. Knowledge on the biological concepts and the on how to use taxonomic keys. No participe	heories developed during the courage and mostly inaccurate. No heories developed during the	cademic level. ourse. Identification skills participation in class or course. No identification uration and identification No. of Hours
Course Teaching	Fail Lecture w	and use of taxonomic keys unsettling. Poor curation an Fail to provide evidence of skills and lack of knowledg highly unsatisfactory or wor ith laboratory componer	understanding of the biological concepts and the of the different groups of arthropods inadequed id identification of the collection. knowledge on the biological concepts and the on how to use taxonomic keys. No participe knot delivered on time. Int course Details This part includes 4 hours of lectuand curation of arthropod collection.	heories developed during the counter and mostly inaccurate. No heories developed during the country in class or unsettling. Country in class or unsettling.	cademic level. ourse. Identification skills participation in class or course. No identification uration and identification
Course Teaching	Fail Lecture w Activities Lectures	and use of taxonomic keys unsettling. Poor curation an Fail to provide evidence of skills and lack of knowledg highly unsatisfactory or wor ith laboratory componer	understanding of the biological concepts and to of the different groups of arthropods inadequed id identification of the collection. knowledge on the biological concepts and to en how to use taxonomic keys. No participe knot delivered on time. the course Details This part includes 4 hours of lecture of the different course.	heories developed during the counter and mostly inaccurate. No heories developed during the countries during the count	cademic level. ourse. Identification skills o participation in class or course. No identification uration and identification No. of Hours 24
Course Teaching	Fail Lecture w Activities Lectures Laborator Project w	and use of taxonomic keys unsettling. Poor curation an Fail to provide evidence of skills and lack of knowledg highly unsatisfactory or wor ith laboratory componer	understanding of the biological concepts and the of the different groups of arthropods inadequed id identification of the collection. I knowledge on the biological concepts and the on how to use taxonomic keys. No participate to the delivered on time. Into course Details This part includes 4 hours of lectuand curation of arthropod collection. Students will collect independer	heories developed during the counter and mostly inaccurate. No heories developed during the countries during the count	cademic level. ourse. Identification skills participation in class or course. No identification uration and identification No. of Hours 24 28
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	Fail Lecture w Activities Lectures Laborator Project w	and use of taxonomic keys unsettling. Poor curation an Fail to provide evidence of skills and lack of knowledg highly unsatisfactory or wor ith laboratory componer is	understanding of the biological concepts and the of the different groups of arthropods inadequed id identification of the collection. I knowledge on the biological concepts and the on how to use taxonomic keys. No participate to the delivered on time. Into course Details This part includes 4 hours of lectuand curation of arthropod collection. Students will collect independer	heories developed during the counter and mostly inaccurate. No heories developed during the countries during the count	cademic level. ourse. Identification skills o participation in class or course. No identification uration and identification No. of Hours 24 28 48
Course Teaching & Learning Activities Assessment Methods	Fail Lecture w Activities Lectures Laborator Project w Reading	and use of taxonomic keys unsettling. Poor curation an Fail to provide evidence of skills and lack of knowledg highly unsatisfactory or wor ith laboratory componer is	understanding of the biological concepts and the of the different groups of arthropods inadequed id identification of the collection. I knowledge on the biological concepts and the on how to use taxonomic keys. No participate to the delivered on time. Into course Details This part includes 4 hours of lectuand curation of arthropod collection. Students will collect independer collection, curate and identify the second in the office of the collection.	heories developed during the counter and mostly inaccurate. No heories developed during the counter and mostly inaccurate. No heories developed during the counter and the cou	cademic level. ourse. Identification skills o participation in class or course. No identification uration and identification No. of Hours 24 28 48 50 Assessment Methods
Course Teaching & Learning Activities Assessment Methods	Fail Lecture w Activities Lectures Laborator Project w Reading / Methods	and use of taxonomic keys unsettling. Poor curation an Fail to provide evidence of skills and lack of knowledg highly unsatisfactory or wor ith laboratory componer is	understanding of the biological concepts and the of the different groups of arthropods inadequed id identification of the collection. I knowledge on the biological concepts and the on how to use taxonomic keys. No participate to the delivered on time. Int course Details This part includes 4 hours of lectuand curation of arthropod collection. Students will collect independer collection, curate and identify the second in the office of the properties of the collection.	heories developed during the counter and mostly inaccurate. No heories developed during the exaction in class or unsettling. Courses about identification in the interest about identification in the interest in the interest pecimen collected Weighting in final course grade (%)	cademic level. ourse. Identification skills o participation in class or course. No identification uration and identification No. of Hours 24 28 48 50 Assessment Methods to CLO Mapping
Course Teaching & Learning Activities Assessment Methods	Fail Lecture w Activities Lectures Laborator Project w Reading Methods Assignment	and use of taxonomic keys unsettling. Poor curation an Fail to provide evidence of skills and lack of knowledg highly unsatisfactory or wor ith laboratory componer is self-transfer of the study. Yet Self study	understanding of the biological concepts and the of the different groups of arthropods inadequed id identification of the collection. I knowledge on the biological concepts and the on how to use taxonomic keys. No participate to the delivered on time. Int course Details This part includes 4 hours of lectuand curation of arthropod collection. Students will collect independer collection, curate and identify the second in the office of the properties of the collection.	heories developed during the counter and mostly inaccurate. No heories developed during the pation in class or unsettling. Counteres about identification in the counter of	cademic level. ourse. Identification skills of participation in class or course. No identification uration and identification uration and identification. No. of Hours 24 28 48 50 Assessment Methods to CLO Mapping CLO 1,2,3,5,6
Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended reading and	Fail Lecture w Activities Lectures Laborator Project w Reading / Methods Assignme Examinat Laborator Price et al USA. 801	and use of taxonomic keys unsettling. Poor curation an Fail to provide evidence of skills and lack of knowledg highly unsatisfactory or wor ith laboratory componer is self-transfer of the strength of the st	understanding of the biological concepts and the of the different groups of arthropods inadequed id identification of the collection. I knowledge on the biological concepts and the on how to use taxonomic keys. No participate the total course the course that course the part includes 4 hours of lecture and curation of arthropod collection. Students will collect independent collection, curate and identify the states. Details Details Details Details Details	heories developed during the counter and mostly inaccurate. No heories developed during the pation in class or unsettling. Counteres about identification in the counter of	cademic level. ourse. Identification skills o participation in class or course. No identification uration and identification uration and identification No. of Hours 24 28 48 50 Assessment Methods to CLO Mapping CLO 1,2,3,5,6 CLO 1,2,3,4,5,6 CLO 1,2,3
Course Teaching & Learning Activities Assessment Methods and Weighting	Fail Lecture w Activities Lectures Laborator Project w Reading / Methods Assignme Examinat Laborator Price et al USA. 801	and use of taxonomic keys unsettling. Poor curation an Fail to provide evidence of skills and lack of knowledg highly unsatisfactory or wor ith laboratory componer is self-transfer of the strength of the st	understanding of the biological concepts and the of the different groups of arthropods inadequed id identification of the collection. I knowledge on the biological concepts and the on how to use taxonomic keys. No participate the total delivered on time. In course Details This part includes 4 hours of lecture and curation of arthropod collection. Students will collect independent collection, curate and identify the states.	heories developed during the counter and mostly inaccurate. No heories developed during the pation in class or unsettling. Counteres about identification in the counter of	cademic level. ourse. Identification skills o participation in class or course. No identification uration and identification uration and identification No. of Hours 24 28 48 50 Assessment Methods to CLO Mapping CLO 1,2,3,5,6 CLO 1,2,3,4,5,6 CLO 1,2,3
Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended reading and	Fail Lecture w Activities Lectures Laborator Project w Reading / Methods Assignme Examinat Laborator Price et al USA. 801 Schowalte http://moo	and use of taxonomic keys unsettling. Poor curation an Fail to provide evidence of skills and lack of knowledg highly unsatisfactory or wor ith laboratory componer is self-transfer of the strength of the st	understanding of the biological concepts and the of the different groups of arthropods inadequed id identification of the collection. I knowledge on the biological concepts and the on how to use taxonomic keys. No participate to the delivered on time. Into course Details This part includes 4 hours of lecture and curation of arthropod collection. Students will collect independent collection, curate and identify the second collection, curate and identify the second collection. Details	heories developed during the counter and mostly inaccurate. No heories developed during the exaction in class or unsettling. Counteres about identification in the exaction in class or unsettling. Countered weighting in final course grade (%) 30 40 30 ties. Cambridge University	cademic level. ourse. Identification skills o participation in class or course. No identification uration and identification uration and identification No. of Hours 24 28 48 50 Assessment Methods to CLO Mapping CLO 1,2,3,5,6 CLO 1,2,3,4,5,6 CLO 1,2,3

BIOL3501	Evolution (6 credits)	Academic Year	2019
Offering Department	Biological Sciences	Quota	50
Course Co-ordinator	Dr M Sun, Biological Sciences (meisun@hku.hk)		
Teachers Involved			
Course Objectives	Evolution is the cornerstone of modern biology. The course aims to i contemporary evolutionary biology, including the history of evolut adaptation, speciation, and evolution as an explanatory framework at all The course emphasizes the interplay between theory and empirical test with the process of science.	tionary biology, evolutior levels of biological organi	nary processes zation.
Course Contents & Topics	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					
		ng Evolutionary Trees				
Course Learning			course, students should be abl	e to:		
Outcomes		miliar with the facts an	,			
			y of evolution by natural select	tion and how the process of na	atural selection can	
		ad to speciation				
			rstanding of the modern evolution			
			ng to real world problems in agr	iculture, medicine, and biodiver	sity conservation	
Pre-requisites	Pass in BI	OL2306				
(and Co-requisites						
and Impermissible						
combinations)						
Offer in 2019 - 2020		er in 2020 - 2021 : N		Examination		
Grade Descriptors	Α		mance demonstrating excellent unders by the course, and skillful application			
(A+ to F)			n critical thinking and logical reasonir			
	dealing with the critical issues in the field.					
	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.					
	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.					
	D 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.					
	Fail	Poor performance in all a	aspects of the course, showing little e			
			iciencies serious enough to make it ina	dvisable to proceed further without addi	tional course work.	
Course Type Course Teaching		ased course	Deteile		No of House	
& Learning Activities	Activities	i	Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials			12		
	Project w				12	
		Self study			100	
Assessment Methods	Methods		Details	Weighting in final	Assessment	
and Weighting				course grade (%)	Methods	
					to CLO Mapping	
	Assignme	ents		10	CLO 1,2,3,4	
	Essay			5	CLO 1,2,3,4	
	Examinat			50	CLO 1,2,3,4	
	Presentat	tion		10	CLO 1,2,3,4	
	Project re	ports	including computer lab	15	CLO 1,2,3,4	
	Test			10	CLO 1,2,3,4	
Required/recommended	J.C. Herro	n and S. Freeman: Ev	olutionary Analysis (5th ed. Pea	arson, 2013)		
reading and	Douglas J	. Futuyma: Evolution,	(3rd Edition, Sinauer Associates	s, 2013)		
online materials	_					
	eBooks av					
Course Website	http://moo	dle.hku.hk/				
Additional Course Information			ct to a minimum enrollment nun	nber and availability of teachers	i.	

BIOL3502	Conservation genetics (6 credits)	Academic Year	2019		
Offering Department	Biological Sciences	Quota	50		
Course Co-ordinator	Dr M Sun, Biological Sciences (meisun@hku.hk)				
Teachers Involved					
Course Objectives	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 to conservation genetics. Part I. Evolutionary Genetics of Natural Populations: - genetic diversity - characterizing genetic diversity: single loci and quantitative variation - evolutionary impacts of natural selection, mutation, migration and th - genetic consequences of small population sizes; - maintenance of genetic diversity; - population genomics. 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:		ations;		

		•	ities and defining manageme	ent units;		
	- genetic management of wild populations;					
	- genetic issues in introduced and invasive species;					
		management of captive				
	_	management for reintr	orensics and understanding s	species hiology		
Course Learning		•	is course, students should be			
Outcomes				cepts of conservation genetics		
-			Ţ ,	vation status of endangered, vulne	rable or threatened	
		species	Tor determining the conserv	ration status of chadingered, valide	rable, or uncateriou	
		•	characterizing genetic diversit	ty at population and species levels		
				ersity, inbreeding, reproductive fitne	ss. and evolutionary	
		ootential in wild populat		3, 1	,	
	CLO 5 d	describe the effects of	habitat fragmentation and p	population size reduction on genet	tic diversity and the	
	ir	mplications in managin	ng nature reserves		·	
	CLO 6 g	gain ability to integrate	genetic information in resolv	ving taxonomic uncertainties, in un	derstanding species	
	b	piology, in setting cons	servation priorities, and in de	eveloping management strategies	for wild and captive	
	р	populations				
Pre-requisites	Pass in BIOL2306 or BIOL3303 or BIOL3408					
(and Co-requisites						
and Impermissible						
combinations)	ļ					
Offer in 2019 - 2020		ffer in 2020 - 2021 : N		Examination		
Grade Descriptors	Α			nderstanding of the subject matter, extensive		
(A+ to F)	range of topics covered by the course, and skillful applications of concepts/theories in solving new or unfamiliar pro showing strong abilities in critical thinking and logical reasoning, with evidence of significant insight and original tho					
		dealing with the critical issues in the field.				
	В	Good performance demonstrating capacity to use the appropriate concepts, a good understanding of the subject matter, an ability to handle the problems and materials encountered in the subject, showing evidence of attaining most of the countered in the subject, showing evidence of attaining most of the countered in the subject.				
	learning outcomes.				ning most of the course	
	С					
		but showing incomplete command of knowledge required for attaining most of the expected course learning outcomes.				
	D	Minimally acceptable performance demonstrating at least partial familiarity with the subject matter and some capacity to deal wit relatively simple problems, but also demonstrating serious deficiencies in knowledge required for attaining most of the expecte				
		course learning outcomes.				
	Fail	Fail Poor performance in all aspects of the course, showing little evidence of learning, lacking real understanding of the sub-				
O	14		*	it inadvisable to proceed further without add		
Course Type		with laboratory compon	Lecture with laboratory component course			
Course Teaching	Activities				itional course work.	
& Learning Activities			Details		No. of Hours	
a Learning Activities	Lectures	S			No. of Hours	
	Lectures Laborato	s ory			No. of Hours 24 12	
	Lectures Laborato Project v	s ory work			No. of Hours 24 12 12	
	Lectures Laborato Project w Tutorials	s ory work s			No. of Hours 24 12 12 12	
	Lectures Laborato Project w Tutorials Reading	s ory work s g / Self study	Details		No. of Hours 24 12 12	
Assessment Methods and Weighting	Lectures Laborato Project w Tutorials	s ory work s g / Self study		Weighting in final course grade (%)	No. of Hours 24 12 12 12 100 Assessment Methods	
	Lectures Laborato Project w Tutorials Reading Methods	s ory work s g / Self study	Details	course grade (%)	No. of Hours 24 12 12 100 Assessment Methods to CLO Mapping	
	Lectures Laborato Project w Tutorials Reading Methods Assignm	s ory work s g / Self study	Details	course grade (%)	No. of Hours	
	Lectures Laborato Project v Tutorials Reading Methods Assignm Essay	s ory work s g / Self study I s	Details	course grade (%) 10 5	No. of Hours	
	Lectures Laborato Project v Tutorials Reading Methods Assignm Essay Examina	s ory work s g / Self study I s nents	Details	course grade (%) 10 5 50	No. of Hours	
	Lectures Laborato Project w Tutorials Reading Methods Assignm Essay Examina Laborato	s ory work s g / Self study s ments ation ory reports	Details	course grade (%) 10 5 50 10	No. of Hours	
	Lectures Laborato Project w Tutorials Reading Methods Assignm Essay Examina Laborato Presenta	s ory work s g / Self study s nents ation ory reports ation	Details	course grade (%) 10 5 50 10 10	No. of Hours	
	Lectures Laborato Project w Tutorials Reading Methods Assignm Essay Examina Laborato Presenta Project re	s ory work s g / Self study s nents ation ory reports ation	Details	course grade (%) 10 5 50 10 10 10 55	No. of Hours 24 12 12 100 Assessment Methods to CLO Mapping CLO 1,3,4,5,6 CLO 1,4,5,6 CLO 3 CLO 1,4,5,6 CLO 1,4,5,6 CLO 1,4,5,6 CLO 1,4,5,6	
and Weighting	Lectures Laborato Project w Tutorials Reading Methods Assignm Essay Examina Laborato Presenta Project ru Test	s ory work s g / Self study s nents ation ory reports ation report	Details Details	course grade (%) 10 5 50 10 10 10 5 10	No. of Hours	
and Weighting Required/recommended reading and	Lectures Laborato Project w Tutorials Reading Methods Assignm Essay Examina Laborato Presenta Project ru Test	s ory work s g / Self study s nents ation ory reports ation report m et al: Introduction to	Details Details	course grade (%) 10 5 50 10 10 10 55	No. of Hours	
and Weighting Required/recommended reading and online materials	Lectures Laborato Project w Tutorials Reading Methods Assignm Essay Examina Laborato Presenta Project references Frankhar e-book av	s ory work s g / Self study ls ments ation ory reports ation report m et al: Introduction to available	Details Details	course grade (%) 10 5 50 10 10 10 5 10	No. of Hours	
and Weighting Required/recommended reading and	Lectures Laborato Project w Tutorials Reading Methods Assignm Essay Examina Laborato Presenta Project r Test Frankhar e-book av http://moo	s ory work s g / Self study s nents ation ory reports ation report m et al: Introduction to	Details Details	course grade (%) 10 5 50 10 10 10 5 10	No. of Hours	

BIOL3503	Endocrinology: human physiology II (6 credits)	Academic Year	2019
Offering Department	Biological Sciences	Quota	60
Course Co-ordinator	Dr C B Chan, Biological Sciences (chancb@hku.hk)		
Teachers Involved	(Dr C B Chan,Biological Sciences) (Prof A S T Wong,Biological Sciences) (Prof B K C Chow,Biological Sciences)		
Course Objectives	To provide an advanced course on hormones and how they regulate me water/salt homeostasis in our body.	tabolism/growth, r	eproduction and
Course Contents & Topics	History: discovery of blood borne factor or hormone. Chemical nature of h signaling. Secondary messengers. Responsivity and hormonal effects. The hypothalamic pituitary axis The GHRH-GH-IGF axis. The TRH-TSH-thyroid hormone axis. The CRH-ACT Catecholamine effects and their pathways. The gastrointestinal system The enteric nervous system. The cephalic phase, stomach phase and in Regulation of acid secretion. Regulation of pancreatic exocrine and endocrine GIP, CCK, secretin, GLP-1, GLP-2 and motilin. Regulation of feeding, energy b Insulin and glucagon. Reproduction The GnRH-gonadotropin-sex hormone axis. Regulation of LH and FSH re Interaction of hormones produced by various cells in the testis to regulate specific production.	H-cortisol axis. Contestinal phase of experiented secretion. Gut he alance and food in the secretion of the secretion of the secretion of the secretion of the secretic secretion of the secretion of the secretic secretion of the secretic secretion of the se	food digestion. from ormones: gastrin, take.

Course Learning Outcomes	testosterone. The erection reflex. Female reproductive system. Development of ovarian follicles. The menstr cycle: hormonal control: Ovulation, fertilization and implantation. The placenta as an endocrine organ. Endocr regulation of parturition. Hormonal control of milk secretion. Prolactin and broodiness. Osmoregulation Posterior pituitary hormone, ADH. Aldosterone and sodium balance. Angiotensin's effect on blood pressure. Atrial natriuretic peptide and its function in water and sodium balance. On successful completion of this course, students should be able to: CLO 1 understand the definition and natures of hormones CLO 2 explain and describe secondary messenger pathways for hormones CLO 3 describe the connection between pituitary the master gland with higher brain centers and peripheral organical explain and describe hormones involved in the regulation of 3 most important body functions including metabolism/growth, reproduction and water/salt homeostasis					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	Pass in BIOL2103				
Offer in 2019 - 2020		fer in 2020 - 2021 : 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, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational 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 organizational skills.					
	C 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. 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 are knowledge to solve problems. Apply limited or barely effective organizational skills. Fail 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 proble				w limited ability to apply	
			e minimally effective or ineffective.			
Course Type		vith laboratory compo			No. of Hours	
Course Teaching	Activitie		Details	Details		
& Learning Activities	Lectures					
	Laborato	,	a 5-hour laboratory session	a 5-hour laboratory session per week for 5 weeks		
	Tutorials					
	Reading	/ Self study			100	
Assessment Methods and Weighting	Methods	5	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Examina	ition		80	CLO 1,2,3,4	
	Laborato	ory reports	lab performance & report	20	CLO 1,3,4	
Required/recommended reading and online materials			ology, (Elsevier, 11th Edition, 20 y, An Integrated Approach (Pears		· · · · · · · · · · · · · · · · · · ·	
Course Website	http://mo	odle.hku.hk/				
Additional Course Information			bject to a minimum enrollment nu	mber and availability of teacher	S.	

BIOL3505	Oyster aquaculture and restoration (6 credits)	Academic Year	2019		
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 a 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 a advanced coastal aquaculture production systems that will enable them to de oyster aquaculture facilities for food production and restoration of wild portion endeavor encompassing larval hatchery technology and aquaculture. After recoastal aquaculture, we will focus on hatchery technology and aquaculture pertaining to coastal aquaculture will also be covered using oyster farming in will learn why oyster habitat is declining in HK and would also explore scient oyster habitat. Students will be exposed to few aquaculture facilities in Hc (Malaysia) to learn practical skills of oyster farming. This course is designed sustainable aquaculture in Hong Kong. Students will be exposed to a uniquiculture, and learning opportunities. Career and small scale business opport discussed. Thus, students will be provided adequate knowledge & analytical larval biology research and aquaculture.	sign, construct, ope pulation. This is are ading about basic of the Environmental is thong Kong as an elific and managemental for the meet the needs the learning environmental them diverse raunities in aquacultur	rate and maintain interdisciplinary yster biology and sues, legislation xample. Students it ways to restore taken to Penang of an expanding lent involving notinge of expertise, e industry will be		
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 the 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 farms) in oyster hatchery and farming 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				
Pre-requisites	Pass in BIOL2103 or BIOL2306 or BIOL3301 or BIOL3303	nology and aquacuit	ure		
rie-requisites	La22 III DIOLY 103 OI DIOLY300 OI DIOL3301 OI DIOL3303				

(and Co-requisites						
and Impermissible						
combinations)	NI Office	- i- 2020 2024 - N		Eveninetien		
Offer in 2019 - 2020	-	r in 2020 - 2021 : N		Examination		
Grade Descriptors (A+ to F)	A Evidence of original thought during the analysis of larval biology issues. Show evidence of analytical, critical and multidimensional thinking about the study subject. Extensive knowledge and skills required for attaining all the course learning outcomes. Demonstrate excellent ability to apply what you have learned in the class room to critically analyze the larval biology project data. Show highly effective organizational, presentational and field trip skills.					
	B Show substantial knowledge and thought during the analysis of marine 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 marine life science issues. Show effective organizational, presentational and field trip skills.					
	С					
	D					
	Fail	and skills required for attain class room to critically analy	equate knowledge and understanding of marine ing all the course learning outcomes. Demonstr ze the real marine life science issues. Show no , or any knowledge of organizational and presen	ate no ability to apply what yo evidence of familiarity with rel	ou have learned in the	
Course Type	Field camp	S				
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures				25	
·	Field work				25	
	Laboratory work				25	
	Tutorials				10	
	Presentation				5	
	Reading / Self study				20	
	Assessme	•			10	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	nts		25	CLO 3,4	
	g		Presentation: developing innovative			
	Report		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 A	quaculture and the Envi	rvae (Larry McEdward, CRC Press) ironment (S.E. Shumway, John Wiley & n Spencer, John Wiley & Sons)	Sons)		
Course Website	http://www	.biosch.hku.hk/ecology/	lsc/			
Additional Course Information	http://www.biosch.hku.hk/ecology/lsc/ Taught and trained by several teachers, guest lecturers from government and aquaculture busines This course is offered in close collaboration with USM (Penang, Malaysia); Tentative duration: 1-15 June, 2016; In Part 1 - First 5 days at HKU for lectures, practicals and field visits - then flight to Penang to vis aquaculture facilities; Few USM (Malaysia) students may join the course; Fund for the Penang visit will be collected from students (about 6000 HKD including airfare, accesselective meals for 7 days). This course will be offered subject to a minimum enrollment number and availability of teachers.				visit various oyster	

BIOL3506	Evolutionary biology (6 credits)	Academic Year	2019
Offering Department	Biological Sciences	Quota	50
Course Co-ordinator	Dr 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	 The course aims to introduce students to the major themes of contemporary history of evolutionary biology, evolutionary processes, adaptation, speciation framework at all levels of biological organization. The course emphasizes the interplay between theory and empirical tests students with the process of science. 	, and evolution as	s an explanatory
Course Contents & Topics	-Introduction to Evolutionary Biology -The tree of life -Patterns of evolution -Biogeography -The evolution of biodiversity -Mechanisms of evolution (Natural selection, mutation, genetic drift) -Phenotypic evolution -Social interactions in evolution (sex, kinship, co-evolution) -Species and speciation -Evolution of genes and genomes -Evolutionary Development (Evo-Devo) -Macroevolution		
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 identify the facts on theory of evolution CLO 2 describe Darwin's theory of evolution by natural selection and how the lead to speciation	e process of natu	al selection can

	CLO 3 understand mechanisms involved in the modern evolutionary theory						
	CLO 4	apply evolutionary thin	nking to real world problems in a	agriculture, medicine	, and biodivers	ity conservation	
	CLO 5	reflect and theorize al	oout evolutionary processes				
Pre-requisites (and Co-requisites and Impermissible combinations)		Pass in BIOL2306 Not for students who have passed in BIOL3501					
Offer in 2019 - 2020	Y 1	st sem Offer in 2020) - 2021 : Y		Examination	Dec	
Grade Descriptors (A+ to F)	A	range of topics cover	rformance demonstrating excellent und ed by the course, and skillful applicat es in critical thinking and logical reason I issues in the field.	tions of concepts/theories	s in solving new o	r unfamiliar problems,	
	В		monstrating capacity to use the approp problems and materials encountered in				
	С	Adequate performance	e demonstrating some understanding of e command of knowledge required for a				
	D	Minimally acceptable p	performance demonstrating at least part ems, but also demonstrating serious de	tial familiarity with the sub	ject matter and sor	ne capacity to deal with	
	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.						
Course Type	Lecture	with laboratory compo	onent course				
Course Teaching	Activities		Details	Details			
& Learning Activities	Lectures						
	Laboratory						
	Project work					12	
	Tutorials					6	
	Reading / Self study					100	
Assessment Methods and Weighting	Method	ds	Details		ing in final grade (%)	Assessment Methods to CLO Mapping	
	Assignr	ments	Tutorial reports		10	CLO 1,2,3,4	
	Examin	ation			50	CLO 1,2,3,4	
	Project	report			30	CLO 1,2,3,4	
	Test				10	CLO 1,2,3,4	
Required/recommended reading and online materials	Douglas	J.C. Herron and S. Freeman: Evolutionary Analysis (5th ed. Pearson, 2013) Douglas J. Futuyma: Evolution, (3rd Edition, Sinauer Associates, 2013) eBooks available					
Course Website	http://mo	oodle.hku/hk					
Additional Course Information	This cou	urse will be offered su	bject to a minimum enrollment r	number and availabil	ity of teachers.		

BIOL3508	Microbial physiology and biotechnology (6 credits)	Academic Year	2019				
Offering Department	Biological Sciences	Quota	60				
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 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 & Topics	Serving as a course which blends fundamental knowledge about the Microbial Biotechnology, This course is organized and presented in the Breath', and 'Microbial Biotechnology'. Under these three themes, a linteresting topics are presented including: 'Microorganisms and their position of the study of microbes', 'Microbial structures a control', 'Energy Generation', 'Central metabolism', and 'Microbial biotech biofuels and synthetic biology '. Topics are taught in a coherent manner following each of the topics such that students will achieve a high quality, experiences.	ree themes: 'Microbial I proad range of highly esition in the living worl and functions', 'Microbi anological applications in with a highly interactive	Rules', 'Microbial educational and d', 'Fundamental al growth and n biodegradation e tutorial session				
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 appreciate the diversity of microbial metabolisms and application	ns in biotechnology					
	CLO 2 comprehend the principles underlying the dynamic nature of microbial physiology						
	CLO 3 gain laboratory skills on methodologies for microbial studies						
	CLO 4 relate knowledge to practical application of microbes in industry and medicine						
Pre-requisites	Pass in BIOL2103 or BIOL2220 or BIOC2600 or BIOC3604;						
(and Co-requisites	Not for students who have passed in BIOL3108; and						
and Impermissible	Not for students who have passed in BIOL4402.						
combinations)							
Offer in 2019 - 2020	Y 2nd sem Offer in 2020 - 2021 : Y	Examination	May				
Grade Descriptors (A+ to F)	Demonstrate thorough mastery at an advanced level of extensive knowled outcomes. Show strong analytical and critical abilities and logical thinking, with knowledge to a wide range of complex, familiar and unfamiliar situations. Apply Demonstrate substantial command of a broad range of knowledge required outcomes. Show evidence of analytical and critical abilities and logical thinking some unfamiliar situations. Apply effective organizational skills.	th evidence of original though y highly effective organization for attaining at least most of	t, and ability to apply al skills. f the course learning				
	some untamiliar 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.						
	Demonstrate partial but limited command of knowledge required for attaining	ng some of the course learning	ing outcomes. Show				

	D	now limited ability to apply					
	Fail	analytical and critical abilitie	or no evidence of command of knowledge required for attaining the course learning outcomes. Lack call abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems are minimally effective or ineffective.				
Course Type	Lecture v	vith laboratory componen	t course				
Course Teaching	Activitie	s	Details		No. of Hours		
& Learning Activities	Lectures				24		
	Laborato	ory			24		
	Project work				12		
	Reading	/ Self study			100		
Assessment Methods and Weighting	Methods	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Examina	ntion		75	CLO 1,2,4		
	Laborato	ory reports		25	CLO 1,3,4		
Required/recommended reading and online materials	Primary Text Book: Prescott, Harley, and Klein's Microbiology, by Joanne M. Willey, Linda M. Sherwood, and Christopher J. Woolverton, published by McGraw-Hill Supplementary Reading: Brock Biology of Microorganisms, by Michael Madigan, John Martinko, Kelly Bender, Daniel Buckley, David Stahl, Pearson Publisher On-line textbook of Bacteriology: Kenneth Tobar, U. of Wisconsin-Madison, Department of Bacteriology. URL (http://www.textbookofbacteriology.net/)						
Course Website	http://mo	odle.hku.hk/	,				
Additional Course Information	This course will be offered subject to a minimum enrollment number and availability of teachers.						

BIOL3606	Diet an	d disease (6 credits)		Academic Year	2019	
Offering Department	Biologica	al Sciences		Quota	70	
Course Co-ordinator	Dr J C Y	Lee, Biological Sciences	(jettylee@hku.hk)			
Teachers Involved	(Dr J C \	Lee, School of Biologica	l 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 basi prevention cardiova	The basics of nutrition for health and fitness and medical nutrition therapy. The role of diet in the development an 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 food allergy and food intolerance. Nutrition in pregnancy and lactation.				
Course Learning	On succe	essful completion of this of	course, students should be able to:			
Outcomes	CLO 2 C	describe the role of die cardiovascular disease, ca clearly differentiate and in	ionships between diet and disease et in the development and prever ancer, immune deficiency, and renal atterpret risk factors that influence diet r postoperative nutritional support for	failure ary choice	and anorexia,	
Pre-requisites and Co-requisites and Impermissible combinations)	Pass in I Not for s	BIOL2220 or BIOC2600 o tudents who have passed	or BIOL3202 or BIOL3203 or BIOL320 d in BIOL3206	04 or BIOL3205		
Offer in 2019 - 2020	Y 2r	nd sem Offer in 2020 - 2		Examination	May	
Grade Descriptors (A+ to F)	В	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the cours learning outcomes. Thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking, with evidenc of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highl effective organizational and presentational skills. Apply highly effective laboratory/fieldwork skills and techniques. Critical use 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 cours learning outcomes. Substantial grasp of the subject. Show evidence of analytical and critical abilities and logical thinking, an				
		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	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. General but incomplete grasp of the subject. 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 presentations skills. Apply moderately effective laboratory / fieldwork skills and techniques. Mostly correct but some erroneous use of data an results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.				
		thinking, and ability to apply skills. Apply moderately effective	complete grasp of the subject. Show evidency y knowledge to most familiar situations. Apply ective laboratory / fieldwork skills and techniqu	ce of some analytical and critical moderately effective organization les. Mostly correct but some erron	l abilities and logical and presentation	
	D	thinking, and ability to apply skills. Apply moderately effer results to draw appropriate Demonstrate partial but lim Partial but limited grasp of and logical thinking, but wii Apply limited or barely eff	complete grasp of the subject. Show evidency knowledge to most familiar situations. Apply ective laboratory / fieldwork skills and technique conclusions. Apply moderately effective organited command of knowledge and skills require the subject, retention of some relevant inform the limited analytical and critical abilities. Show fective organizational and presentational skill to use data and results to draw approp	ce of some analytical and critical moderately effective organization ies. Mostly correct but some erron izational and presentational skills. ed for attaining some of the cours nation of the subject. Show evider w limited ability to apply knowledg ls. Apply partially effective lab /	I abilities and logical and presentation leous use of data are learning outcomence of some coherence to solve problems fieldwork skills an	
	D Fail	thinking, and ability to apply skills. Apply moderately efferesults to draw appropriate. Demonstrate partial but limited grasp of and logical thinking, but will Apply limited or barely eff techniques. Limited ability organizational and presenta Demonstrate little or no evic or no grasp of the knowled thinking. Show very little or effective or ineffective. App	complete grasp of the subject. Show evidency knowledge to most familiar situations. Apply ective laboratory / fieldwork skills and technique conclusions. Apply moderately effective organited command of knowledge and skills require the subject, retention of some relevant inform the limited analytical and critical abilities. Show fective organizational and presentational skill to use data and results to draw approp	ce of some analytical and critical moderately effective organization uses. Mostly correct but some erron izational and presentational skills. ed for attaining some of the cours nation of the subject. Show evider wilmited ability to apply knowledgils. Apply partially effective lab / viriate conclusions. Apply limited quired for attaining the course lea of analytical and critical abilities, ms. Organization and presentation / / fieldwork skills and techniques	I abilities and logical and presentational and presentational eleous use of data and le learning outcomes de learning outcomes fieldwork skills and or barely effective rming outcomes. Littl logical and coherer all skills are minimall. Misuse of data an	
Course Type	Fail	thinking, and ability to apply skills. Apply moderately efferesults to draw appropriate. Demonstrate partial but limited grasp of and logical thinking, but will Apply limited or barely eff techniques. Limited ability organizational and presenta Demonstrate little or no evic or no grasp of the knowled thinking. Show very little or effective or ineffective. App	complete grasp of the subject. Show evidency knowledge to most familiar situations. Apply ective laboratory / fieldwork skills and technique conclusions. Apply moderately effective organited command of knowledge and skills requiring the subject, retention of some relevant inform the limited analytical and critical abilities. Show fective organizational and presentational skills to use data and results to draw appropational skills. dence of command of knowledge and skills redge and understanding of the subject. Lack no ability to apply knowledge to solve probler by minimally effective or ineffective laboratory wappropriate conclusions. Organization and presentations and presentations.	ce of some analytical and critical moderately effective organization uses. Mostly correct but some erron izational and presentational skills. ed for attaining some of the cours nation of the subject. Show evider wilmited ability to apply knowledgils. Apply partially effective lab / viriate conclusions. Apply limited quired for attaining the course lea of analytical and critical abilities, ms. Organization and presentation / / fieldwork skills and techniques	I abilities and logical and presentational and presentational eleous use of data and learning outcomes are learning outcomes to solve problems fieldwork skills and or barely effective rming outcomes. Littl logical and coherer all skills are minimal. Misuse of data an	
Course Teaching	Fail	thinking, and ability to apply skills. Apply moderately efferesults to draw appropriate. Demonstrate partial but lim Partial but limited grasp of and logical thinking, but wit Apply limited or barely eff techniques. Limited ability organizational and presenta Demonstrate little or no evic or no grasp of the knowled thinking. Show very little or effective or ineffective. Appresults and/or unable to drawith laboratory componer	complete grasp of the subject. Show evidency knowledge to most familiar situations. Apply ective laboratory / fieldwork skills and technique conclusions. Apply moderately effective organited command of knowledge and skills requiring the subject, retention of some relevant inform the limited analytical and critical abilities. Show fective organizational and presentational skills to use data and results to draw appropational skills. dence of command of knowledge and skills redge and understanding of the subject. Lack no ability to apply knowledge to solve probler by minimally effective or ineffective laboratory wappropriate conclusions. Organization and presentations and presentations.	ce of some analytical and critical moderately effective organization uses. Mostly correct but some erron izational and presentational skills. ed for attaining some of the cours nation of the subject. Show evider wilmited ability to apply knowledgils. Apply partially effective lab / viriate conclusions. Apply limited quired for attaining the course lea of analytical and critical abilities, ms. Organization and presentation / / fieldwork skills and techniques	I abilities and logical and presentational and presentational eleous use of data and learning outcomes are learning outcomes to solve problems fieldwork skills and or barely effective rming outcomes. Littl logical and coherer all skills are minimal. Misuse of data an	
Course Teaching	Fail Lecture v	thinking, and ability to apply skills. Apply moderately efferesults to draw appropriate. Demonstrate partial but lim Partial but limited grasp of and logical thinking, but wii Apply limited or barely eff techniques. Limited ability organizational and presenta Demonstrate little or no evior no grasp of the knowled thinking. Show very little or effective or ineffective. Appresults and/or unable to dra with laboratory componer pes	complete grasp of the subject. Show evidency knowledge to most familiar situations. Apply ective laboratory / fieldwork skills and technique conclusions. Apply moderately effective organited command of knowledge and skills requiring the subject, retention of some relevant inform the limited analytical and critical abilities. Show fective organizational and presentational skills to use data and results to draw appropational skills. In the subject is a subject of the	ce of some analytical and critical moderately effective organization uses. Mostly correct but some erron izational and presentational skills. ed for attaining some of the cours nation of the subject. Show evider wilmited ability to apply knowledgils. Apply partially effective lab / viriate conclusions. Apply limited quired for attaining the course lea of analytical and critical abilities, ms. Organization and presentation / / fieldwork skills and techniques	I abilities and logical and presentational and presentational eleous use of data and le learning outcomes are le for some coherer to solve problems fieldwork skills and or barely effective rrning outcomes. Littl logical and coherer al skills are minimall. Misuse of data an effective or ineffective	
Course Type Course Teaching & Learning Activities	Fail Lecture v	thinking, and ability to apply skills. Apply moderately efferesults to draw appropriate Demonstrate partial but lim Partial but limited grasp of and logical thinking, but wir Apply limited or barely eff techniques. Limited ability organizational and presenta Demonstrate little or no evior no grasp of the knowled thinking. Show very little or effective or ineffective. Appresults and/or unable to drawith laboratory componer	complete grasp of the subject. Show evidency knowledge to most familiar situations. Apply ective laboratory / fieldwork skills and technique conclusions. Apply moderately effective organited command of knowledge and skills requiring the subject, retention of some relevant inform the limited analytical and critical abilities. Show fective organizational and presentational skills to use data and results to draw appropational skills. In the subject is a subject of the	ce of some analytical and critical moderately effective organization uses. Mostly correct but some erron izational and presentational skills. ed for attaining some of the cours nation of the subject. Show evider wilmited ability to apply knowledgils. Apply partially effective lab / viriate conclusions. Apply limited quired for attaining the course lea of analytical and critical abilities, ms. Organization and presentation / / fieldwork skills and techniques	l abilities and logical and presentation leous use of data are learning outcome in the learning outcome in the learning outcome is to solve problem; fieldwork skills an or barely effective rining outcomes. Litt logical and cohere al skills are minimal is. Misuse of data an effective or ineffective. No. of Hours	

Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping				
	Assignments		20	CLO 1,3,4				
	Examination		50	CLO 1,2,3,4				
	Laboratory reports	Laboratory & Research Reports	30	CLO 1,2,3				
Required/recommended reading and online materials	S. Rodwell Williams: Nutrition and	Selected readings will also be available on the class website. S. Rodwell Williams: Nutrition and Diet Therapy (7th ed.) Suitor & Hunter: Nutrition: Principles and Application in Health Promotion Wardlaw Gordon: Perspectives in Nutrition (2nd ed.)						
Course Website	http://moodle.hku.hk/							
Additional Course Information	This course will be offered subject to a minimum enrollment number and availability of teachers.							

BIOL3608	Food co	mmodities (6 credit	ts)	Academic Ye	ar 2019		
Offering Department	Biological	Sciences		Quota	30		
Course Co-ordinator	Prof N P S	Shah, Biological Science	es (npshah@hku.hk)				
Teachers Involved		Lee,School of Biologica					
	`	ng,School of Biological S	,				
		Shah, School of Biologic					
Course Objectives			anding of modern practice and tech processing and marketing.	inologies used in agricultu	re products including		
Course Contents			feed formulation; genetic selection				
& Topics	fermented	arcass inspection; meat preservation and safety; sensory quality of meat. Dairy processing emphasizing ermented products such as cheese and yogurt; probiotics and health effects. Grain production related to milling; ough rheology; the baking process and quality. Meat, dairy and grain product marketing.					
Course Learning	On succes	ssful completion of this of	course, students should be able to:				
Outcomes	CLO 1 un	derstand modern practi	ces in meat, dairy and grain produc	ction			
	CLO 2 de	monstrate a knowledge	and understanding of meat and da	airy sensory quality, and th	e technologies used		
	in	processing, preservatio	n or improvement of meat and dair	y products			
	CLO 3 de	monstrate knowledge o	of selected issues related to meat a	nd dairy safety			
	CLO 4 un	derstand the technolog	y behind the production of grain-ba	sed foods			
Pre-requisites		,	and any level 3 BIOL course); and				
(and Co-requisites		dents who have passed					
and Impermissible		dents who have passed					
combinations)		dents who have passed					
Offer in 2019 - 2020		sem Offer in 2020 - 2		Examination	May		
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.						
Course Type	Lecture wi	th laboratory componer	nt course				
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures				24		
	Laborator	у		24			
	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		
	Laborator	CLO 1,2,4					
Required/recommended		leat Science. RA Lawrie	Laboratory & research reports (CRC Press. 2006)	20			
reading and			urance. RC Chandan, A Kilara, N S	Shah (Eds) (Blackwell. 200	8)		
online materials			dited by Wrigley CW, Corke H, and		,		
Course Website		dle@hku.hk	, , , , , , , , , , , , , , , , , , , ,	- \-++./			
Additional Course			ted to a minimum enrollment numbe	er and availability of teacel	nrs.		
Information		,		,			

BIOL3951	Ecology & biodiversity field course (6 credits) Academic Year 2019					
Offering Department	Biological Sciences	Quota	20			
Course Co-ordinator	Dr L Karczmarski, Biological Sciences (leszek@hku.hk)					
Teachers Involved	(Dr L Karczmarski,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	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		•	ourse, students should be able to:			
Outcomes			sity and primary habitats in the ecosy			
			eeded to identify target species asso			
	(ecosystems studied	and able to implement sampling t			
			ogy of target species and how biotic	·		
Pre-requisites (and Co-requisites and Impermissible	BIOL4X	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.				
combinations)		The earliest that a student is allowed to take this capstone course is their year 3 study.				
Offer in 2019 - 2020						
Grade Descriptors	Α	Evidence of a thorough grasp of the subject and relevant research techniques. Eagerness and enthusiasm to learn and excelle				
(A+ to F)		familiarity with relevant back skills. Ample evidence of ind comparative perspective to presentation skills with excellevel.	ground reading and case studies. Exemplary lependent critical thought with excellent use or draw insightful and logical conclusions. Sho illent analytical argumentation. Excellent or c	handling of field data collection of a broad range of fundament w outstanding abilities of inde utstanding work relative to wh	n and excellent analytica al concepts and broader ependent work, effective nat is required at degree	
	В	with relevant background re Good evidence of critical the consideration of broader co	f the subject and relevant research technique ading and case studies. Good handling of fi ought (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. Idamental concepts and Ependent work, effective	
	С	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.				
	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 m background reading and no	inimum grasp of the subject and the mini familiarity with any relevant examples and of ation skills with poor argumentation and no	mum relevant research techr case studies. Inadequate evide	ence of coherent logical	
Course Type	Field car	mps				
Course Teaching	Activitie	es	Details		No. of Hours	
& Learning Activities	Field wo	ork			42	
	Reading	g / Self study			100	
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignn	nents		35	CLO 1,2,3,4	
	Report		project report (35%), group investigation & presentation (30%)	65	CLO 1,2,3,4	
Required/recommended reading and online materials	Students	s will be directed to releva	nt scientific literautre and websites			
Course Website	http://www	w.biosch.hku.hk/ecology/	lsc/			
Additional Course		0,				
Information	Students can choose either one of the following courses: Subclass A: Marine Mammal Field Course					
	Subclass B: Animal Behaviour Field Course					
	Farellanet Dropedure					
	Enrollment Procedure: The course is open to enrollment only during the add/drop period of the 2nd semester. Students are required					
	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					
	to submit a brief (maximum 1-page) application letter (PDF file) via e-mail to the Course Coordinator (leszek@hku.hk) not later than 11 January 2016. The application shall include the following:					
	(leszek@nku.nk) not later than 11 January 2016. The application shall include the following: 1. Personal and academic details					
		otograph				
		description of academic in	terests			
	4. GPA	·				
		equisite courses taken and	grades received (if pre-requisites ar	e not met, a reasoned re	quest for	
	waiver)					
			ior to the commencement of the 2nd the add/drop period of the 2nd seme		II DE	

Directed studies in ecology & biodiversity (6 credits)	Academic Year	2019			
Biological Sciences	Quota				
Dr M Yasuhara, Biological Sciences (yasuhara@hku.hk)					
(All academic staff in E&B Major / E&B Major (Intensive) Major, Biological Science	es)				
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; written presentation skills; and personal time management.					
of Ecology & Biodiversity staff, who will act as the student's supervisor. Formal	teaching will be I	imited and aimed			
On successful completion of this course, students should be able to:					
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					
	Biological Sciences Dr M Yasuhara, Biological Sciences (yasuhara@hku.hk) (All academic staff in E&B Major / E&B Major (Intensive) Major,Biological Science Students will undertake a dissertation on a topic related to the field of ecology will not involve any practical research in terms of laboratory or fieldwork, but study. Conducting a dissertation is an independent learning experience and wi including the use of library and Web-based resources; the logical developme presentation skills; and personal time management. An appropriate dissertation topic will be selected from a predeterminted list and for a fecology & Biodiversity staff, who will act as the student's supervisor. Formal at introducing students to the techniques necessary for successful completion of On successful completion of this course, students should be able to: 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 of the staff	Biological Sciences Dr M Yasuhara, Biological Sciences (yasuhara@hku.hk) (All academic staff in E&B Major / E&B Major (Intensive) Major,Biological Sciences) Students will undertake a dissertation on a topic related to the field of ecology and biodiversity. will not involve any practical research in terms of laboratory or fieldwork, but will take the for study. Conducting a dissertation is an independent learning experience and will enable students including the use of library and Web-based resources; the logical development of scientific arpresentation skills; and personal time management. An appropriate dissertation topic will be selected from a predeterminted list and following discussic of Ecology & Biodiversity staff, who will act as the student's supervisor. Formal teaching will be liat introducing students to the techniques necessary for successful completion of their dissertation. On successful completion of this course, students should be able to: 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 CLO 3 undertake the appropriate research to test the question / address the knowledge gap using			

	CLO 4 c	CLO 4 draw appropriate scientific conclusions from their research					
	CLO 5 p	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 2019 - 2020		ear long Offer in 20	•	Examination	No Exam		
Grade Descriptors (A+ to F)	A	Evidence of complet attainment of all lear hypothesis. Well design	e or near-complete understanding and a thorough rning outcomes. Excellent critique and knowledge of gned scientific approach to test research hypothesis. Senensive, critical, assessment of findings and profession	grasp of the subject matter f relevant literature and iden show excellent organizational	as demonstrated by ntification of research and/or analytical skills		
	В	of learning outcomes. designed scientific a effective, critical, asse	plete understanding and a good grasp of the subject r Good critique and knowledge of relevant literature an pproach to test research hypothesis. Show good o presentation of findings and good presentation of research	d identification of research hy rganizational and/or analytica work.	pothesis. Appropriatel al skills. Demonstrate		
	С	most of the learning o	e understanding and grasp of the subject matter as de utcomes. Acceptable critique and knowledge of relevar I scientific approach to test research hypothesis. e but not necessarily critical, assessment of findings ar	nt literature and identification of Show fair organizational an	of research hypothesis d/or analytical skills.		
	D 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 scientific approach to test research hypothesis. Show fair organizational and/or analytical skills. Demonstrate confused and poorly organized assessment of findings 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 scientific approach to test research hypothesis. Show little evidence of appropriate organizational and/or analytical skills. Demonstrate incorrect interpretation and assessment of findings and poor presentation of research work.						
Course Type	Project-b	pased course					
Course Teaching	Activitie	es	Details	Details			
& Learning Activities	Reading	g / 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		
	Research report		Mid-term written essay plan (20%), Written report 6000-7000 words (excluding figures and references) (80%)	100	CLO 1,2,3,4,5		
Course Website	http://mo	odle.hku.hk					
Additional Course Information	and on h	http://moodle.hku.hk 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.					

BIOL3992	Directed	I studies in food & nutritional science (6 credits)	Academic Year	2019				
Offering Department	Biological	Biological Sciences Quota						
Course Co-ordinator	Dr O Hab	Dr O Habimana, Biological Sciences (ohabim@hku.hk)						
Teachers Involved	(All acade	mic staff in Food & Nutritional Science Major, Biological Sciences)						
Course Objectives		se aims to provide a stimulating capstone experience for a fluates to integrate and apply their knowledge and skills obtained f		Science Majo				
Course Contents & Topics	student's commitme course (a methodolo	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 this course, students should be able to:						
Outcomes		acquaint with the process of scientific enquiry						
		have a better understanding of the nature of food & nutritional scie						
		apply scientific methods to address important issues in various bio						
	CLO 4	develop the key intellectual skills that will be valubale for all scient	ific studies					
(and Co-requisites and Impermissible combinations)	This caps The earlie	 X) in the Food & Nutritional Science Major. tone course is for Food & Nutritional Science Major students only. st that a student is allowed to take this capstone course is their ye 	•	`				
Offer in 2019 - 2020	Y 1st	sem 2nd sem Offer in 2020 - 2021 : Y	Examination	No Exam				
Grade Descriptors (A+ to F)	A	Work displaying a high level of scholarship and originality; virtually flawle dissertation topic, showing a thorough grasp of the topic from background readin of the research; comprehensive exploration of the topic, personal synthesis of the comprehensive and up-to-date references integrated into argument or logical reproblems and their solutions and implications; thought-provoking discussions; well-connected and presented logically with clarity of goals, demonstrating exceskills. The length of the dissertation meet the specified requirements. All othe academic standard.	ng and analysis; clear staten le issues with detailed supp asoning; critical evaluations accurate summary. All cha llent organizational, rhetoric	ment of the objective ort from the literature of the main points of pters/paragraphs ar al and presentations				
	В							
	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	Demonstrating superficial or partial or faulty understanding of the fundamental minimum of information, poorly digested and not very well organized in present	concepts of the field of stu					

	Fail	information or ideas, quotations with little acknowledgements an The dissertation topi understanding fundan ideas; unreflective; in acknowledgements or the course. The writter	iments undeveloped or inappropriate or unsupported; lack of clarity or structure in communicat dissertation topic not fully covered; discussion too brief or just repeating the data or findings; over explanation; insufficient support from literature; reading not well incorporated into the text; limit dight bibliography; some major points missed. Minimum conform to an acceptable academic standard ic was not covered acceptably; demonstrating evidence of poor knowledge, clear deficiencies mental concepts; materials largely irrelevant; incomplete or confusing communication of information ncoherent argument; complete misinterpretation of the topic or data; no evidence of reading or bibliography); structure confused or not discernible; Fail to meet most or all of the basic requirement in work is not of an academic standard.					
Course Type	Project-ba	sed course						
Course Teaching	Activities		Details		No. of Hours			
& Learning Activities	Reading / Self study		at least 120 hours on the dissertation	at least 120 hours on the dissertation or project				
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Oral prese	entation	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://moo	dle.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.							

	credits)	tudies in Molecu	lar biology & biotechnology (6	Academic Yea	r 2019	
Offering Department	Biological Sc	iences		Quota		
Course Co-ordinator		ological Sciences (a)	/an8@hku.hk)			
eachers Involved			iology & Biotechnology Major,Biologic	al Sciences)		
Course Objectives	This course aims to provide a stimulating capstone experience for all Molecular Biology & Biotechnology Majoundergraduates to integrate and apply their knowledge and skills obtained from the Major.					
Course Contents	The directed study can be a review of literature on a specific topic, or a lab or field study that enhances			that enhances the		
& Topics	commitment course (avai methodologie	student's understanding of the topic in the field of molecular biology & biotechnology. The student should obtain t 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 are students will gain knowledge through discussion and feedback from their supervisors.				
Course Learning	On successfu	ul completion of this	course, students should be able to:			
Outcomes	CLO 1 acc	quaint with the proce	ss of science			
	CLO 2 hav	e a better understar	nding of the nature of molecular biolog	y & biotechnology		
	CLO 3 app	oly scientific methods	s to address important issues in variou	s biological disciplines		
	CLO 4 develop the key intellectual skills that will be valubale for all scientific studies					
Pre-requisites (and Co-requisites and Impermissible combinations)	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.				olecular Biology 8	
Offer in 2019 - 2020	Y 1st se	m 2nd sem Offer	in 2020 - 2021 : Y	Examination	No Exam	
			late references integrated into argument or logi	cal reasoning: critical evaluation	ns of the main points o	
	B W po	ell-connected and presen cultis. The length of the di- cademic standard. fork showing some evide erspectives or problem so udy; adequate grasp of clude an attempt at critic ferences included; main p	ns and implications; thought-provoking discuss ted logically with clarity of goals, demonstrating ssertation meet the specified requirements. A goiving approaches; demonstrating substantial the topic from background reading and analy all comment or appraisal; regular support provivoints fully elaborated; summary given in the findemonstrating good organizational, rhetorical and the provious fully elaborated; summary given in the findemonstrating good organizational, rhetorical and the provious fully elaborated; summary given in the findemonstrating good organizational, rhetorical and the provious full that the pro	ions; accurate summary. All ch excellent organizational, rhetor Il other aspects of the dissertal enerating and communicating understanding of fundamental c sis; a systematic exploration of ded from the literature; compret al chapter/paragraphs; commun	napters/paragraphs ar- rical and presentationation conform to a high competing arguments concepts of the field of the topic which man nensive and up-to-dat dicating information an	
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	B W property of the control of the c	ell-connected and presen (ills. The length of the di cademic standard. (fork showing some evide erspectives or problem soudy; adequate grasp of clude an attempt at critic eferences included; main eas clearly and fluently, eet the specified requiren fork showing no eviden comprehension of most as points presented in logic terpretation of the topic, napter/paragraphs; most proper/paragraphs; most presented in solic terpretation of the solic.	ns and implications; thought-provoking discuss ted logically with clarity of goals, demonstrating sesertation meet the specified requirements. A sence of originality and insight in identifying, golving approaches; demonstrating substantial the topic from background reading and analyal comment or appraisal; regular support provionits fully elaborated; summany given in the findemonstrating good organizational, rhetorical anents. Most aspects conform to a high academic of originality and insight, but the prese pects of the dissertation topic; essential topic nally sequential paragraphs; reasonably bala some explanation, illustration and support proresentation details met (front page, margin, let	ions; accurate summary. All ch excellent organizational, rhetor Il other aspects of the dissertal enerating and communicating understanding of fundamental c sis; a systematic exploration o ded from the literature; comprel al chapter/paragraphs; commun nd presentational skills. The let c standard intation demonstrated adequat haterials have been read and a unced discussion of the majo wided from the literature; sum glibility, citations correctly report	napters/paragraphs ar rical and presentational tion conform to a high competing arguments concepts of the field of if the topic which man the nestive and up-to-data incating information an night of the dissertation e understanding and cknowledged; the mai or issues; acceptable mary given in the fine	
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	B W py st in red id m C C W CC pp in in cl fe	ell-connected and present (ills. The length of the disademic standard. Vork showing some evide erspectives or problem sides, adequate grasp of clude an attempt at critic afferences included; main pleas clearly and fluently, east the specified requiren fork showing no eviden or specified requiren for showing no eviden or showing no eviden or showing no eviden or showing no eviden or showing resented in logic terpretation of the topic, napter/paragraphs; most a type or grammatical emonstrating superficial dinimum of information, pritical thinking; argument formation or ideas. disseportations with little explications with little explications with little explications with grammatical explications with grammatical explications with little ex	ns and implications; thought-provoking discuss ted logically with clarity of goals, demonstrating sesertation meet the specified requirements. A sence of originality and insight in identifying, golving approaches; demonstrating substantial the topic from background reading and analyal comment or appraisal; regular support proviocints fully elaborated; summary given in the findemonstrating good organizational, rhetorical anents. Most aspects conform to a high academic of originality and insight, but the prese pects of the dissertation topic; essential topic neally sequential paragraphs; reasonably bala some explanation, illustration and support progresentation details met (front page, margin, leg rores; Most aspects conform to an acceptable a propartial or faulty understanding of the fundament o	ions; accurate summary. All che excellent organizational, rhetor il other aspects of the dissertal enerating and communicating understanding of fundamental cosis; a systematic exploration oded from the literature; comprel al chapter/paragraphs; commun nd presentational skills. The let compression of the major of the	napters/paragraphs artical and presentations tition conform to a high tition conform to a high competing arguments concepts of the field of the topic which manensive and up-to-dat hicating information an injust of the dissertation of insues; acceptable mary given in the finate and tabulated, etc. tudy; showing the bar showing no evidence our in communicating a or findings; overus into the text; limite academic standard. clear deficiencies ir atton of information of lence of reading (no	
Course Teaching	B W pp st sin in region in characteristic feet and the cha	ell-connected and presen (ills. The length of the di cademic standard. Fork showing some evide erspectives or problem si udy; adequate grasp of clude an attempt at critic ferences included; main leas clearly and fluently, leet the specified requiren fork showing no eviden omprehension of most as oints presented in logic terpretation of the topic, napter/paragraphs; most the without of the topic, napter/paragraphs; most the without of the topic, napter/paragraphs; most the topic, napter/paragraphs; napter/	ns and implications; thought-provoking discuss ted logically with clarity of goals, demonstrating severation meet the specified requirements. A sence of originality and insight in identifying, golving approaches; demonstrating substantial the topic from background reading and analyal comment or appraisal; regular support provious fully elaborated; summany given in the findemonstrating good organizational, rhetorical anents. Most aspects conform to a high academic of originality and insight, but the prese pects of the dissertation topic; essential topic nally sequential paragraphs; reasonably bala some explanation, illustration and support proresentation details met (front page, margin, legrors; Most aspects conform to an acceptable a propartial or faulty understanding of the fundam for partial or faulty understanding of the fundam forly digested and not very well organized in presentation topic not fully covered; discussion too enaution; insufficient support from literature; int bibliography; some major points missed. Mini as not covered acceptably; demonstrating eli concepts; materials largely irrelevant; inconferent argument; complete misinterpretation or organized in academic standard.	ions; accurate summary. All che excellent organizational, rhetor il other aspects of the dissertal enerating and communicating understanding of fundamental csis; a systematic exploration oded from the literature; comprel al chapter/paragraphs; commun of presentational skills. The let c standard intation demonstrated adequate naterials have been read and a unced discussion of the majowided from the literature; sum gibility, citations correctly reporticademic standard. Iterature is the control of the field of steental concepts of the field of steental concepts of the field of steentation; irrelevant material; stred; lack of clarity or struct, brief or just repeating the dat reading not well incorporated mum conform to an acceptable evidence of poor knowledge, uplete or confusing communicate of the topic or data; no evid; Fail to meet most or all of the	napters/paragraphs ar ical and presentations tion conform to a hig competing arguments soncepts of the field of the topic which manensive and up-to-dat incating information an ingth of the dissertation are understanding and cknowledged; the maior issues; acceptable many given in the finate and tabulated, etc. tudy; showing the bar showing no evidence oure in communicating a or findings; overuse into the text; limited academic standard. clear deficiencies in taiton of information of lence of reading (not basic requirements of the control of	
Course Teaching	B W pp st in in red in in character in in in character in in character in in in in character in	ell-connected and presen (ills. The length of the di cademic standard. Fork showing some evide erspectives or problem si udy; adequate grasp of clude an attempt at critic ferences included; main leas clearly and fluently, leet the specified requiren fork showing no eviden omprehension of most as oints presented in logic terpretation of the topic, napter/paragraphs; most the without of the topic, napter/paragraphs; most the without of the topic, napter/paragraphs; most the topic, napter/paragraphs; napter/	ns and implications; thought-provoking discuss ted logically with clarity of goals, demonstrating sesertation meet the specified requirements. A sence of originality and insight in identifying, golving approaches; demonstrating substantial the topic from background reading and analyal comment or appraisal; regular support proviously all comments and a substantial through the topic from background reading and analyal comment or appraisal; regular support proviously and the substantial good organizational, rhetorical and the substantial good organizational, rhetorical and the substantial good organizational, rhetorical and the substantial good organization and support progressents of the dissertation topic; essential topic in ally sequential paragraphs; reasonably balasome explanation, illustration and support progressentation details met (front page, margin, legerors; Most aspects conform to an acceptable and propriate or unsupport and the substantial progressential or faulty understanding of the fundaminary sundeveloped or inappropriate or unsuppopertation topic not fully covered; discussion too anation; insufficient support from literature; in the bibliography; some major point missed. Ming all concepts; materials largely irrelevant; incomparating the prography); structure confused or not discernible k is not of an academic standard.	ions; accurate summary. All che excellent organizational, rhetor il other aspects of the dissertal enerating and communicating understanding of fundamental csis; a systematic exploration oded from the literature; comprel al chapter/paragraphs; commun of presentational skills. The let c standard intation demonstrated adequate naterials have been read and a unced discussion of the majowided from the literature; sum gibility, citations correctly reporticademic standard. Iterature is the sesentation; irrelevant material; seental concepts of the field of steentation; irrelevant material; steet; lack of clarity or struct, brief or just repeating the dat reading not well incorporated mum conform to an acceptable evidence of poor knowledge, uplete or confusing communicate of the topic or data; no evid; Fail to meet most or all of the	napters/paragraphs ar ical and presentations tion conform to a hig competing arguments concepts of the field of the topic which manensive and up-to-dat inicating information an ingth of the dissertation are understanding and cknowledged; the maior issues; acceptable many given in the fine and tabulated, etc. tudy; showing the barchowing no evidence oure in communicating a or findings; overus into the text; limited academic standard. clear deficiencies in the text of information of ence of reading (not basic requirements of	
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	B W pp st sin in region in characteristic feet and the cha	ell-connected and presen (ills. The length of the di cademic standard. Fork showing some evide erspectives or problem si udy; adequate grasp of clude an attempt at critic ferences included; main leas clearly and fluently, leet the specified requiren fork showing no eviden omprehension of most as oints presented in logic terpretation of the topic, napter/paragraphs; most the without of the topic, napter/paragraphs; most the without of the topic, napter/paragraphs; most the topic, napter/paragraphs; napter/	ns and implications; thought-provoking discuss ted logically with clarity of goals, demonstrating severation meet the specified requirements. A sence of originality and insight in identifying, golving approaches; demonstrating substantial the topic from background reading and analyal comment or appraisal; regular support provious fully elaborated; summany given in the findemonstrating good organizational, rhetorical anents. Most aspects conform to a high academic of originality and insight, but the prese pects of the dissertation topic; essential topic nally sequential paragraphs; reasonably bala some explanation, illustration and support proresentation details met (front page, margin, legrors; Most aspects conform to an acceptable a propartial or faulty understanding of the fundam for partial or faulty understanding of the fundam forly digested and not very well organized in presentation topic not fully covered; discussion too enaution; insufficient support from literature; int bibliography; some major points missed. Mini as not covered acceptably; demonstrating eli concepts; materials largely irrelevant; inconferent argument; complete misinterpretation or organized in academic standard.	ions; accurate summary. All che excellent organizational, rhetor il other aspects of the dissertal enerating and communicating understanding of fundamental csis; a systematic exploration oded from the literature; comprel al chapter/paragraphs; commun of presentational skills. The let c standard intation demonstrated adequate naterials have been read and a unced discussion of the majowided from the literature; sum gibility, citations correctly reporticademic standard. Iterature is the sesentation; irrelevant material; seental concepts of the field of steentation; irrelevant material; steet; lack of clarity or struct, brief or just repeating the dat reading not well incorporated mum conform to an acceptable evidence of poor knowledge, uplete or confusing communicate of the topic or data; no evid; Fail to meet most or all of the	napters/paragraphs are ical and presentations tion conform to a high competing arguments soncepts of the field of the topic which may nensive and up-to-data incating information and the discating information is used. It is a support of the discating in the final and tabulated, etc.; tudy; showing the bare showing no evidence oure in communicating a or findings; overuse into the text; limited academic standard. It is a clear deficiencies in the discating of information of ence of reading (not basic requirements of the discating of information of the discating of information of the discating of the disc	

	Research report	Written report 6000-8000 words (excluding figures and references).	80	CLO 1,2,3,4
Course Website	http://moodle.hku.hk/			
Additional Course Information		n the supervisor and student. Guidance from the rite scientifically. Students should spend at least ay be assigned.	•	, ,

BIOL3994	Directe	d studies in biologic	cal sciences (6 credits)	Academic Year	2019
Offering Department	Biologica	al Sciences		Quota	
Course Co-ordinator	Dr S Can	nicci, Biological Science	es (cannicci@hkuk.hk)		
Teachers Involved	(All acad	emic staff in Biological S	sciences Major,Biological Sciences)		
Course Objectives		•	mulating capstone experience for all E	iological 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 th student's understanding of the topic in the field of biological sciences. The student should obtain the commitment a supervisor in the area of the dissertation topic before submitting the registration form for the course (availab 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 an students will gain knowledge through discussion and feedback from their supervisors.				
Course Learning			course, students should be able to:		
Outcomes	CLO 1	acquaint with the proce			
	CLO 2		nding of the nature of biological science		
	CLO 3		s to address important issues in variou		
	_		tual skills that will be valuable for all so		(510/ 510/
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in at least 24 credits of advanced level disciplinary core/elective biological sciences courses (BIOL3XXX 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.				ses (BIOL3XXX o
Offer in 2019 - 2020		t sem 2nd sem Offer	•	Examination	No Exam
Grade Descriptors	Α	Work displaying a high le	evel of scholarship and originality; virtually	flawless presentation with exc	ellent introduction to
(A+ to F)	B C D	dissertation topic, showing a thorough grasp of the topic from background reading and analysis; clear statement of the object of the research; comprehensive exploration of the topic, personal synthesis of the issues with detailed support from the literat comprehensive and up-to-date references integrated into argument or logical reasoning; critical evaluations of the main point problems and their solutions and implications; thought-provoking discussions; accurate summary. All chapters/paragraphs well-connected and presented logically with clarity of goals, demonstrating excellent organizational, rhetorical and presentations skills. The length of the dissertation meet the specified requirements. All other aspects of the dissertation conform to a lacademic standard. B Work showing some evidence of originality and insight in identifying, generating and communicating competing argume perspectives or problem solving approaches; demonstrating substantial understanding of fundamental concepts of the field study; adequate grasp of the topic from background reading and analysis; a systematic exploration of the topic which rinclude an attempt at critical comment or appraisal; regular support provided from the literature; comprehensive and up-to-creferences included; main points fully elaborated; summary given in the final chapter/paragraphs; communicating information ideas clearly and fluently, demonstrating good organizational, rhetorical and presentational skills. The length of the dissertation elect the specified requirements. Most aspects conform to a high academic standard. C Work showing no evidence of originality and insight, but the presentation demonstrated adequate understanding a comprehension of most aspects of the dissertation topic; essential topic materials have been read and acknowledged; then points presented in logically sequential paragraphs; reasonably balanced discussion of the major issues; accepta interpretation of the topic, some explanation, illustration and support provided from the literature			
Course Type	Project-based course				
Course Teaching	Activities		Details		No. of Hours
Learning Activities	Reading	/ Self study	at least 120 hours on the dissertatio	n or project	120
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin
	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.hk/				
Additional Course Information	Regular meetings between the supervisor and student. Guidance from the supervisor on the scientific method 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.				

BIOL4201	Public health nutrition (6 credits)	Academic Year	2019
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 preventing disease and improving human health through programs aimed at enhancing good nutritional practices. This course presents a broad overview of the professional practice and essential skills required of a public health nutritionist.		
Course Contents & Topics	Public health nutrition: overview, nature and identification of problems, object epidemiological study of diet: disease associations. Development of dieta		

Additional Course	This cours	se will be offered subject	to a minimum enrollment number	http://moodle.hku.hk/ This course will be offered subject to a minimum enrollment number and availability of teachers.						
online materials	,	,,g, 10a.	J, (—)							
•		y, BM Margetts, JM Kear	· · · · · · · · · · · · · · · · · · ·	T)						
			□ on Society Textbook Series, 200		OLO 1,2,3,4					
	Examinat			70	CLO 3 CLO 1,2,3,4					
	Assignme	ante		30	to CLO Mapping					
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods					
		/ Self study			90					
	Laborato	,			24					
-	Lectures				36					
	Activities	S	Details		No. of Hours					
		ith laboratory component								
	Fail	or no grasp of the knowledge thinking. Show very little or r effective or ineffective. Apply results and/or unable to draw	ge and understanding of the subject. Less ability to apply knowledge to solve programming the subjective or ineffective labors appropriate conclusions. Organization	ack of analytical and critical abiliti oblems. Organization and presenta ratory / fieldwork skills and techniq	es, logical and coherer tional skills are minimall ues. Misuse of data an					
	Fail	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 and skills required for attaining the course learning outcomes. Little								
	D	results 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. Partial but limited grasp of the subject, retention of some relevant information of the subject. 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 / fieldwork skills and								
	С	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. General but incomplete grasp of the subject. 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 laboratory / fieldwork skills and techniques. Mostly correct but some erroneous use of data and								
	В	Demonstrate substantial cor learning outcomes. Substantial ability to apply knowledge to	nmand of a broad range of knowledge tial grasp of the subject. Show evidenc o familiar and some unfamiliar situation eldwork skills and techniques. Correct u	and skills required for attaining at e of analytical and critical abilities ns. Apply effective organizational	least most of the cours and logical thinking, an and presentational skills					
Grade Descriptors (A+ to F)	Α	learning outcomes. Thorough of original thought, and abili effective organizational and	tery at an advanced level of extensive h grasp of the subject. Show strong ana ty to apply knowledge to a wide range presentational skills. Apply highly effect ropriate and insightful conclusions. Appl	lytical and critical abilities and logic of complex, familiar and unfamilia ive laboratory/fieldwork skills and to	al thinking, with evidend r situations. Apply high echniques. Critical use					
		d sem Offer in 2020 - 20		Examination	May					
and Co-requisites and Impermissible combinations)	I doo iii diolozo i di diolozoz									
Pre-requisites	outcomes Pass in BIOL3201 or BIOL3202									
	CLO 3 be able to formulate recommendations for action for nutritional interventions at the community level CLO 4 understand the impact of socio-cultural factors on community food choices and consequently on health									
		ss-developed and develo e able to formulate recom	•	onal interventions at the com	munity level					
			derstanding of a range of select	ed examples of public heal	th nutrition cases in					
	CLO 1 have a broad knowledge of the scope and methodologies of public health nutrition									
	On successful completion of this course, students should be able to:									
Course Learning	On succe	aafiil aamamlatiam af thia a	consequences, and elimination of vitamin and mineral deficiencies. Disease prevention. Educating healthy eating and food safety.							

BIOL4202	Nutrition and sports performance (6 credits) Academic Yea							
Offering Department	Biological Sciences Quota 30							
Course Co-ordinator	Dr T Sc	oko, Biological Sciences (tsobko@hku.hk)						
Teachers Involved	(Dr T S	bko,School of Biological Sciences)						
Course Objectives	in-depth function suppler	onstrate evidence-based links between nutrition, understanding about how the metabolic dem is and exercise performance. To focus on the role tents and hydration in sustaining and enhancing ce exercise.	ands of exercise influe of major macronutrient	ence physiologic ts, minerals, vitam	al and cognitive iins, antioxidants			
Course Contents & Topics	adaptat perform Commit (Maugh and/or I vary be and and macron athletes	aims and requirements differ during habituations to developing metabolic efficiency to correct through appropriate nutrition, following tee: "The amount, composition and timing of an et al, 2004). The course will firstly examine the abitual exercise to perform at its best. Secondly, ween different athlete groups, the difference between different athlete groups, the difference between the erobic exercise. Putting exercise and sports perform trients; selected micronutrients; fluid balance at a sport foods and supplements; position stands and the exercise and sports, ergogenic aids and the exercise and sports.	mpetition nutrition. Pro the recommendations food intake can profothe physiological needs it will investigate how an ween energy metabolism formance in focus, the total and hydration strategies and new perspectives of	fessional athletes s of the Interna undly affect spor pre-, during and nd why nutrient ai m and requiremer topics will include s; weight loss an	s enhance their ational Olympic ts performance" post-competitior nd energy intakes its during aerobic energy balance d weight gain in			
Course Learning	On succ	essful 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							
		describe the impact of dietary macronutrients, vita						
	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.							

		ccess and analyze the erformance in different s	e importance of meal frequency, en	ergy source and supp	lements on the			
	CLO 5 demonstrate convincing argument for importance of balanced nutrition for sports performance and good health.							
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Bl							
Offer in 2019 - 2020	N Offe	Examination						
Grade Descriptors (A+ to F)	A	evidence of creative ability techniques and analysis of	p of the subject matter covered. Show strong an and competence in professional-level problem s data and results to draw appropriate and insight organizational and presentational skills.	solving. Critically use quality m	nanagement skills and			
	В	thinking with some evidence	rasp of the subject matter covered. Show evide of competence in professional-level problem so soults to draw generally appropriate conclusions resentational skills	lving. Use quality managemen	t skills and techniques			
	С	and logical thinking with lim and analysis of data and re	complete grasp of the subject matter covered. Sited competence in professional-level problem so seults to draw moderately appropriate but somet fective team-based organizational and presentative.	olving. Use quality managemen imes erroneous conclusions to	t skills and techniques			
	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 erroneou conclusions to real-world problems. Demonstrate team-based organizational and presentational skills of limited effectiveness.						
	Fail							
Course Type	Lecture-ba	ased course						
Course Teaching	Activities	3	Details	No. of				
& Learning Activities	Lectures		with practicals	36				
	Tutorials				10			
	Discussio	n		20				
	Reading /	Self study		50				
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignments		Tutorial assessment (40%); Group project and presentation (50%) and Critical review (10%)		CLO 1,2			
Required/recommended reading and online materials	book and Sport Nu (2004)Sports an	journal resources in HK trition. An introduction and Exercise Nutrition. W	be provided on Moodle or given durin	ce. Asker Jeukedrup &				
Course Website		dle.hku.hk	, , , , , , , , , , , , , , , , , , , ,					
Additional Course Information			t to a minimum enrollment number and	availability of teachers.				

BIOL4204	Diet, brain function and behavior (6 credits) Academic Year								
Offering Department	Biological Sciences Quota 30								
Course Co-ordinator	Dr E T S L	i, Biological Sciences (etsli@hku.hk)							
Teachers Involved	١,	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		ntals of the central nervous system; Nutrition & brain development; Diet, learning NS stimulants; Neurotransmitters, drugs & behaviour; Physiological and socio-culti haviour.	,						
Course Learning	On succes	ssful completion of this course, students should be able to:							
Outcomes	CLO 1 ur	nderstand the basic structure and functions of the brain and how nutrition influences i	s development						
	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 cr	itically evaluate and interpret the internal and external cues that determine dietary be	haviour						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Bl	OL3204, or already enrolled in this course							
Offer in 2019 - 2020	N Offe	er in 2020 - 2021 : N Examination							
Grade Descriptors (A+ to F)	A	Demonstrate thorough grasp of the subject matter covered. Show exceptional ability on knowled identification and solving. Show outstanding ability to critically analyze and interpret scientific data conclusions. Demonstrate highly effective presentation / writing skills.	a and draw appropriate						
	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 general but incomplete grasp of the subject matter covered. Might show misunderstandir some ability on knowledge integration, problem identification and solving. Show some ability to analyze data and draw proper conclusions. Demonstrate adequate organization / writing skills.							
	D	Demonstrate partial but limited grasp, with retention of some relevant information, of the si Misunderstanding of the materials is not uncommon. Show limited ability on knowledge integration, p solving. Use elementary approaches to analyze and interpret scientific data and draw sometimes Demonstrate basic organization / writing skills.	roblem identification and						

	Fail	and logical thinking, and r	ninimal competence in prob	elevant information, of the subject matter covere lem solving. Fail to integrate information and ide ta and draw conclusions. Demonstrate poor orgar	entify problems. Seriously			
Course Type	Lecture-based course							
Course Teaching	Activities	5	Details		No. of Hours			
& Learning Activities	Lectures				36			
	Tutorials		tutorials/group discu	issions/seminars	12			
	Project w	ork	oral presentation		12			
	Reading	/ Self study			100			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignments			20	CLO 1,2,4			
	Examination		60		CLO 1,2,3,4			
	Presenta	tion		20	CLO 2,4			
Required/recommended reading and online materials	2003 Lieberma Nutritiona Physiolog Appetite (Copper J. R., Bloom F. E. & Roth R. H.: The Biochemical Basis of Neuropharmacology. Oxford 003 ieberman H. R., Kanarek R. B. & Prasad C.: Nutritional Neuroscience. CRC Press, 2005 lutritional Neuroscience (Journal) Physiology and Behavior (Journal) uppetite (Journal) uppetite (Journal) ournal of Nutritional Biochemistry (Journal)						
Course Website	http://mod	dle.hku.hk/						
Additional Course Information	This cours	se will be offered subject	ct to a minimum enrollr	ment number and availability of teachers	S.			

BIOL4205	Food technology (6 credits) Academic Year 2019								
Offering Department	Biological Sciences Quota 30								
Course Co-ordinator	Prof N P Shah, Biological Sciences (npshah@hku.hk)								
Teachers Involved	(Prof N P Shah,Biological Sciences)								
Course Objectives	To provide students with basic principles and methodologies of food processing and preservation technology. T cover key engineering principles relevant to the food industry. Students will gain hands-on experience with selecte food processing and preservation techniques.								
Course Contents & Topics	Food pro properties production equipmen 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 nutritious 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 succes	ssful completion of thi	s course, students should be able	e to:					
Outcomes	CLO 1 ur	nderstand basic princi	ples of food processing methods	and preservation technology					
	CLO 2 be	able to apply their kr	nowledge and practical skills to pr	ocess and develop food produ	ıcts				
		emonstrate in-depth reservation	understanding of selected me	thods and problems in foo	d processing and				
Pre-requisites and Co-requisites and Impermissible combinations)		IOL3201 or BIOL3209							
Offer in 2019 - 2020	Y 2nd	sem Offer in 2020	- 2021 · Y	Examination	May				
Grade Descriptors (A+ to F)	A	Demonstrate thorough grasp of the subject matter covered. Show strong evidence of analytical and critic changes that take place in variety of food during preparation, processing and storage. Identifies and uses advand equipment for a variety of food-specific purposes. Demonstrates advance skills in designing, producin solutions of excellent quality for specific food purposes. Critically use lab skills and techniques and analysis of draw appropriate and insightful conclusions.							
	В	Demonstrate substantial grasp of the subject matter covered. Show evidence of analytical and critical abilities of that take place in variety of food during preparation, processing and storage, Identifies and uses techniques and equivariety of food-specific purposes. Demonstrates high-level skills in designing, producing and evaluating solutions of for specific food purposes. Use lab skills and techniques and analysis of data and results to draw generally conclusions.							
	C Demonstrate general but incomplete grasp of the subject matter covered. Show adequate evidence of analytical and critica abilities and logical thinking of the changes that take place in variety of food during preparation, processing and storage Identifies and uses appropriate techniques and equipment for a variety of food-specific purposes. Demonstrates adequate skill in designing, producing and evaluating solutions of sound quality for specific food purposes. Use lab skills and techniques an analysis of data and results to draw moderately appropriate conclusions.								
	D	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject matter covered. Show son evidence of coherent and logical thinking of the changes that take place in variety of food during preparation, processing at storage. Identifies and uses basic techniques and equipment for a variety of food-specific purposes. Demonstrates basic skills designing, producing and evaluating solutions for specific food purposes. Use lab skills and techniques and analysis of data at results to draw appropriate conclusions occasionally.							
	Fail	and logical thinking of he guidance factors and us guidance, demonstrates	asp, with retention of little relevant information, of the subject matter covered. Show lack of cohere changes that take place in variety of food during preparation, processing and storage. Identifies we some appropriate techniques and equipment for a limited range of food-specific purposes. Winited skills in designing, producing and evaluating solutions for specific food purposes. Use lab skills of data and results ineffectively, leading generally to inappropriate and usually erroneous						
Course Type	Lecture w	ith laboratory compon	ent course						
Course Teaching	Activities	3	Details		No. of Hours				
Learning Activities	Lectures				24				
	Laborator	У	laboratory/field trip/seminar		24				
	Tutorials				6				
	Reading /	Self study			100				
Assessment Methods and Weighting	Methods	Assessment Methods							

	Examination		80	CLO 1,2,3
	Laboratory reports	Laboratory & research reports	20	CLO 2,3
Required/recommended reading and online materials	Food Processing Technology-Prin Unit Operations in Food Processi	nciples & Practice 3rd Ed P.J. Fellow ng - 2nd ed. R.L. Earle	S	
Course Website	http://moodle.hku.hk/			
Additional Course Information	This course will be offered subject	et to a minimum enrollment number a	nd availability of teacher	rs.

BIOL4207	Meat an	r 2019						
Offering Department	Biological	Sciences	Quota	50				
Course Co-ordinator	Prof N P Shah, Biological Sciences (npshah@hku.hk)							
Teachers Involved		•						
Course Objectives	To give st	tudents a broad understa	anding of modern practice	and technologies used in meat an	d dairy production			
	processin	g and marketing.						
Course Contents	Principles	of animal nutrition and	feed formulation; genetic se	election and breeding of farm anin	nals; slaughter an			
& Topics				ry quality of meat. Dairy proces				
	fermented	d products such as chees	se and yogurt; probiotics and	d health effects. Meat and dairy pro	oduct marketing.			
Course Learning	On succes	ssful completion of this c	ourse, students should be a	able to:				
Outcomes			ces in meat and dairy produ					
		9	· ·	and dairy sensory quality, and the	technologies use			
			n or improvement of meat a	, ·				
	CLO 3 de	emonstrate knowledge of	f selected issues related to r	meat and dairy safety				
Pre-requisites	Pass in BI	IOL3201						
and Co-requisites								
and Impermissible								
ombinations)								
Offer in 2019 - 2020	N Off	er in 2020 - 2021 : N		Examination				
Grade Descriptors	Α			how strong analytical and critical abilities a				
(A+ to F)				evel problem solving. Critically use lab ski				
		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	B Demonstrate substantial grasp of the subject matter covered. Show evidence of analytical and critical abilities and log						
		thinking with some evidence of competence in professional-level problem solving. Use lab skills and techniques and analysis						
	data and results to draw generally appropriate conclusions to real-world problems. Demonstrate effective team-based organizational and presentational skills.							
	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 lab skills and techniques and analysis o						
	data and results to draw moderately appropriate but sometimes erroneous conclusions to real-world problems. Demonstrate							
	D	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-work problems. Demonstrate team-based organizational and presentational skills of limited effectiveness.							
				times appropriate but often erroneous cor	ng. Use lab skills and			
	Fail	problems. Demonstrate tean	n-based organizational and presen	times appropriate but often erroneous cor	ng. Use lab skills and nclusions to real-work			
	Fail	problems. Demonstrate tean Demonstrate little or no grad and logical thinking, and min	n-based organizational and presen sp, with retention of little relevant i himal competence in professional-le	times appropriate but often erroneous contational skills of limited effectiveness. information, of the subject matter covered. evel problem solving. Use lab skills and tec	ing. Use lab skills and notusions to real-work Show lack of coherer hniques and analysis of sections.			
	Fail	problems. Demonstrate tean Demonstrate little or no gras and logical thinking, and min data and results ineffective	n-based organizational and presen sp, with retention of little relevant i nimal competence in professional-le ly, leading generally to inappropr	times appropriate but often erroneous contational skills of limited effectiveness. information, of the subject matter covered. evel problem solving. Use lab skills and tecriate and usually erroneous conclusions to	ing. Use lab skills and notusions to real-work Show lack of coherer hniques and analysis of sections.			
Course Type		problems. Demonstrate tean Demonstrate little or no gras and logical thinking, and min data and results ineffective Demonstrate ineffectiveness	n-based organizational and presen sp, with retention of little relevant i ilmal competence in professional-le ly, leading generally to inappropr team-based organizational and pr	times appropriate but often erroneous contational skills of limited effectiveness. information, of the subject matter covered. evel problem solving. Use lab skills and tecriate and usually erroneous conclusions to	ing. Use lab skills and notusions to real-work Show lack of coherer hniques and analysis of sections.			
	Lecture w	problems. Demonstrate tean Demonstrate little or no gra and logical thinking, and min data and results ineffective Demonstrate ineffectiveness rith laboratory componen	n-based organizational and presen sp, with retention of little relevant imal competence in professional-le ly, leading generally to inappropr team-based organizational and pr t course	times appropriate but often erroneous contational skills of limited effectiveness. information, of the subject matter covered. evel problem solving. Use lab skills and tecriate and usually erroneous conclusions to	ng. Use lab skills an- nclusions to real-world Show lack of coherer hniques and analysis o real-world problems			
ourse Teaching	Lecture w	problems. Demonstrate tean Demonstrate little or no gra and logical thinking, and min data and results ineffective Demonstrate ineffectiveness rith laboratory componen	n-based organizational and presen sp, with retention of little relevant i ilmal competence in professional-le ly, leading generally to inappropr team-based organizational and pr	times appropriate but often erroneous contational skills of limited effectiveness. information, of the subject matter covered. evel problem solving. Use lab skills and tecriate and usually erroneous conclusions to	ng. Use lab skills annolusions to real-work Show lack of coherer hniques and analysis o o real-world problems No. of Hours			
Course Teaching	Lecture w Activities Lectures	problems. Demonstrate tean Demonstrate little or no gra- and logical thinking, and min data and results ineffective Demonstrate ineffectiveness rith laboratory componen	n-based organizational and presen sp, with retention of little relevant imal competence in professional-le ly, leading generally to inappropr team-based organizational and pr t course	times appropriate but often erroneous contational skills of limited effectiveness. information, of the subject matter covered. evel problem solving. Use lab skills and tecriate and usually erroneous conclusions to	ng. Use lab skills annoclusions to real-world Show lack of coherer hiniques and analysis or eal-world problems No. of Hours 24			
Course Teaching	Lecture w Activities Lectures Laborator	problems. Demonstrate tean Demonstrate little or no gra- and logical thinking, and min data and results ineffective Demonstrate ineffectiveness rith laboratory componen	n-based organizational and presen sp, with retention of little relevant imal competence in professional-le ly, leading generally to inappropr team-based organizational and pr t course	times appropriate but often erroneous contational skills of limited effectiveness. information, of the subject matter covered. evel problem solving. Use lab skills and tecriate and usually erroneous conclusions to	ng. Use lab skills annoclusions to real-work Show lack of coherer hniques and analysis o o real-world problems No. of Hours 24 24			
Course Teaching	Lecture w Activities Lectures Laborator Tutorials	problems. Demonstrate tean Demonstrate little or no gra: and logical thinking, and min data and results ineffective Demonstrate ineffectiveness rith laboratory componen s	n-based organizational and presen sp, with retention of little relevant imal competence in professional-le ly, leading generally to inappropr team-based organizational and pr t course	times appropriate but often erroneous contational skills of limited effectiveness. information, of the subject matter covered. evel problem solving. Use lab skills and tecriate and usually erroneous conclusions to	ng. Use lab skills annoclusions to real-work Show lack of coherer hniques and analysis o o real-world problems No. of Hours 24 24 6			
Course Teaching & Learning Activities	Lecture w Activities Lectures Laborator Tutorials Reading	problems. Demonstrate tean Demonstrate little or no gra and logical thinking, and min data and results ineffective Demonstrate ineffectiveness rith laboratory componen s	n-based organizational and presen sp, with retention of little relevant isimal competence in professional-le ly, leading generally to inappropreteam-based organizational and preference to the course Details	times appropriate but often erroneous contational skills of limited effectiveness. Information, of the subject matter covered, evel problem solving. Use lab skills and tecriate and usually erroneous conclusions tresentational skills.	ng. Use lab skills annoclusions to real-work Show lack of coherer hniques and analysis o o real-world problems No. of Hours 24 24 6 100			
Course Teaching Learning Activities Assessment Methods	Lecture w Activities Lectures Laborator Tutorials	problems. Demonstrate tean Demonstrate little or no gra and logical thinking, and min data and results ineffective Demonstrate ineffectiveness rith laboratory componen s	n-based organizational and presen sp, with retention of little relevant imal competence in professional-le ly, leading generally to inappropr team-based organizational and pr t course	times appropriate but often erroneous contational skills of limited effectiveness. information, of the subject matter covered. evel problem solving. Use lab skills and tecriate and usually erroneous conclusions tresentational skills. Weighting in final	ng. Use lab skills an nclusions to real-worl Show lack of coherenthiques and analysis or eal-world problems No. of Hours 24 24 6 100 Assessment			
Course Teaching Learning Activities Assessment Methods	Lecture w Activities Lectures Laborator Tutorials Reading	problems. Demonstrate tean Demonstrate little or no gra and logical thinking, and min data and results ineffective Demonstrate ineffectiveness rith laboratory componen s	n-based organizational and presen sp, with retention of little relevant isimal competence in professional-le ly, leading generally to inappropreteam-based organizational and preference to the course Details	times appropriate but often erroneous contational skills of limited effectiveness. Information, of the subject matter covered, evel problem solving. Use lab skills and tecriate and usually erroneous conclusions tresentational skills.	ng. Use lab skills annoclusions to real-work Show lack of coherer hniques and analysis to real-world problems No. of Hours 24 24 6 100 Assessment Methods			
Course Teaching Learning Activities Assessment Methods	Lecture w Activities Lectures Laborator Tutorials Reading Methods	problems. Demonstrate tean Demonstrate little or no gra- and logical thinking, and mir data and results ineffective Demonstrate ineffectiveness rith laboratory componen s ry / Self study	n-based organizational and presen sp, with retention of little relevant isimal competence in professional-le ly, leading generally to inappropreteam-based organizational and preference to the course Details	imes appropriate but often erroneous contational skills of limited effectiveness. information, of the subject matter covered, evel problem solving. Use lab skills and tecriate and usually erroneous conclusions tresentational skills. Weighting in final course grade (%)	ng. Use lab skills an nclusions to real-work Show lack of coherer hinques and analysis to real-world problems No. of Hours 24 24 6 100 Assessment Methods to CLO Mapping			
Course Teaching Learning Activities Assessment Methods	Lecture w Activities Lectures Laborator Tutorials Reading Methods	problems. Demonstrate tean Demonstrate little or no gra- and logical thinking, and mir data and results ineffective Demonstrate ineffectiveness rith laboratory componen s ry / Self study ition	n-based organizational and presen sp, with retention of little relevant isimal competence in professional-le ly, leading generally to inappropreteam-based organizational and preference to the course Details	imes appropriate but often erroneous contational skills of limited effectiveness. information, of the subject matter covered, evel problem solving. Use lab skills and tecriate and usually erroneous conclusions tresentational skills. Weighting in final course grade (%)	ng. Use lab skills annoclusions to real-work Show lack of coherer Iniques and analysis of o real-world problems No. of Hours 24 24 6 100 Assessment Methods to CLO Mapping CLO 1,2,3			
Course Type Course Teaching Learning Activities Assessment Methods and Weighting	Lecture w Activities Lectures Laborator Tutorials Reading / Methods Examinat Laborator	problems. Demonstrate tean Demonstrate little or no gra- and logical thinking, and min data and results ineffective Demonstrate ineffectiveness rith laboratory componen s ry / Self study ition ry reports	n-based organizational and presen sp, with retention of little relevant is immal competence in professional-ly, leading generally to inapproprise team-based organizational and professional seam-based organizational and professional seam-based professional seam-based professional seam-based organizational and professional seam-based organizational and professional seam-based organizational and professional seam-based organizational	imes appropriate but often erroneous contational skills of limited effectiveness. information, of the subject matter covered, evel problem solving. Use lab skills and tecriate and usually erroneous conclusions tresentational skills. Weighting in final course grade (%)	ng. Use lab skills an nclusions to real-work Show lack of coherer hinques and analysis to real-world problems No. of Hours 24 24 6 100 Assessment Methods to CLO Mapping			
Course Teaching Learning Activities Assessment Methods and Weighting Required/recommended	Lecture w Activities Lectures Laborator Tutorials Reading Methods Examinat Laborator Lawrie's M	problems. Demonstrate tean Demonstrate little or no gra- and logical thinking, and min data and results ineffective Demonstrate ineffectiveness rith laboratory componen s ry / Self study ition ry reports Meat Science. RA Lawrie	n-based organizational and presen sp, with retention of little relevant is immal competence in professional-ly, leading generally to inappropristeam-based organizational and professional statement of the course Details Details (CRC Press, 2006)	weighting in final course grade (%) Weighting in final course grade (%) Weighting in final course grade (%)	ng. Use lab skills an nclusions to real-work Show lack of coherer hriques and analysis to real-world problems No. of Hours 24 24 6 100 Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2			
Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended reading and	Lecture w Activities Lectures Laborator Tutorials Reading Methods Examinat Laborator Lawrie's M	problems. Demonstrate tean Demonstrate little or no gra- and logical thinking, and min data and results ineffective Demonstrate ineffectiveness rith laboratory componen s ry / Self study ition ry reports Meat Science. RA Lawrie	n-based organizational and presen sp, with retention of little relevant is immal competence in professional-ly, leading generally to inappropristeam-based organizational and professional statement of the course Details Details (CRC Press, 2006)	imes appropriate but often erroneous contational skills of limited effectiveness. information, of the subject matter covered, evel problem solving. Use lab skills and tecriate and usually erroneous conclusions tresentational skills. Weighting in final course grade (%)	ng. Use lab skills an nclusions to real-work Show lack of coherer hriques and analysis to real-world problems No. of Hours 24 24 6 100 Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2			
Course Teaching Learning Activities Assessment Methods and Weighting Required/recommended eading and online materials	Lecture w Activities Lectures Laborator Tutorials Reading Methods Examinat Laborator Lawrie's M Dairy Proces	problems. Demonstrate tean Demonstrate little or no gra- and logical thinking, and mir data and results ineffective Demonstrate ineffectiveness rith laboratory componen s ry / Self study tion ry reports Meat Science. RA Lawrie cessing and Quality Assu	n-based organizational and presen sp, with retention of little relevant is immal competence in professional-ly, leading generally to inappropristeam-based organizational and professional statement of the course Details Details (CRC Press, 2006)	weighting in final course grade (%) Weighting in final course grade (%) Weighting in final course grade (%)	ng. Use lab skills an nclusions to real-work Show lack of coherer hriques and analysis to real-world problems No. of Hours 24 24 6 100 Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2			
Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended eading and online materials Course Website	Lecture w Activities Lectures Laborator Tutorials Reading / Methods Examinat Laborator Lawrie's M Dairy Proc	problems. Demonstrate tean Demonstrate little or no gra- and logical thinking, and min data and results ineffective Demonstrate ineffectiveness rith laboratory componen s ry / Self study tion ry reports Meat Science. RA Lawrie cessing and Quality Assu	n-based organizational and presen sp, with retention of little relevant is immal competence in professional-lely, leading generally to inapproprise team-based organizational and professional structures. Details Details (CRC Press, 2006) Jurance, RC Chandan, A Kilanance, RC Chandan, A Kilanan	weighting in final course grade (%) Weighting in final course grade (%) Weighting in final course grade (%) 80 20 ara, N Shah (Eds) (Blackwell, 2008)	ng. Use lab skills an aclusions to real-work Show lack of coherer hingues and analysis to real-world problems No. of Hours 24 24 6 100 Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2			
course Teaching Learning Activities Assessment Methods and Weighting Required/recommended eading and online materials	Lecture w Activities Lectures Laborator Tutorials Reading / Methods Examinat Laborator Lawrie's M Dairy Proc	problems. Demonstrate tean Demonstrate little or no gra- and logical thinking, and min data and results ineffective Demonstrate ineffectiveness rith laboratory componen s ry / Self study tion ry reports Meat Science. RA Lawrie cessing and Quality Assu	n-based organizational and presen sp, with retention of little relevant is immal competence in professional-lely, leading generally to inapproprise team-based organizational and professional structures. Details Details (CRC Press, 2006) Jurance, RC Chandan, A Kilanance, RC Chandan, A Kilanan	weighting in final course grade (%) Weighting in final course grade (%) Weighting in final course grade (%)	ng. Use lab skills an anclusions to real-worl real-worl Show lack of cohere thiques and analysis or real-world problems No. of Hours 24 24 6 100 Assessment Methods to CLO Mappin CLO 1,2,3 CLO 1,2			

BIOL4208	Meat, dairy and grain sciences (6 credits) Academic Year 2019							
Offering Department	Biological Sciences Quota 15							
Course Co-ordinator	Prof N P Shah, Biological Scie	nces (npshah@hku.hk)						
Teachers Involved	(Dr J C Y Lee,School of Biological Science) (Prof N P Shah,School of Biological Science)							
Course Objectives	To give students a broad unde meat, dairy and grain production	erstanding of modern practice and technologies on, processing and marketing.	used in agriculture բ	products including				
Course Contents & Topics	carcass inspection; meat prefermented products such as c	and feed formulation; genetic selection and bree eservation and safety; sensory quality of me heese and yogurt; probiotics and health effects ocess and quality. Meat, dairy and grain product	eat. Dairy processi s. Grain production	ng emphasizing				
Course Learning	On successful completion of this course, students should be able to:							
Outcomes	CLO 1 understand modern practices in meat, dairy and grain production							
	CLO 2 demonstrate a knowledge and understanding of meat and dairy sensory quality, and the technologies used in processing, preservation or improvement of meat and dairy products							
	CLO 3 demonstrate knowledge of selected issues related to meat and dairy safety							

			logy behind the production					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BIOL3201 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							
Offer in 2019 - 2020	N Offe	er in 2020 - 2021 : N			Examination			
Grade Descriptors (A+ to F)	Α	evidence of creative ab analysis of data and res	grasp of the subject matter covere illity and competence in professio sults to draw appropriate and insignal and presentational skills.	nal-level problem solving. C	ritically use lab sk	tills and techniques and		
	В	thinking with some evided data and results to do organizational and prese		al-level problem solving. Use usions to real-world proble	e lab skills and ted ms. Demonstrate	chniques and analysis of effective team-based		
	С	and logical thinking with data and results to dra	It incomplete grasp of the subject in limited competence in profession w moderately appropriate but so im-based organizational and prese	nal-level problem solving. Use metimes erroneous conclusi	e lab skills and ted	hniques and analysis of		
	D	evidence of coherent a techniques and analysi	limited grasp, with retention of s and logical thinking, but lacking of s of data and results to draw so team-based organizational and pr	competence in professional-lometimes appropriate but o	evel problem solv ften erroneous co	ring. Use lab skills 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 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.							
Course Type	Lecture wi	ith laboratory compor	nent course					
Course Teaching	Activities	<u> </u>	Details No. of Hou					
& Learning Activities	Lectures			24				
	Laborator	У				24		
	Reading /	Self study			100			
Assessment Methods and Weighting	Methods		Details		ing in final grade (%)	Assessment Methods to CLO Mapping		
	Examination				70	CLO 1,2,3,4		
	Examinat	1011				OLO 1,2,0,7		
	Laborator				30	CLO 1,2,3		
Required/recommended	Laborator	y reports	wrie (CRC Press, 2006)					
•	Laborator Lawrie's M	ry reports Meat Science. RA Lav	wrie (CRC Press, 2006) Assurance. RC Chandan, A	v Kilara, N Shah (Eds) (30	CLO 1,2,3		
reading and	Laborator Lawrie's M Dairy Proc	ry reports Meat Science. RA Lav cessing and Quality A			30 Blackwell, 200	CLO 1,2,3		
Required/recommended reading and online materials Course Website	Laborator Lawrie's M Dairy Prod Encyclope	ry reports Meat Science. RA Lav cessing and Quality A	Assurance. RC Chandan, A		30 Blackwell, 200	CLO 1,2,3		

	Functional foods (6 credits) Academic Year 2019							2019			
Offering Department	Biological Sciences Quota 40										
Course Co-ordinator	Dr M F Wang, Biological Sciences (mfwang@hku.hk)										
Teachers Involved	(Dr L Zhang,Biological Sciences) (Dr M F Wang,Biological Sciences)										
Course Objectives	To provide a fundamental understanding of the rapidly emerging functional food/nutraceutical industry with ar emphasis on the history, regulation, chemical basis and quality control of healthy ingredients/products and thei effects on human health.										
Course Contents & Topics	nutraceut fibers as containing	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 sulphur containing compounds; probiotics and prebiotics; small berries, spices, teas and herbs for health; quality control and assurance of functional foods and nutraceuticals.									
Course Learning			npletion of th		,						
Outcomes									utraceuticals		
			stantial chem								
	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									
	Pass in BIOL3201 or BIOL3202								, .		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in B	3IOL320		•			,		·		
(and Co-requisites and Impermissible				2			•		Examination		Dec
(and Co-requisites and Impermissible combinations)		t sem Demor	or BIOL320	- 2021 : Y grasp of the lity and cor	ν subject matt npetence in μ	er covered. professional-	Show strong level probler	n solving. C	Examination nd critical abilities ar ritically use knowled m-based organizatio	nd I	ogical thinking, with to draw appropriate
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Y 1st	Demor eviden- and in- skills. Demor thinking	or BIOL320: Offer in 2020 Strate thorough ge of creative abightful conclusion with some evidence of the conclusion of	- 2021 : \\ \text{grasp of the lity and corns to real-v} \text{I grasp of ence of con}	subject matt npetence in p vorld problem the subject npetence in p	er covered. professional- ns. Demonst matter cove rofessional-	Show strong level probler trate highly e red. Show e evel problem	m solving. Confective tead evidence of a solving. Us	nd critical abilities a	nd lige in all all all all all all all all all al	ogical thinking, with to draw appropriate and presentationa abilities and logical enerally appropriate
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Y 1st	Demor eviden and inskills. Demor thinking conclustion and loapprop	or BIOL320: Offer in 2020 Strate thorough of the conclusion of t	2 - 2021 : Y grasp of the lity and cor ns to real-v I grasp of ence of con I problems. t incomplet th limited mes errone	subject matt npetence in p vorld problem the subject npetence in p Demonstrate e grasp of th competence ous conclus	er covered. professional- matter cove rofessional- e effective te e subject ma in professio	Show strong level probler trate highly e red. Show e level problem am-based on atter covered onal-level pr	m solving. Confective teadevidence of a solving. Using anizational solving sol	nd critical abilities at ritically use knowled m-based organization analytical and critic se knowledge to draw	nd lige on all all all all all all all all all al	ogical thinking, with to draw appropriate and presentationa abilities and logical enerally appropriates. and critical abilities draw moderately
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Y 1st	t sem Demor eviden and inskills. Demor thinking conclusion and lo appropogrania Demor and lo appropor genizen appropogrania bemor eviden someti	or BIOL320: Offer in 2020 Strate thorough of the of creative abightful conclusion on the conclusion of the conclusion	2 2021: \(\) -	subject matt npetence in poolen the subject npetence in p Demonstrate e grasp of the competence ous conclus kills. sp, with rete inking, but law rroneous cor	er covered. professional- as. Demonst matter cove rofessional- e effective te e subject ma in professions to rea nation of som cking compe	Show strong level probler trate highly e red. Show e level problem am-based on alter covered nonal-level problem e relevant ir tence in prof	m solving. C effective tea evidence of n solving. Us ganizational . Show som oblem solvi lems. Demonformation, fessional-lev	nd critical abilities an ritically use knowled m-based organizatio analytical and critic se knowledge to draw and presentational se e evidence of analyt ng. Use knowledge	nd lege on all a sal a s	ogical thinking, with to draw appropriate and presentationa abilities and logical enerally appropriate s. and critical abilities draw moderately ective team-based wered. Show some knowledge to draw
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Y 1st A B	Demor eviden and inskills. Demor thinking concluing the properties of the propertie	or BIOL320: Offer in 2020 Strate thorough ge of creative abightful conclusion on the contract general but ical thinking whate but sometiational and presentate partial but of coherent are appropriate ational skills of littrate little or notical thinking, air	- 2021 : \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	subject matt npetence in p world problem the subject npetence in p Demonstrate e grasp of the competence sous conclus tills. sp, with rete inking, but lau rroneous con iveness. retention of competence ally erroneou	er covered. professional- is. Demonst matter cove rofessional- e effective te e subject ma in professions to rea nation of som cking compe clusions to little relevar in professi	Show strong level probler rate highly e red. Show e level problem am-based on atter covered onal-level problem e relevant in tence in profesel-world poblet information in al-level problem.	m solving. Confective tea evidence of a solving. Us ganizational and solving solving. Us ganizational and solving solv	nd critical abilities an ritically use knowled m-based organization analytical and critics knowledge to draw and presentational se evidence of analyting. Use knowledge onstrate moderately of the subject matte el problem solving.	nd lege sonal all a w ge skills ical e to eff. She sed	ogical thinking, with to draw appropriate and presentationa abilities and logical anerally appropriate s. and critical abilities draw moderately ective team-based wered. Show som knowledge to draw organizational and

Course Teaching	Activities	Details		No. of Hours
& Learning Activities	Lectures			36
	Tutorials	tutorials/seminars		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		70	CLO 1,2,3,4,5
Required/recommended reading and online materials	R. E. C. Wildman: Handbook of C. M. Hasler: Regulation of Fund		nal Foods (CRC Press, 2007) ticals: a Global Perspective (IFT Pre	ess, 2005)
Course Website	http://moodle.hku.hk/			
Additional Course Information	This course will be offered subje	ect to a minimum enrollment	number and availability of teachers	3 .

BIOL4210	Food pr	roduct development	(6 credits)	Academic Year	2019			
Offering Department	Biologica	l Sciences		Quota	40			
Course Co-ordinator	Dr M F W	M F Wang, Biological Sciences (mfwang@hku.hk)						
Teachers Involved	(Dr M F V	Dr M F Wang,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	developm	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			course, students should be able to:					
Outcomes		understand the food prod						
		know the key steps in nev						
			sight and understanding of current an	d future trends in the food	lindustry			
			ractical experience in new product dev		,			
			stics of different sectors of the food inc	•				
Pre-requisites (and Co-requisites and Impermissible combinations)		Pass in BIOL3203 or BIOL4205						
Offer in 2019 - 2020	N Off	fer in 2020 - 2021 : N		Examination				
Grade Descriptors	_		p of the subject matter covered. Show strong a		d logical thinking, wit			
(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.							
	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 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.							
Course Type	Laborator	ry and workshop course						
Course Teaching	Activitie	s	Details		No. of Hours			
& Learning Activities	Laborato	ory			48			
	Group we	ork	80-100 hours group project work		100			
	Tutorials		10 lectures + 12 tutorials		22			
	Reading	/ Self study			100			
Assessment Methods and Weighting	Methods	· S	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			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)				
reading and	E. Graf a	nd I. S. Saguy: Food Pro	duct Development (Avi Books, 1991)	ng Marketplace (CRC Pre				
Required/recommended reading and online materials	A. L. Brod E. Graf an G. W. Ful	nd I. S. Saguy: Food Pro ller: New Food Product D		ng Marketplace (CRC Pre				
reading and	A. L. Broo E. Graf an G. W. Ful http://moo	nd I. S. Saguy: Food Pro ller: New Food Product D odle.hku.hk/	duct Development (Avi Books, 1991)					

BIOL4301	Fish and fisheries (6 credits)	Academic Year	2019
Offering Department	Biological Sciences	Quota	40
Course Co-ordinator	TBC, Biological Sciences ()		
Teachers Involved	(TBC,)		

Course Objectives	 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. 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. to cover the theoretical and practical aspects of marine fisheries management, fish farming and fish conservation using local, regional and global examples Introduction to course: phylogenetic, biological and ecological concepts and adaptation. Multispecies interactions in 				
Course Contents & Topics	marine an fisheries; f roles of n manageme exploitation	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 Outcomes	On successful completion of this course, students should be able to: 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				
	CLO 5 en	stainability hance the ability for ci d management	ritical and synthetic thinkii	ng and to consider innovative appr	oaches to research
Pre-requisites (and Co-requisites and Impermissible combinations)		OL3301 or BIOL3303			
Offer in 2019 - 2020	N Offe	er in 2020 - 2021 : N		Examination	
Grade Descriptors (A+ to F)	В	outcomes. Show strong an and synthesize information highly effective presentation. Demonstrate substantial clearning outcomes. Show apply knowledge to familia attention to thoughtful and Demonstrate general but outcomes. Show evidence familiar situations. Apply m	nalytical and critical abilities and , and ability to apply knowledge nal skills. Strong evidence of cleat ommand of a broad range of kn evidence of analytical and critical ar and some unfamiliar situation reflective thinking. incomplete command of knowle of some analytical and critical incomplete.	ensive knowledge and skills required for att logical thinking, with evidence of original the to a wide range of complex, familiar and una attention to thoughtful and reflective thinking owledge and skills required for attaining at all abilities and logical thinking, integration ons. Demonstrate effective presentational edge and skills required for attaining most abilities and logical thinking, and ability to all skills. Little evidence of clear attention to	ought, ability to integrate framiliar situations. Applying. least most of the course of materials and ability to skills. Evidence of clear tof the course learning apply knowledge to most
	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 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.				
Course Type	Lecture-ba	ased course	a presentational skills are minime	my checuve of inchecuve.	
Course Teaching	Activities		Details		No. of Hours
& Learning Activities	Lectures				24
	Field work	(Field, laboratory, practical and tutorials		36
	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	on		60	CLO 1,2,3,4,5
Required/recommended reading and	Test Hart P. J. I Science Lt	,	ls): Handbook of Fish Biol	10 ogy and Fisheries (Volumes 1 & 2,	CLO 3 Blackwell
online materials		' '	ncev: The Diversity of Fish	es (Blackwell Science, 1997)	
Course Website		biosch.hku.hk/ecology		co (Diackwell Colonice, 1991)	
Additional Course		ernate vear from 2017-			
Information				number and availability of teachers	2

BIOL4302	Environmental impact assessment (6 credits)	Academic Year	2019			
Offering Department	Biological Sciences Quota 30					
Course Co-ordinator	Dr J Wu, Biological Sciences (jinwu@hku.hk)					
Teachers Involved	(Dr C H Hau,Biological Sceinces) (Dr J Wu,Biological Sciences) (Prof K M Y Leung,Biological Sciences)					
Course Objectives	To introduce the general principles, processes, techniques, current practice impact assessment (EIA).	To introduce the general principles, processes, techniques, current practices and problems of environmental impact assessment (EIA).				
Course Contents & Topics	legislation. Processes in conducting EIA. Risk assessment and manageremediation. Cost benefit analysis. Socio-economic perspectives and analy Common techniques employed in EIA (e.g. matrix, sequence diagram, causal	Background and history of EIA development. Concept of carrying capacity and precautionary principle. EIA legislation. Processes in conducting EIA. Risk assessment and management. Mitigatory measures and remediation. Cost benefit analysis. Socio-economic perspectives and analysis. Project monitoring and audit. Common techniques employed in EIA (e.g. matrix, sequence diagram, causal chain analysis, modeling). Modern EIA instruments (environmental liability, environmental insurance and environmental share). Application of EIA in				
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 understand the operation of EIA systems in Hong Kong and overseas CLO 2 apply a variety of techniques in assessing environmental impact CLO 3 evaluate different options and determine acceptability in environmental CLO 4 prepare EIA reports for small scale projects	l impact assessme	nt			

Pre-requisites (and Co-requisites and Impermissible combinations)		IOL2103 or BIOL2306); 14 or any BIOL3XXX co				
Offer in 2019 - 2020	Y 2nd	sem Offer in 2020 - 2	2021 : Y	Examination	May	
Grade Descriptors (A+ to F)	A	outcomes. Show strong and and synthesize information,	alytical and critical abilities and logical, and ability to apply knowledge to a v	e knowledge and skills required for atta il thinking, with evidence of original th vide range of complex, familiar and un ntion to thoughtful and reflective thinkir	ought, ability to integrate familiar situations. Apply	
	В	learning outcomes. Show e	evidence of analytical and critical abil ar and some unfamiliar situations. D	ge and skills required for attaining at ities and logical thinking, integration of temonstrate effective presentational s	f material sand ability to	
	С	outcomes. Show evidence	of some analytical and critical abilitie	and skills required for attaining most as and logical thinking, and ability to a ls. Little evidence of clear attention to	apply knowledge to most	
	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.					
Course Type	Lecture wi	th laboratory componer	nt course			
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures				24	
	Field work	(field trip / tutorials		24	
	Reading /	Self study	student center learning		70	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	nts		100	CLO 1,2,3,4	
Required/recommended reading and online materials	J. Glassor 2005) HKSAR G HKSAR G	J. Glasson, R. Therivel & A. Chadwick: Introduction to Environmental Impact Assessment, (London: Routledge,				
Course Website	http://moo	•				
Additional Course Information			to a minimum enrollment num	ber and availability of teachers		

BIOL4303	Anima	I behaviour (6 credits)	Academic Year	2019			
Offering Department	Biologic	Biological Sciences Quota 30					
Course Co-ordinator	Dr L Kaı	rczmarski, 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	behavio How do are som the hun complex be expla as poss the rest within th behavio research will also	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 individual 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 within the paradigm of behavioural ecology and understand the causes, functions, development, and evolution of behaviour. We will discuss several classical studies that form the foundation of this field, as well as more recent research that represents the current concepts which have led to modern understanding of animal behaviour. We will also illustrate the links between the recent extraordinary advances in behavioural ecology and socio-ecology					
Course Learning Outcomes	CLO 1 CLO 2 CLO 3 CLO 4 CLO 5	with their application in animal conservation. On successful completion of this course, students should be able to: CLO 1 learn to appreciate the causes, functions, development, and evolution of animal behaviour CLO 2 appreciate the complexity of interactions between environmental selective pressures and animal behaviour CLO 3 appreciate current theories that form basis for modern understanding of animal behaviour CLO 4 learn the scientific reasoning and methodology in the field of Animal Behaviour CLO 5 think analytically in terms of behavioural ecology, animal socio-behavioural complexity, and how the understanding of species' behaviour contributes to its conservation					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in	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					
Offer in 2019 - 2020	N C	Offer in 2020 - 2021 : N	Examination				
Grade Descriptors (A+ to F)	Α	Evidence of a thorough grasp of the subject in a broader compar excellent use of named examples and case studies. Evidence of of fundamental concepts to draw insightful and logical conclusion: effective presentation skills with excellent analytical argumentatic degree level.	independent critical thought with excellent is. Show eagerness to learn, great abilities	use of a broad range of independent work,			
	В	Evidence of a good grasp of the subject as demonstrated by som and some case studies. Evidence of good critical thought, alth					

			ependent work, effective presentation skills ved knowledge to draw meaningful and logical		
	С	of named examples and cas abilities to use acquired kno correct argumentation, but li level.	out not coherent and incomplete grasp of the sive studies. Some abilities of logical critical thin wledge and work independently to draw mean imited (or no) abilities to integrate broader continuous control of the co	king, but not insightful and/or ir ingful conclusions. Fair presen ncepts. Work sufficient for wha	ndependent; only partial tation skills, with mostly t is required for degree
	D	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	familiarity with any relevant of	mum knowledge and understanding of the sexamples and case studies. Inadequate evider on and no abilities to draw meaningful conclusion	nce of coherent logical thought;	ineffective presentation
Course Type	Lecture w	rith laboratory componen	t course		
Course Teaching	Activities		Details		No. of Hours
& Learning Activities	Lectures				24
	Laboratory		including field trips, site visits, intersessions, classroom debates	32	
	Project work		project work review		8
	Reading / Self study			60	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments		active participation/continuous assessment/presentation	55	CLO 1,2,3,4,5
	Examina	tion		45	CLO 1,2,3,4,5
Required/recommended reading and online materials	Publishing Danchin E Dugatkin	Bolhuis J.J. & Giraldeau L.A. The Behavior of Animals: Mechanisms, Function, and Evolution (Blackwell Publishing 2005) Danchin E., Giraldeau L-A. & Cezilly F. Behavioural Ecology (Oxford University Press 2008) Dugatkin L.A. Principles of Animal Behavior (2nd edition) (W.W. Norton & Company 2009) Breed M.D. & Moore J. (eds). Encyclopedia of Animal Behavior (Academic Press 2010)			
Course Website	http://www	v.biosch.hku.hk/ecology/	Isc		
Additional Course	This cour	se is offered in alternate	year.		
Information	This cours	se will be offered subject	to a minimum enrollment number an	d availability of teachers.	

BIOL4304	Ecosyst	tem functioning and	services (6 credits)		Academic Year	2019	
Offering Department	Biological	Sciences			Quota	30	
Course Co-ordinator	Dr B D R	ussell, Biological Science	s (brussell@hku.hk)				
Teachers Involved	(Dr B D R	(Dr B D Russell, Biological Sciences)					
Course Objectives	This cour	se will introduce the func	tioning of terrestrial, fresl	n water and marine e	ecosystems and th	ne services which	
	including how hum increase	vide human populations. financial, cultural, social an activities degrade the the ecosystem services s	and, importantly, the intrese ecosystem services upplied to humans.	insic value that may and how protecting	be priceless. We ecosystems and	will also explo biodiversity ca	
Course Contents & Topics	services of may be p marine er to human can provi	Natural ecosystems provide trillions of dollars' worth of ecosystem services to humans every year. Many of these services go unrecognized and undervalued. In fact, because humans rely on ecosystems many of these services may be priceless. This course will first cover the function of different ecosystems from terrestrial, fresh water and marine environments. Students will then be introduced to the concept of ecosystem services and what they provide to human populations. Finally, human activities which degrade ecosystems and reduce the extent that ecosystems can provide these services, and what that means for human populations, will be covered. Students will develop independent and creative thinking when proposing solutions to the question of how to value ecosystems for their inherent properties rather than perceived monetary value.					
Course Learning	On succe	ssful completion of this co	ourse, students should be	e able to:			
Outcomes	CLO 1 D	emonstrate an understan	ding of the complexity an	d function of ecosyst	tems		
	CLO 2 Explain how ecosystems provide services which humans use						
	CLO 3 Demonstrate knowledge on methods used to calculate the value of ecosystem services						
	CLO 4 Demonstrate knowledge on the limits to the methods used to calculate the value of ecosystems and the dangers of placing a value on nature						
	CLO 5 Demonstrate an understanding of how human activities reduce the function of ecosystems and reduces ecosystem services						
Pre-requisites (and Co-requisites and Impermissible combinations)		one of the following cou 04 or ENVS3020	urses: BIOL3301 or BIC	DL3303 or BIOL331:	3 or BIOL3319 o	or ENVS3019	
Offer in 2019 - 2020	Y 1st	sem Offer in 2020 - 20	21 : N		Examination	Dec	
Grade Descriptors (A+ to F)	A	familiarity with relevant backs skills. Ample evidence of ind comparative perspective to	p of the subject and relevant re ground reading and case studie lependent critical thought with of draw insightful and logical cor llent analytical argumentation.	es. Exemplary handling of excellent use of a broad raccusions. Show outstandi	field data collection ar ange of fundamental on ng abilities of indepel	nd excellent analytic concepts and broad ndent work, effectiv	
	В	B Evidence of a good grasp of the subject and relevant research techniques. Interest in learning and good-to-moderate familia with relevant background reading and case studies. Good handling of field data collection and commendable analytical ski Good evidence of critical thought (although not always independent), with an appreciable use of fundamental concepts a consideration of broader comparative perspective in drawing logical conclusions. Good abilities of independent work, effect presentation skills with logical and analytical argumentation. Work more than sufficient for what is required at degree level.					
	C	relevant background reading critical thinking (although no	but incomplete grasp of the s and case studies, but no intere t always independent), with mo n mostly correct argumentation for degree level.	est in learning beyond the sostly good use of fundame	adequate average leve ental concepts to drav	el. Evidence of logi v logical conclusion	
	D	Demonstrate some grasp or research techniques. Some	f the subject, but only partial				

	ability of drawing a	abilities of critical independent thinking. Ineffective presentation skills with generally weak logical argumentation ability of drawing appropriate conclusions. Work barely meets what is required at degree level.				
	background readii thought; ineffectiv	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.				
Course Type	Lecture-based course					
Course Teaching	Activities	Details		No. of Hours		
& Learning Activities	Lectures			36		
	Tutorials			12		
	Reading / Self study			70		
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		40	CLO 1,2,3,4,5		
	Presentation		20	CLO 1,2,4,5		
Required/recommended reading and online materials	Students will be directed to	Students will be directed to relevant scientific literature and websites				
Course Website	http://moodle.hku.hk					
Additional Course Information	Offer in alternate year from This course will be offered		nt number and availability of teachers	s.		

BIOL4401	Medica	al microbiology and a	pplied immunology (6 credits)	Academic Ye	ear 2019		
Offering Department		al Sciences	,	Quota	40		
Course Co-ordinator	Dr W Y L	r W Y Lui, Biological Sciences <i>(wylui @hku.hk)</i>					
Teachers Involved	(Dr A Ya	an,Biological Sciences)					
	,	Lui,Biological Sciences)					
		ological Sciences)					
Course Objectives	biologica	The objective is to provide students the knowledge on the practical applications of immunology and microbiology in biological research, clinical analysis and disease diagnosis. Basic parameters affecting antigen-antibody interactions					
Course Contents & Topics	Applicati immunoh Principle Techniqu Microbia	Application of antigen-antibody interaction in advanced research: CHIP assay, co-immunoprecipitation, immunohistochemistry and dual Immunofluorescence Principles and application of flow cytometry Techniques in cellular immunology and tumor immunology Microbial pathogens and associated diseases, host immune response, antimicrobial agents and multidrug resistance, epidemiology and prevention of microbial infections					
					al mathalam.		
Course Learning	Clinical laboratory analyses in serology, haematology, blood banking, microbiology and chemical pathology on successful completion of this course, students should be able to:						
Course Learning Outcomes			ourse, students should be able to: gen-antibody interaction in various ac	lvanced research techn	iaues		
Julcomes			n microbial pathogens, mechanisms		•		
	a	antibiotic development	,		ig, and principles c		
		·	rinciples of various clinical laboratory	•			
Pre-requisites		promote public attention or BIOL3401 or BIOL3403	n control of microbial infection and the	e spread of antibiotic re	sistance		
and Co-requisites and Impermissible combinations)				-			
Offer in 2019 - 2020		offer in 2020 - 2021 : Y		Examination			
Grade Descriptors (A+ to F)	A	outcomes. Show strong anal knowledge to a wide range of use of data and results to di skills.	tery at an advanced level of extensive know lytical and critical abilities and logical thinking of complex, familiar and unfamiliar situations. A raw appropriate and insightful conclusions. A	with evidence of original the Apply highly effective lab skill oply highly effective organiza	ought, and ability to apples and techniques. Critical tional and presentational		
	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.						
	C 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.						
					data and results to draw		
	Fail	Demonstrate little or no evi analytical and critical abilities Apply minimally effective or	oly limited or barely effective organizational an idence of command of knowledge required s, logical and coherent thinking. Show very lit ineffective lab skills and techniques. Misuse and presentational skills are minimally effective	for attaining the course lear tle or no ability to apply know of data and results and/or ur	data and results to draw rning outcomes. Lack o rledge to solve problems		
Course Type		Demonstrate little or no evi analytical and critical abilities Apply minimally effective or	dence of command of knowledge required s, logical and coherent thinking. Show very lit ineffective lab skills and techniques. Misuse and presentational skills are minimally effective	for attaining the course lear tle or no ability to apply know of data and results and/or ur	data and results to draw rning outcomes. Lack o rledge to solve problems		
Course Teaching		Demonstrate little or no evi analytical and critical abilities Apply minimally effective or conclusions. Organization an with laboratory component	dence of command of knowledge required s, logical and coherent thinking. Show very lit ineffective lab skills and techniques. Misuse and presentational skills are minimally effective	for attaining the course lear tle or no ability to apply know of data and results and/or ur	data and results to draw rning outcomes. Lack of pledge to solve problems lable to draw appropriat		
Course Teaching	Lecture v	Demonstrate little or no evi analytical and critical abilities Apply minimally effective or conclusions. Organization ar with laboratory component es	dence of command of knowledge required s, logical and coherent thinking. Show very lit ineffective lab skills and techniques. Misuse and presentational skills are minimally effective the course	for attaining the course lear tle or no ability to apply know of data and results and/or ur	data and results to drawning outcomes. Lack of eledge to solve problems table to draw appropriation. No. of Hours 24		
Course Teaching	Lecture v Activitie Lectures Laborate	Demonstrate little or no evi analytical and critical abilities Apply minimally effective or conclusions. Organization ar with laboratory component es s	dence of command of knowledge required s, logical and coherent thinking. Show very lit ineffective lab skills and techniques. Misuse and presentational skills are minimally effective the course	for attaining the course lear tle or no ability to apply know of data and results and/or ur	data and results to draw rining outcomes. Lack of pledge to solve problems lable to draw appropriat No. of Hours 24 20		
Course Teaching	Lecture v Activitie Lectures Laborate Tutorials	Demonstrate little or no evi analytical and critical abilities Apply minimally effective or conclusions. Organization an with laboratory component es S Ory	dence of command of knowledge required s, logical and coherent thinking. Show very lit ineffective lab skills and techniques. Misuse and presentational skills are minimally effective the course	for attaining the course lear tle or no ability to apply know of data and results and/or ur	data and results to drawning outcomes. Lack of ledge to solve problem hable to draw appropriate. No. of Hours 24 20 6		
Course Teaching & Learning Activities	Lecture v Activitie Lectures Laborate Tutorials Reading	Demonstrate little or no evi analytical and critical abilities Apply minimally effective or conclusions. Organization ar with laboratory component es s ory s g / Self study	dence of command of knowledge required s, logical and coherent thinking. Show very lit ineffective lab skills and techniques. Misuse and presentational skills are minimally effective the course	for attaining the course lear lle or no ability to apply know of data and results and/or ur or ineffective.	data and results to drawning outcomes. Lack of ledge to solve problems table to draw appropriate to the ledge to solve problems and the ledge to solve problems are solve problems.		
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	Lecture v Activitie Lectures Laborate Tutorials	Demonstrate little or no evi analytical and critical abilities Apply minimally effective or conclusions. Organization ar with laboratory component es s ory s g / Self study	dence of command of knowledge required s, logical and coherent thinking. Show very lit ineffective lab skills and techniques. Misuse and presentational skills are minimally effective the course	for attaining the course lear tle or no ability to apply know of data and results and/or ur	data and results to drawning outcomes. Lack of ledge to solve problem hable to draw appropriate. No. of Hours 24 20 6		

	Laboratory reports		30	CLO 1,2,3
Required/recommended reading and online materials	To be announced in class			
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.	

BIOL4402	Microbia	al biotechnology (6	credits)	Academic Ye	ar 2019		
Offering Department	Biological	Sciences	·	Quota	30		
Course Co-ordinator	, Biolog	, Biological Sciences ()					
Teachers Involved	(,Biolog	ical Sciences)					
Course Objectives			dents who would like to under				
			stems being used include differ				
			nts are expected to know the				
Course Contents		,	able for the expression of vaiou	,, o, i			
& Topics			cessing will be briefly describe est advances in microbial expre				
a ropics			examples on the use of these				
			ant vaccines, secondary metab				
			emediation and medical diagnos		,		
Course Learning	On succes	ssful completion of this	course, students should be able	e to:			
Outcomes	CLO 1 ex	plain the fundamental	biochemical concepts underlyi	ing the industrial production of	selected microbial		
		otechnology products					
		•	ce of the current recombinant to	echnology for large-scale manu	ıfacturing of various		
		otein products					
			ssion systems, understand their		•		
			up presentation on a self-decid	ed topic related to microbial bid	technology		
Pre-requisites	Pass in Bl	IOL3401					
(and Co-requisites and Impermissible							
combinations)							
Offer in 2019 - 2020	N Off	er in 2020 - 2021 : N		Examination			
Grade Descriptors	Α		stery at an advanced level of extensi		attaining all the course		
(A+ to F)		learning outcomes. Demor	nstrate deep understanding of the sub	oject. Demonstrate integration of the f	ull range of appropriate		
,		theories, principles, evidence and techniques. Illustrate insightful use and critical analysis / evaluation of information drawn from a full range of high quality sources and to quote/reference aptly. Apply highly effective organizational and presentational skills.					
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining most of the course learning					
		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 between different secondary interpretations and to quote/reference aptly. Apply effective organizational and presentational skills.					
	С	Demonstrate general but incomplete knowledge and skills required for attaining most of the course learning outcomes.					
		Demonstrate general but incomplete grasp of the subject. Demonstrate some partial integration of theories, principles, evidence and techniques. Illustrate use of relevant information from sources, showing ability to make comparisons between different					
		interpretations and to quote/reference aptly. Apply moderately effective organizational and presentational skills. Demonstrate limited knowledge and skills required for attaining some of the course learning outcomes. Demonstrate partial bu					
	D						
		limited grasp, with retention of some relevant information, of the subject. Show limited integration of theories, principles, evidence and techniques. Demonstrate use and reference of several sources, but mainly through summary rather than analysis and					
		comparison. Apply limited or barely effective organizational and presentational skills.					
	Fail	Fail Demonstrate little or no knowledge and skills required for attaining the course learning outcomes. Demonstrate evidence of little					
	or no grasp of the knowledge and understanding of the subject. Show little or no or inapt integration of theories, principles, evidence and techniques. Show limited use of secondary sources and no critical comparison of them. Organization and						
	presentational skills are minimally effective or ineffective.						
Course Type	Lecture-ba	ased course					
Course Teaching	Activities	3	Details		No. of Hours		
& Learning Activities	Lectures				30		
	Tutorials	, o . i	including group presentations		18		
		Self study			100		
Assessment Methods	Methods		Details	Weighting in final	Assessment		
and Weighting				course grade (%)	Methods		
	Assignme	nto		20	to CLO Mapping		
	- Assignine	1110		30	CLO 1,2,3,4		
		ion		70	CI O 1 2 3		
Paguirod/racommonded	Examinat		orobial Biotochnology: Fundam	70	CLO 1,2,3		
	Examinat A. N. Gla	zer and H. Nikaido: Mi	crobial Biotechnology: Fundam				
Required/recommended reading and online materials	Examinat A. N. Glaz Co., 1995	zer and H. Nikaido: Mio)	crobial Biotechnology: Fundam Atlas, G. Cohen, C. L. Hershbe	nentals of Applied Microbiology			

BIOL4409	General virology (6 credits) Academic Year 2019				
Offering Department	Biological Sciences				
Course Co-ordinator	Dr W B L Lim, Biological Sciences (bllim@hku.hk)				
Teachers Involved	(Dr W B Lim, School of Biological Sceinces)				
Course Objectives	This Course provides the fundamental principles of virology so that students can understand the pathogenesis of major viral diseases that affect animal health. The course will prepare students for profession or graduate work in virology, medicine and biotechnology.				
Course Contents & 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. Baltimor	e Class IV (+) s.s. RNA	viruses: Picornaviruses			
		Baltimore Class V (-) s.s. RNA viruses: Myxoviruses Ambisense RNA viruses: Bunyaviruses and Arenaviruses				
		. Ambisense RNA viruses: Bunyaviruses and Arenaviruses 0, 11. Baltimore Class VI (+) s.s. RNA viruses: Retroviruses				
		2. Baltimore Class III d.s. RNA viruses: Reoviruses				
		3, 14. Baltimore Class I d.s. DNA viruses: Adenoviruses, Herpesviruses				
		i. Baltimore Class II s.s. (+) DNA viruses: Parvoviruses i. Mechanisms of Viral Oncogenesis				
		Anti-viral treatments				
		Anti-viral treatments Viruses as Tools in Medicine and Biotechnology				
	TO: VII GOO	3 do 100io in Medionie d	nd Bioteonnology			
	Practical V	'iroloav				
	19. Specim	nen Collection, Transpor	tation and Processing,			
	Quality Ass	surance & Laboratory Sa	afety			
		solation, propagation an				
			ocytochemical assays, ELISA,			
			agglutination and HI assays			
		utralization assay and A				
Course Learning			ourse, students should be able to:			
Outcomes			ification and the modes of replicati		rious viral families	
		•	on common virological techniques			
		•	rology after taking this course			
Pre-requisites	Pass in BI	OL3401 or BIOL3403				
(and Co-requisites						
and Impermissible						
combinations) Offer in 2019 - 2020	N Offer in 2020 - 2021 : Y Examination					
Grade Descriptors	-		ery at an advanced level of knowledge requ	Examination	oorning outcomes Chow	
(A+ to F)	Α		ompetent ability to acquire knowledge on n			
(A. 101)		skills and techniques. Apply	highly effective organizational and presenta	itional 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 skills and adequate ability to acquire knowledge on new development of the					
	subject. Apply effective lab skills and techniques. Apply effective organizational and presentational skills.					
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning					
			f some analytical skills and certain ability to			
	D	Apply moderately effective lab skills and techniques. 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 limited analytical skills and ability to acquire knowledge on new development of the subject. Apply partially					
	effective lab skills and techniques. 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 skills and ability to acquire knowledge on new development of the subject. Apply minimally effective or ineffective lab					
			ization and presentational skills are minima			
Course Type	Lecture wit	th laboratory component	course			
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures				24	
	Laboratory	1			24	
	Tutorials				6	
	Reading /	Self study			100	
Assessment Methods	Methods		Details	Weighting in final	Assessment	
				course grade (%)	Methods	
and Weighting					4- OLO M!	
and Weighting					to CLO Mapping	
and Weighting	Examination			80	CLO 1,2,3	
	Laboratory	/ reports		20		
Required/recommended	Laboratory Virology: M	/ reports lolecular Biology and pa	athogenesis (2010) L. C. Norkin, A	20	CLO 1,2,3	
Required/recommended reading and	Laboratory Virology: M Principles	/ reports folecular Biology and pa of Virology (2009) S.J. F	Flint, ASM Press.	20	CLO 1,2,3	
Required/recommended reading and online materials	Virology: M Principles of Basic Virol	/ reports Molecular Biology and pa of Virology (2009) S.J. F ogy (2008) E.K. Wagne	Flint, ASM Press.	20	CLO 1,2,3	
Required/recommended reading and online materials Course Website	Virology: M Principles of Basic Virol http://mood	/ reports folecular Biology and pa of Virology (2009) S.J. F ogy (2008) E.K. Wagne dle.hku.hk/	lint, ASM Press. r. Blackwell.	20	CLO 1,2,3	
Required/recommended reading and online materials	Virology: M Principles of Basic Virol http://mood Offer in alto	y reports folecular Biology and pa of Virology (2009) S.J. F ogy (2008) E.K. Wagne dle.hku.hk/ ernate year from 2017-2	lint, ASM Press. r. Blackwell.	20 SM Press.	CLO 1,2,3 CLO 1,2,3	

BIOL4411	Plant and food biotechnology (6 credits)	Academic Year	2019				
Offering Department	Biological Sciences	Quota	80				
Course Co-ordinator	Dr Juliana Xu, Biological Sciences (julianax@hku.hk)	r Juliana Xu, Biological Sciences <i>(julianax</i> @hku.hk)					
Teachers Involved	Dr Juliana Xu,Biological Sciences)						
Course Objectives	This course covers the principles and key concepts of plant and food biotechnology and its applications in 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 and 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	 Genetic improvements in agriculture. Transgenic crops in global food production. Tools in plant genetic engineering: promoters and marker genes. Techniques in plant gene transfer: Agrobacterium-mediated transformation, bid. Nuclear and plastid transformation. Gene silencing in plants. Genetic manipulation of commercially useful biosyntt Extending shelf-life of fruits. Prevention of enzymatic browning of potato tuber Genetically-engineered biofortified foods: provitamin A-enriched rice, anthocyanin tomatoes. Biotechnology in plant pest and disease management: Producing crops resistant to phytopathogens and pests. Short-interfering RNAs in gene silencing to defend against plant viruses. Protecting crops in the field using the Bt toxin. Pest-resistant genetically-transformed seeds using the alpha-amylase inhibitor 	netic pathways in o s. omega-3-enriched	crops.				

	- Herbicio	de-resistant crops.			
	- Plants biopharm Biodegr - Genetic	as bioreactors for molect aceutical proteins. adable plastics. Biofuels. ally-modified crops and f		0	ducing recombinant
			f plant-derived pharmaceutic		
Course Learning		•	course, students should be a		
Outcomes	b	iotechnology	•	nology and basic laboratory te	echniques in plant
			pplications in plant and food	biotechnology	
	CLO 3 d	evelop scientific inquiry a	and critical thinking skills		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	ss in BIOL3211 or BIOL3401			
Offer in 2019 - 2020	Y 1s	t sem Offer in 2020 - 20	021 : Y	Examination	Dec
Grade Descriptors (A+ to F)	A Demonstrate thorough and complete mastery of extensive knowledge and skills required for attaining the learning outcomes in Plant and Food Biotechnology. 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 in plant biotechnology. 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 in plant biotechnology. 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. Show moderately effective organizational and presentational skills.				
	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 skills. Show limited ability to 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 and critical abilities, logical and coherent thinking. No evidence in ability to apply knowledge in plant biotechnology. Ineffective organizational and presentational skills.				
Course Type	Lecture v	vith laboratory componen	nt course		
Course Teaching	Activitie	s	Details		No. of Hours
& Learning Activities	Lectures				24
	Laborato	ory	practical/laboratory/project		30
	Reading	/ Self study			100
Assessment Methods and Weighting	Methods	5	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Examina	tion		70	CLO 1,2,3
	Laboratory reports			10	CLO 1,2,3
	Presentation			20	CLO 1,2,3
Required/recommended reading and online materials	,	ls, M.J. and D.E. Sadava es (HKU Library)	. Plants, genes, and agricult	ture. Jones and Bartlett.	
Ommo materiale		otes on Moodle			
Course Website		odle.hku.hk/			
Additional Course		Nolecular Biology & Biote	chnology Major		
Information	An advar	nced elective course in FI	NS Major		

BIOL4415	Healthcare biotechn	ology (6 credits)	Academic Year	2019	
Offering Department	Biological Sciences		Quota	70	
Course Co-ordinator	Prof A S T Wong, Biologi	ical Sciences (awong1@hku.hk)			
Teachers Involved	(Dr K W Y Yuen, Biologic				
	(Prof A S T Wong, Biological Sciences)				
Course Objectives	This course discusses the key concepts and principles involved in healthcare biotechnology, and their applications in molecular medicine.				
Course Contents & Topics	Genetic biotechnology in animals (transgenics, knockouts and other related technologies): Transgenic animals as 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 diagnostic 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 Outcomes	On successful completion of this course, students should be able to: CLO 1 describe key concepts in genetic biotechnology and human health CLO 2 acquire and apply advanced laboratory techniques essential to biotechnology CLO 3 develop scientific inquiry and critical thinking skills to understand, analyze, and evaluate problems in order to develop solutions CLO 4 gain insight into real-world applications in healthcare biotechnology				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in BIOL3401				
Offer in 2019 - 2020	Y 2nd sem Offer in	n 2020 - 2021 : Y	Examination	May	
Grade Descriptors (A+ to F)	outcomes. Show	orough mastery at an advanced level of extensiventions and strong analytical and critical abilities and logical to wide range of complex, familiar and unfamiliar si	thinking, with evidence of original though	t, and ability to apply	

		consistently demonstrate	informed, thoughtful intellectual engage	ment with broad range of relevant cond	cepts.	
	В	Demonstrate substantial command of a broad range of knowledge required for attaining at least most of the course lead outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familisome unfamiliar situations. Apply effective organizational skills. Writings mostly demonstrate informed, thoughtful integragement with broad range of relevant concepts.				
	С	evidence of some analyt Apply moderately effecti	incomplete command of knowledge recical and critical abilities and logical thinly or organizational skills. Writings mostly with sufficient depth, breadth or understan	king, and ability to apply knowledge to y indicate informed, intellectual engaç	most familiar situations.	
	D	evidence of some coher knowledge to solve pro	limited command of knowledge require ent and logical thinking, but with limite oblems. Apply limited or barely effect its or theories but mostly at a superficial	ed analytical and critical abilities. Sho ive organizational skills. Writings inc	w limited ability to apply	
	Fail	analytical and critical abi	evidence of command of knowledge lities, logical and coherent thinking. Sho minimally effective or ineffective. Writing rrelevant or superficial.	w very little or no ability to apply know	ledge to solve problems.	
Course Type	Lecture wi	th laboratory compon	ent course			
Course Teaching & Learning Activities	Activities		Details	Details		
	Lectures				24	
	Laboratory				24	
	Tutorials		tutorials/assignments/compu	ter sessions	6	
	Reading / Self study				100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents	Assignment/Discussion	10	CLO 1,3,4	
	Examinat	ion		60	CLO 1,3,4	
	Laborator	y reports		20	CLO 1,2,3,4	
	Test			10	CLO 1,3	
Required/recommended reading and online materials	- Textbook of Drug Design and Discovery (Krogsgaard-Larsen, Liljefors, and Madsen, Taylor & Francis, 2002) - Human Molecular Genetics (Strachan and Read, Garland Science, 2010) - Suggested readings for each topic will be provided.			Francis, 2002)		
Course Website		dle.hku.hk/	·			
Additional Course Information	Moodle					

BIOL4416	Stem ce	ells and regenerative biology (6 credits)	Academic Year	2019		
Offering Department		Sciences	Quota	40		
Course Co-ordinator	Dr K W Y	Yuen, Biological Sciences (kwyyuen@hku.hk)				
Teachers Involved		(Dr J Zhang,Biological Sciences) (Dr K W Y Yuen,Biological Sciences)				
Course Objectives		uce the current understanding in regenerative biology, aging and to present the interconnection between these biological events.	longevity at the cellu	lar and molecular		
Course Contents & Topics	The course will discuss cutting-edge research in (i) regenerative and stem cell biology: - the basic characteristics of stem cells - the molecular and genetic control of cell fate specification and differentiation - embryonic and adult stem cells - experimental inducible pluripotent stem cells and tissue engineering - therapeutics potentials for stem cell technology - ethical issues in stem cell research (ii) aging and longevity: - model systems used for aging and life-span studies - cellular and molecular biology of aging - telomeres and cellular senescence - genomic stability, DNA mutations and repair - mitochondrial defects and oxidative stress - genetic aging diseases - genetic, biochemical and metabolic pathways involved in longevity					
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 appreciate the complex regulations of cell potency, cell age and organism longevity CLO 2 describe the characteristics of stem cells and the different types of stem cells CLO 3 describe applications of stem cell research, and understand ethical concerns involved CLO 4 describe the cellular mechanisms of aging, and the pathways involved in longevity					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in B	IOC3601 or BIOC3604 or BIOL3211 or BIOL3401 or BIOL3402 or	BIOL3403 or BIOL34	04 or BIOL3408		
Offer in 2019 - 2020	N Off	er in 2020 - 2021 : Y	Examination			
Grade Descriptors (A+ to F)	A	Demonstrate thorough and complete mastery at an advanced level of extensive course learning outcomes. Show strong analytical and critical abilities and logic ability to apply knowledge to a wide range of complex, familiar and unfamiliar sit presentational skills.	al thinking, with evidence of	f original thought, and		
	В					
	С	Demonstrate general but incomplete command of knowledge and skills requoutcomes. Evidence of some analytical and critical abilities and logical thinking situations. Apply moderately effective organizational and presentational skills.				
	D	Demonstrate partial but limited command of knowledge and skills required for Evidence of some coherent and logical thinking, but with limited analytical au knowledge to solve problems. Apply limited or barely effective organizational and	nd critical abilities. Show li			
	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. Organization and presentational skills are minimally effective or ineffe	for attaining the course lea little or no ability to apply			

Course Type	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	assignment/discussion	10	CLO 1,2,3,4		
	Examination		60	CLO 1,2,3,4		
	Laboratory reports		20	CLO 1,2,3,4		
	Test		10	CLO 1,2,3,4		
Required/recommended reading and online materials	Essentials of stem cell biologedited by Robert Paul Lanza Science in medicine: the JCI By Andrew R. Marks, Americ Molecular biology of aging, Is	2009 textbook of molecular medicine an Society for Clinical Investigation,				
Course Website	http://moodle.hku.hk/	5 , =g 2	-			
Additional Course Information	Offer in alternate year from 2		Offer in alternate year from 2017-2018 This course will be offered subject to a minimum enrollment number and availability of teachers.			

BIOL4417	'Omics'	and systems biolog	y (6 credits)	Academic Y	ear 2019	
Offering Department	Biologica	l Sciences		Quota	40	
Course Co-ordinator	Dr J W Z	hang, Biological Sciences	s (jzhang1 @hku.hk)			
Teachers Involved	(Dr J W Z	Zhang,Biological Science	s)			
Course Objectives	profiling the poter Omics ar environm	Recent progress in high-throughput omics technology has revolutionized the biological research. Genome-wide profiling of various biomolecules simultaneously by omics technology generates huge amounts of data, providing the potential to obtain a global and holistic view of the system. This course aims to introduce the technologies o Omics and Systems Biology, and overview of various applications of omics technology in agricultural, biomedical environmental, and nutritional sciences. This course will make the state-of-the-art knowledge of Systems Biology and know-how available to those working on an omics projects as well as those preparing their research proposal.				
Course Contents & Topics	sequenci experien Genomic Transcrip Proteomi Interacto Systems biologica Metagen Metabolo	ing, computational model ce in large scale data ana is - the study of all genes btomics - the study of all ro- ics - the study of all prote mes - the study of all gen biology and functional I system, and modeling to omics - all genetic materiomics - metabolites & inte	ins netic or physical interactions ar genomics - the study of the discover the integrated funct als found in an environment rmediates involved in a biolog	g. This course will also provide thodologies involved in: me mong genes or proteins interactome/network between ion and emergent properties of ical reaction.	le students hands-or	
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 explain the conceptual differences between 'Omics'/Systems Biology studies and traditional one-operation approach, and discuss the pros and cons of both approaches CLO 2 describe common methodologies used in major 'Omics' studies CLO 3 describe basic analytical methods, and access database resources generated in major 'Omics' studies CLO 4 describe how 'Omics' data are used in Systems Biology to understand the integrated functions of system identify questions that can be addressed by 'Omics' and System Biology studies, appreciate and desapplications in 'Omics' studies				r 'Omics' studies ted functions of the	
Pre-requisites and Co-requisites and Impermissible combinations)	Pass in E	3IOC3601 or BIOC3604 o	or BIOL3211 or BIOL3401 or B	SIOL3402 or BIOL3403 or BIOI	L3404 or BIOL3408	
Offer in 2019 - 2020	Y 2n	d sem Offer in 2020 - 2	2021 : Y	Examination	n May	
Grade Descriptors (A+ to F)	A	course learning outcomes. Sability to apply knowledge to presentational skills.	complete mastery at an advanced leven Show strong analytical and critical abit to a wide range of complex, familiar an approach of a broad range of knowled	lities and logical thinking, with eviden d unfamiliar situations. Apply highly e	ce of original thought, and ffective organizational and	
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the coul learning outcomes. Evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar asome 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. 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.					
Course Type	Lecture v	vith laboratory componen	t course			
Course Teaching	Activitie	es	Details		No. of Hours	
& Learning Activities	Lectures	· · · · · · · · · · · · · · · · · · ·			24	
	Laborato	ory			24	
		/ Self study				

Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments		40	CLO 2,3,4,5
	Examination		60	CLO 1,2,3,4,5
Required/recommended reading and online materials	TBA			
Course Website	http://moodle.hku.hk/			
Additional Course	Offer in alternate year from 2017-2	Offer in alternate year from 2017-2018		
Information	This course will be offered subject	to a minimum enrollment numbe	r and availability of teachers	S.

BIOL4451		an behaviour, ecology and co h experience (6 credits)	nservation: field	Academic Yea	2019	
Offering Department		l Sciences		Quota	12	
Course Co-ordinator		al Sciences ()		Quota	12	
Teachers Involved	, blologic	al Sciences ()				
	This seem	ffiting	amina annotativity there is to	handa an aymanianaa in	field messenab int	
Course Objectives	behaviou students effectivel mobile m	This course offers an exciting experiential learning opportunity through hands-on experience in field research int behavioural ecology and conservation of free-ranging cetaceans (whales, dolphins and porpoises). It provide students with a fundamental knowledge, skills, and the appreciation of what it takes to design, implement, an effectively run field studies in cetacean ecology, behaviour and conservation, and similar studies of other large an mobile marine vertebrates.				
Course Contents	Field-bas	ed studies of cetaceans have bee	en rapidly evolving in rec	ent years. There are r	nany exciting nev	
& Topics	developm compone and on it research definition will learn emphasis the scien to advan informal extensive field-base	developments that allow researchers to tackle previously unexplored avenues of research. However, the primary component of cetacean studies, the direct contact with free-ranging animals out at sea, in their natural environmen and on their terms remains unchanged; both challenging and fascinating. This course, conducted in a field research site outside Hong Kong, will expose students to various aspects of cetacean field studies, from the definition of a research question to project design, and to various stages of data collection and analyses. Students will learn a suite of research techniques, and will exercise their skills in data processing and interpretation. The emphasis will be on delphinid behavioural ecology and conservation applications; students will be guided through the scientific reasoning and methodology, and will develop an understanding how individual projects can contribute to advancing science and benefiting broader conservation management efforts. The course includes lectures, informal discussions of current research and recent discoveries, review of innovative research techniques, and extensive field component with sea-based research surveys performed daily (weather permitting). Following the field-based activities, students are required to write an independent report describing the learning outcome of the course.				
Course Learning		essful completion of this course, stud	ents should be able to:			
Outcomes		nderstand of the biodiversity and prin		stem studied		
		stablish the basic skills needed to ide			Δ	
		e knowledgeable about and able to	to implement sampling te	cilliques for organisms	s in the particular	
	ecosystems studied					
		CLO 4 understand the basic ecology of target species and how biotic and abiotic factors shape focal communit				
Pre-requisites		t least one of the following courses:				
(and Co-requisites	This experiential field course is primarily for Ecology & Biodiversity Major students. The earliest that a student is allowed to take this experiential course is their year 3 study; and because					
and Impermissible					and because it i	
combinations)	conducted in early June, this course is best suited for year 3 students.					
Offer in 2019 - 2020	N Of	fer in 2020 - 2021 : N		Examination		
Grade Descriptors (A+ to F)	A	Evidence of a thorough grasp of the subjet familiarity with relevant background readin skills. Ample evidence of independent crit comparative perspective to draw insightfu presentation skills with excellent analytica level.	g and case studies. Exemplary h ical thought with excellent use of all and logical conclusions. Show	andling of field data collection a broad range of fundamenta outstanding abilities of inde	and excellent analytica I concepts and broade pendent work, effective	
	С	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 No evidence of basic a minimum grasp of the subject and the minimum background reading and no familiarity with any relevant examples and thought; ineffective presentation skills with poor argumentation and no a		No evidence of basic a minimum grasp background reading and no familiarity wit thought; ineffective presentation skills wit reach degree level.	of the subject and the minim h any relevant examples and ca	ium relevant research techni ase studies. Inadequate evide	nce of coherent logica	
	Field camps					
	Field can	T-				
	Field can Activitie	•			No. of Hours	
Course Teaching		s Details	nd tutorials		No. of Hours 12	
Course Teaching	Activitie	Details lectures ar	nd tutorials			
Course Teaching	Activitie Lectures	s Details lectures an			12	
Course Teaching	Activitie Lectures Field wo Presenta	Details lectures and rk stition interactive			12 80 10	
Course Teaching	Activitie Lectures Field wo Presenta Reading	b Details lectures at rk stition interactive / Self study	debates		12 80 10 100	
Course Teaching & Learning Activities Assessment Methods	Activitie Lectures Field wo Presenta	Details lectures ar rk stion interactive / Self study nent group proj	debates	Weighting in final course grade (%)	12 80 10 100 12 Assessment Methods	
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	Activitie Lectures Field wo Presenta Reading Assessm Methods	Details lectures at rk ation interactive / Self study nent group proj Details	debates	course grade (%)	12 80 10 100 12 Assessment Methods to CLO Mapping	
Course Teaching & Learning Activities Assessment Methods	Activitie Lectures Field wo Presenta Reading Assessm	Details lectures at rk ation interactive / Self study nent group proj b Details	debates		12 80 10 100 12 Assessment Methods	

Required/recommended reading and online materials	Mann, J., Connor, R.C., Tyack, P.L., Whitehead, H. (eds.) 2000. Cetacean societies: Field studies of dolphins and whales. Chicago University Press. Boyd, I.L., Bowen, W.D., Iverson, S.J. (eds). 2010. Marine Mammal Ecology and Conservation: A Handbook of Techniques. Oxford University Press.
Course Website	http://www.biosch.hku.hk/ecology/lsc/
Additional Course Information	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.

BIOL4501	Molecul	ar phylogen	etics and evolution (6 credits)	Academic Ye	ear 2019		
Offering Department	Biological		·	Quota	25		
Course Co-ordinator	TBC, Biole	ogical Sciences	s ()				
Teachers Involved	(TBC,Biol	ogical Sciences	s)				
Course Objectives	phylogene in formal I - acquisit - DNA an - phyloge - introduc	he purpose of this course is to provide a comprehensive overview of state-of-the-art molecular systematics and hylogenetic research, focusing on in depth coverage of the latest techniques. The treatment of theoretical issues 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 likelihood approaches introduction to relevant software for phylogenetics methods for the evaluation of phylogene trees					
Course Contents & Topics	Introduction and tissue studies, to isolation, of nucleon maximum	troduction to molecular systematics and phylogenetics. Tree of life. Obtaining, storing and archiving specimens of tissue samples for use in molecular studies. Sources of molecular data, experimental design for molecular udies, taxon sampling and marker choice. Overview of basic laboratory methods for data collection (DNA plation, PCR, DNA sequencing). Sequence editing and aligning; utilizing public sequence databases. Estimation nucleotide polymorphism and diversity. Methods for phylogeny reconstruction: parsimony, distance methods, aximum likelihood, Bayesian methods. Statistical methods for the evaluation of phylogenetic trees. Software for					
			n. Molecular markers in conservation and		ogenies for differen		
Course Learning			y vs. phylogeography using molecular data. n of this course, students should be able to:				
Outcomes	CLO 1 ur CLO 2 ur fo CLO 3 ur	On successful completion of this course, students should be able to: CLO 1 understand the fundamental principles of molecular phylogenetics CLO 2 understand the purposes each method is used for and be able to choose the most appropriate method(s) for the analysis of given data CLO 3 understand the advantages and disadvantages of the methods CLO 4 acquire practical skills for the analysis of molecular data					
Pre-requisites and Co-requisites and Impermissible combinations)		IOL3401 or BIC					
Offer in 2019 - 2020	N Off	er in 2020 - 20		Examination			
Grade Descriptors (A+ to F)	Demonstrate comprehensive knowledge and an advanced level of skills sufficient for achieving all the goals and expect learning outcomes of the course. Show deep understanding of the course subject. Excellent ability to efficiently combine a apply the relevant theories, principles, and methods taught in the course. Advanced skills in possession and application of i methods and software for evolutionary analysis of real data. Excellent ability to collect, systematize, analyze and critical evaluate data from various sources and to quote them appropriately. Excellent presentational skills. Be Demonstrate good knowledge and good level of skills sufficient for accomplishing most of the goals and expected learning outcomes of the course. Demonstrate good understanding of the course subject. Show good ability to combine and to ap theories, principles, and methods taught in the course. Substantial skills in possession and application of the methods a software for molecular evolutionary analysis of real data. Show good ability to collect, systematize, analyze and critically evaluated.						
	data from various sources and to quote them appropriately. Good presentational skills. 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.						
	Fail	Demonstrate po course. Demons principles, and r molecular evolut	or or no knowledge and skills required for accompli strate very poor or no understanding of the subject methods taught in the course. Poor or no skills in pos ionary analysis of real data. Show very poor or no ab luate them appropriately. Very poor or no presentation	Show no ability to combine a session and application of the r ility to collect data from other so	and/or to apply theories nethods and software fo		
Course Type	Lecture w	ith laboratory c	omponent course				
Course Teaching	Activities	3	Details				
Learning Activities	Lectures				24		
	Laboratory		computer laboratory/tutorial/proje	ects	36		
	Reading	Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin		
	Assignme			40	CLO 2,3,4		
	Examinat	ion		60	CLO 1,2,3		
Required/recommended reading and			cular Evolution and Phylogenetics (Oxford User, 2004, 2nd ed.)	Jniversity Press, 2000) Ha	II B.G.: Phylogenet		

online materials	TBC
Course Website	http://moodle.hku.hk/
Additional Course Information	This course will be offered subject to a minimum enrollment number and availability of teachers.

BIOL4505	Oyster a	quaculture (6 cred	its)	Academic Year	2019		
Offering Department	Biological			Quota	20		
Course Co-ordinator	Dr T Veng	atesen, Biological Scie	nces (rajan@hku.hk)				
Teachers Involved	(Dr T Ven	gatesen,School of Biolo	gical Sciences)				
Course Objectives	-Introduce	oyster biology and ha	tchery technology and aquaculture busir	ness;			
	-Enable s aquacultu -Facilitate	Provide scientific basis for oyster aquaculture through field demonstrations and laboratory exercises; inable students to design, construct and maintain oyster hatchery for production of seeds for sustainable quaculture and restoration of wild oysters; acilitate transfer of academic knowledge to oyster growers and aquaculture industry for sustainable, healthy and life sea-food production;					
Causa Cautanta			is to anhance studental knowledge in a	f the emplied meaning	hialam, fialda i		
Course Contents & Topics	hatchery maintain shellfish pendeavor aquacultu marine la Environme covered u facilities ir course is	his experiential learning course is to enhance students' knowledge in one of the applied marine biology fields, i.e. atchery technology and coastal aquaculture business that will enable them to design, construct, operate and maintain coastal aquaculture facilities and small-scale 'green and environmentally sustainable' business for hellfish production and restoration of wild benthic biodiversity in coastal habitats. This is an interdisciplinary indeavor encompassing larval hatchery technology, seafood quality, and economic dimensions of coastal quaculture business. After reading about basic oyster biology and oyster aquaculture topics, we will focus on how harine larvae will be useful for human society through hatchery technology and aquaculture business. Invironmental issues, legislation pertaining to coastal aquaculture business and community interaction will also be overed using oyster aquaculture in Hong Kong as an example. Students will be exposed to several aquaculture civilities in Hong Kong, Zhanjiang, and Qingdao to learn industrial and business skills of oyster aquaculture. This ourse is designed to meet the needs of an expanding sustainable aquaculture in Hong Kong and in mainland. areer and small scale business opportunities in aquaculture industry will be discussed.					
Course Learning	On succes	n successful completion of this course, students should be able to:					
Outcomes	CLO 2 action CLO 3 ex	CLO 1 gain scientific knowledge required for setting up oyster hatchery, farming and small-scale business, best understanding biology and ecology of larvae and shellfishes and consider potential environmental effection hatchery and farming acquire skills and experiential learning opportunities (e.g. hands-on experiences at laboratories and farming oyster hatchery and aquaculture business, farming and industry acquire skills and experiential learning in coastal habitat restoration plan and execute a commercially important research project in marine science and coastal aquaculture					
Pre-requisites	CLO 5 develop novel ideas, and think creatively, about hatchery production in relation to the aquaculars of 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 Biodivers Major or Environmental Science Major or Biological Science Major.					
and Impermissible							
combinations)		idents who have passe	•				
Offer in 2019 - 2020	N Off	er in 2020 - 2021 : Y		Examination			
Grade Descriptors	A Evidence of original thought during the analysis of larval biology issues. Show evidence of analytical						
(A+ to F)	outcomes. Demonstrate excellent ability to apply what you have learned in the class room to critically analyze the larval biology project data. Show highly effective organizational, presentational and field trip skills. Show substantial knowledge and thought during the analysis of marine 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 marine life science issues. Show effective organizational, presentational and field trip skills. C Show general but incomplete knowledge and original thought during the analysis of marine 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 marine life science issues. Show considerable organizational, presentational and field trip skills. D Evidence to show a minimum knowledge (i.e. knowledge is very incomplete) and thought during the analysis of marine life						
	Fail	science issues. Show insufficient knowledge and skills required for attaining all the course learning outcomes. I ability to apply what you have learned in the class room to critically analyze the real marine life science issues organizational, presentational and field trip skills. Evidence of meager or inadequate knowledge and understanding of marine life science issues. Show no evide and skills required for attaining all the course learning outcomes. Demonstrate no ability to apply what you have					
		class room to critically anal	lyze the real marine life science issues. Show no	evidence of familiarity with rel			
		·	s, or any knowledge of organizational and present	tational skills.	-		
Course Type	Field cam						
Course Teaching	Activities	5	Details		No. of Hours		
Learning Activities	Lectures		including tutorial		40		
	Field worl				50		
	Laborator		hands on training		30		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents	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 online materials			vironment (S.E. Shumway, John Wiley & an Spencer, John Wiley & Sons)	Sons)			
Course Website	http://moo	dle.hku.hk					
Additional Course		ternate year from 2017-	-2018				
Information	- Tentative	e duration: May 24 to Ju I field trips are compuls	ıne, 2019	t and aquaculture husin	oss soctor		

1st week: Lectures, practical's and field trips in Hong Kong
2nd week: Lectures and field trips in Penang (Malaysia)
3rd week: Lecture and field trips in Qingdao (China). This course will be offered subject to a minimum enrollment number and availability of teachers.

BIOL4861	Ecology	& biodiversity	/ inter	nship (6 credits)	Academic Yea	ar 2019	
Offering Department	Biological	Sciences		•	Quota		
Course Co-ordinator	Dr T Veng	atesen, Biologica	l Scien	ces (rajan@hku.hk)			
Teachers Involved	(All acade	mic staff in Ecolog	gy & Bi	odiversity Major, Biological Sciences	s)		
Course Objectives				e for all Ecology & Biodiversity Maj			
				n the Ecology & Biodiversity Major t	through gaining work expe	rience in the field of	
				ated to the major of study.			
Course Contents				work as an intern for at least 160			
& Topics				ment department or NGO. The int			
				In the latter case, the internship			
Course Learning		diversity Major that the students are taking and prior approval by the course coordinator is required. successful completion of this course, students should be able to:					
Outcomes				ience in a job placement related to t	their Ecology & Riodiversit	v Maior	
Outcomes				eir Ecology & Biodiversity Major in s	0,	, ,	
				and appreciation of the real work er	· · · · ·	in the work place	
		tend their network		• • •	WIIGHINGH		
Pre-requisites				,	rtive courses in the Ecolo	av and Riodiversity	
(and Co-requisites	Major.	Pass in at least 24 credits of advanced level disciplinary core / elective courses in the Ecology and Biodiversit					
and Impermissible	,	e is for Ecoloav 8	& Biodiv	versity Major students only.			
combinations)				ed to take this course is their Year 3	3.		
Offer in 2019 - 2020	Y 1st	sem 2nd sem	Summ	ner Offer in 2020 - 2021 : Y	Examination	No Exam	
Grade Descriptors (Pass /Pass with distinction /Fail)	the job. Succes and evaluation by Very limited or r by supervisor(s)		risor(s). If y fulfills to upervisor bility to sails to est	Establishes effective collaboration and common the requirements set out in the Course Descr(s), etc. solve problems in the workplace. Fails to har tablish effective collaboration or communicat uirements set out in the Course Description	nunication with supervisor(s), co- cription regarding working hours andle or carry out the work require tion with supervisor(s), other coll	olleagues, and clients in written and oral report, and in the job or assigned eagues, or clients in the	
Course Type	Internship	evaluation by super	visor(s),	etc			
Course Teaching	Activities			Details		No. of Hours	
& Learning Activities	Internship			at least 160 hours		160	
Assessment Methods	Methods	WOIK		Details	Weighting in final	Assessment	
and Weighting	Wethous			Details	course grade (%)	Methods to CLO Mapping	
	Written report		written report, supervisor's feedback and oral presentation	100	CLO 1,2,3,4		
Course Website	http://mood						
Additional Course				to submit a written report of not les			
Information	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. 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. BIOL4861 E&B internship is not a Capstone Course.						

BIOL4911	Conse	ervation science in practice (6 credits)	Academic Year	2019		
Offering Department	Biologic	cal Sciences	Quota	9		
Course Co-ordinator	TBC, Bi	iological Sciences ()				
Teachers Involved						
Course Objectives	environi produce science econom scientifi	To build on the foundation acquired by students in the Biological Sciences in the fields of ecology, biodiversity and environmental science by using case studies that stimulate them to integrate the principles and concepts learned to produce and successfully debate a topic in conservation science. Case studies will specifically address the use of science in achieving meaningful conservation outcomes taking into account the need for considering social, economic, and political contexts. Students will be expected to present their cases orally using sound practical and scientific reasoning. This course is a capstone course for Ecology & Biodiversity major / Ecology & Biodiversity Intensive) Major students.				
Course Contents & Topics	specific wider of conduct address wildlife instrume will intro	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 across case studies				
Course Learning	On succ	cessful completion of this course, students should be able to:				
Outcomes	CLO 1 have an in-depth understanding of the topic studied, the major issues involved and the need prospects for further work in the area					
	CLO 2 have developed investigative skills associated with the case study selected which include synthe organization and presentation of information and innovative and creative thinking around problem solving					
		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					

Pre-requisites		•	tly present the case study and convi of advanced level disciplinary core/e	0,7 0	ırses (BIOL3XXX o	
and Co-requisites			Biodiversity Major / Ecology & Biod			
and Impermissible	This cap	stone course is for E	Ecology & Biodiversity Major / Ecolog	gy & Biodiversity (Íntensive) Ma	ajor students only.	
combinations)	The earli	est that a student is	allowed to take this capstone cours	e is their year 3 study.		
Offer in 2019 - 2020	N O	ffer in 2020 - 2021 :	N	Examination		
Grade Descriptors (A+ to F)	A 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 strong evidence of ability to integrate and synthesize information across subject areas, including from practical work undertaken, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations and showing consideration of practical and political dimensions for addressing conservation challenges. Apply highly effective presentational skills. Strong evidence of attention to thoughtful and reflective thinking and consideration of the wider issues of biodiversity conservation for Society.					
	В	learning outcomes. S ability to apply knowled of clear attention to	ntial command of a broad range of knowledge thow evidence of analytical and critical abilitied edge to familiar and some unfamiliar situation thoughtful and reflective thinking and attement must be demonstrated including the im-	ies and logical thinking, with some intens. Demonstrate effective presentation tention to detail. Consideration of p	egration of materials and nal skills. Some evidence practical components in	
	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, ability to apply knowledge to most familiar situations and of relevance of biodiversity conservation for Society. Apply moderately effective presentational skills and understanding of the practical challenges of effective conservation initiatives. 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. 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.					
	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 or attention to detail. Show very little or no ability to apply knowledge or practical thinking to solve problems. Organization and presentational skills are minimally effective or ineffective.					
Course Type	Project-b	ased course				
Course Teaching	Activitie	es	Details		No. of Hours	
& Learning Activities				supervised practical work of at least 80 hours followed by		
	Reading / Self study		written & oral reports. Tui coordinator	written & oral reports. Tutorials provided by course coordinator		
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Oral pre	sentation		40	CLO 1,2,4,5	
	Researc	h report	project report	60	CLO 1,2,3,4,5	
Course Website	http://ww	w.biosch.hku.hk/eco	ology/lsc/			
Additional Course	This cou	rse will be offered in	alternate year from 2017-2018 ubject to a minimum enrollment num	ther and availability of teachers	•	

BIOL4912	Senso	ry evaluation of food (6 credits)	Academic Year	2019			
Offering Department	Biologic	al Sciences	Quota	15			
Course Co-ordinator	Dr J C	Y Lee, Biological Sciences (jettylee@hku.hk)					
Teachers Involved							
Course Objectives	percept	ide a broad understanding of the physiological and psycho ion of food. To develop expertise in the choice and applica s of sensory data, in food science and consumer research.					
Course Contents & Topics	in mainl lectures percepti descript food or	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	On succ	cessful completion of this course, students should be able to	to:				
Outcomes	CLO 1 understand the psychophysiological basis for human sensory perception of food						
	CLO 2 understand the major techniques used in sensory testing						
	CLO 3 interpret sensory evaluation reports, and to design and conduct sensory evaluation projects using appropriately chosen methods						
Pre-requisites	Pass in	BIOL3201; and					
(and Co-requisites	Pass in	at least 24 credits of advanced level disciplinary core/ele	ective biological sciences cours	es (BIOL3XXX c			
and Impermissible	BIOL4X	(XX) in the Food & Nutrional Science Major.					
combinations)		ostone course is for Food & Nutrional Science Major stude					
		liest that a student is allowed to take this capstone course	is their year 3 study.				
Offer in 2019 - 2020	N C	Offer in 2020 - 2021 : N	Examination				
Grade Descriptors (A+ to F)	A	Demonstrate thorough grasp of the subject matter covered. Show sevidence of creative ability and competence in professional-level panalysis of data and results to draw appropriate and insightful conciteam-based organizational and presentational skills.	problem solving. Critically use lab skills	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	C Demonstrate general but incomplete grasp of the subject matter covered. Show some evidence of analytical and critical abilitic and logical thinking with limited competence in professional-level problem solving. Use lab skills and techniques and analysis data and results to draw moderately appropriate but sometimes erroneous conclusions to real-world problems. Demonstrat moderately effective team-based organizational and presentational skills.					
	D	Demonstrate partial but limited grasp, with retention of some relevevidence of coherent and logical thinking, but lacking competence techniques and analysis of data and results to draw sometimes problems. Demonstrate team-based organizational and presentation	e in professional-level problem solving appropriate but often erroneous cond	g. Use lab skills and			
	Fail	Demonstrate little or no grasp, with retention of little relevant inform and logical thinking, and minimal competence in professional-level p data and results ineffectively, leading generally to inappropriate a	problem solving. Úse lab skills and techr	niques and analysis o			

	Demonstrate ineffec	ctiveness team-based organizational ar	nd presentational skills.				
Course Type	Laboratory and workshop course						
Course Teaching	Activities	No. of Hours					
& Learning Activities	Laboratory			48			
	Project work			48			
	Tutorials lectures/tutorials						
	Reading / Self study			30			
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Laboratory reports		20	CLO 2,3			
	Project reports		60	CLO 2,3			
	Test		20	CLO 1,2,3			
Required/recommended reading and online materials		004) Sensory Evaluation Praction atory Exercises for Sensory Evaluation Practical Sensory Evaluation Pr					
Course Website	http://moodle.hku.hk/	http://moodle.hku.hk/					
Additional Course Information	This course will be offered subject to a minimum enrollment number and availability of teachers.						

BIOL4913	Advanc	ed practicum o	on food and nutrient analysis (6 cr	redits)	Academic Year	2019	
Offering Department	Biologica	Sciences			Quota	8	
Course Co-ordinator	Dr J C Y	Lee, Biological Sci	iences (jettylee@hku.hk)				
Teachers Involved			of Biological Sciences)				
	(Dr J C Y	Lee, School of Bio	logical Sciences)				
Course Objectives	Food pro	ducts are analyse	d to follow the compliance with legal and	labelling req	uirements, asse	ssment of produ	
·	the analy products analysis individual	quality, determination of nutritive value, research and development. The lectures and laboratory sessions will cover he 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 ndividually on food products where they will analytically assess components using advanced techniques necessary for basic labelling of food products.					
Course Contents & Topics	Key lectu technique	ires on specific t s and contaminar	echniques and cases studies demonstr at assessment for certain class of foods o	r food compo	onents will be di	scussed. Studen	
	equivalen materials	it methods. The s are assessed in	ence in analysing food products and will students will learn how mycotoxins ass food products. In-depth learning in the LISA and procedures for sample preparat	says, allerge e use of diffe	ns and genetic erent chromato	ally modified ra graphy and mas	
Course Learning		•	of this course, students should be able to:				
Outcomes			food labeling system				
			of appropriate analytical techniques for f	•			
	CLO 3 H	ave knowledge of	a variety of analytical techniques for eval	luation of foo	d products		
			nowledge of the state of the art of th	ne most imp	ortant analytica	I methods, the	
	possibilities and their application in complex food systems						
	CLO 5 Able to perform risk assessment and compare the outcomes with governmental regulated levels					l levels	
Pre-requisites and Co-requisites and Impermissible combinations)	Pass in at least 24 credits of advanced level disciplinary core/elective biological sciences courses (BIOL3XXX 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.						
Offer in 2019 - 2020	N Off	fer in 2020 - 2021	: N		Examination		
Grade Descriptors (A+ to F)	A	Demonstrate a thorough grasp of the subject matter covered. Show strong analytical and critical abilities and logical think with evidence of creative ability and competence in professional-level problem solving. Critically use lab skills and technic and analysis of data and results to draw appropriate and insightful conclusions to real-world problems. Demonstrate high effective team-based organizational and presentational skills.					
	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 lab skills and techniques and analysis o 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 inappropriate and usually erroneous conclusions to real-world problems. Demonstrate ineffectiveness team-based organizational and presentational skills.						
Course Type	Lecture w	ith laboratory com	ponent course				
Course Teaching	Activitie	S	Details	Details			
Learning Activities	Lectures						
	Laborato						
	Reading	/ Self study				100	
Assessment Methods and Weighting	Methods		Details		ing in final grade (%)	Assessment Methods to CLO Mappir	
	Project re	eport			50	CLO 1,2,3,4	
	Test				50	CLO 1,2,3,4,5	
Required/recommended reading and conline materials			s 4th Edition (2010 Springer USA) of Food Techniques and Applications (20	12, Knovel, S	Science Direct o		

Course Website	http://moodle.hku.hk
Additional Course Information	The course will be offered subject to a minimum enrollment number and availability of teachers.

BIOL4921	credits)		avioural ecology: field course (6 Academic Ye	ar 2019	
Offering Department	Biological	Sciences		Quota	15	
Course Co-ordinator	, Biologica	al Sciences ()				
Teachers Involved						
Course Objectives	students t exposes s generates	to scientific reasoning students to 'research-ir and all demanding c	apstone experience and unique experience and conceptual basis of studying and nearling and logistics of studying and studying along, with hand betting field studies of animal behaviou	mal behaviour and beh a field research, with a s-on experience in des	avioural ecology. all the excitement signing, conducting	
Course Contents & Topics	animal be and how informal d provides of experienc data, and location. See technique individual contribute application	haviour, how to design to put this framework iscussions, review of reexperiential learning the in application of diversity of the control of the knowledge action of the knowledge actions of the control of the con	e outside Hong Kong, this course tead a field research protocol, construct a into a practice of collecting and ana esearch techniques, and extensive field prough (i) direct participation in an operse research techniques, (iii) handscientific debates with researchers and if through the scientific reasoning and reskills in data gathering and interpretaribute to a greater understanding of be at large. The emphasis is placed equired previously during relevant clauded to give a seminar-type presentation.	conceptual framework of lysing data. The course d component with daily in ngoing field-based rese on involvement in colle- research teams directly methodology, will learn tion, and will develop are ehavioural and evolutio on independent think ssroom courses. Follow	of a research project includes lectures research activities. Parch, (ii) hands-orcting and analysing project in their field studies a suite of research understanding howary processes and ing and thoughtfuring the field-based	
Course Learning	On succes	ssful completion of this	course, students should be able to:			
Outcomes			ersity and primary habitats in the ecosy			
	CLO 3 be		needed to identify target species assoc t and able to implement sampling to			
	CLO 4 ur	nderstand the basic eco	ology of target species and how biotic a	ind abiotic factors shape	focal communities	
Pre-requisites		IOL3101; and				
and Co-requisites			vanced level disciplinary core/elective	biological sciences cou	ırses (BIOL3XXX d	
and Impermissible combinations)		X) in the Ecology & Bio	diversity Major. ogy & Biodiversity Major students only.			
John Dinations)			wed to take this capstone course is the	ir vear 3 study		
Offer in 2019 - 2020		er in 2020 - 2021 : N	mou to take and capetone counce is an	Examination		
Grade Descriptors	Α		asp of the subject and relevant research techniq			
	B C D	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. 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.				
Course Type	Field com	thought; ineffective preser reach degree level.	no familiarity with any relevant examples and contation skills with poor argumentation and no a			
Course Type Course Teaching	Field cam Activities	•	Details		No. of Hours	
Learning Activities	Lectures		lectures and tutorials		10	
-	Field worl	k			72	
	Presentat		interactive debates		10	
		Self study			100	
Annanament Made at	Assessm		group project	147.1.1.41 2 2 2 2	15	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin	
	Assignments		project report (250/) group	35	CLO 1,2,3,4	
	Report		project report (35%), group investigation & presentation (30%)	65	CLO 1,2,3,4	
Required/recommended reading and online materials	(at most 4 Lehner, P Dugatkin, approache Yamagiwa	L.A. (ed.) 2001. Modeles. Princeton University	and online materials Handbook of ethological methods. Call systems in behavioral ecology. Integraphs. Press. (eds.) 2014. Primates and Cetaceans:	rating conceptual, theore	etical, and empirica	

Course Website	http://www.biosch.hku.hk/ecology/lsc/
Additional Course	Enrollment Procedure:
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 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 pro	duct development	and evaluation (6 credits)	Academic Yea	r 2019				
Offering Department	Biological		· · · · · · · · · · · · · · · · · · ·	Quota	20				
Course Co-ordinator	Dr M F Wa	ang, Biological Sciences	(mfwang@hku.hk)						
Teachers Involved	(Dr M F W	ang,Biological Sciences	3)						
Course Objectives			and techniques used in food production and production of a new food pro		vide small group				
Course Contents		listory and future of the food industry; industrial product development process; idea generation and							
& Topics	, ,,	rototype development for new food products; quality management and legal protection; marketing							
		trategies; 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:							
Outcomes		nderstand the food produ	· · · · · · · · · · · · · · · · · · ·						
		now the key steps in nev	•						
			sight and understanding of current and		dindustry				
			actical experience in new product deve						
			stics of different sectors of the food ind	•	(21212)				
Pre-requisites (and Co-requisites and Impermissible combinations)	BIOL4XXX This capst The earlie	() included BIOL3203 ar one course is for Food & st that a student is allow	anced level disciplinary core/elective to d / or BIOL4205 in the Food & Nutritio Nutritional Science Major students or ed to take this capstone course is their	nal Science Major. nly. · year 3 study.	ses (BIOL3XXX o				
		dents who have passed	in BIOL4210 Food product developme	ent.					
Offer in 2019 - 2020	Y 1st	sem Offer in 2020 - 20		Examination	Dec				
Grade Descriptors (A+ to F)	A	evidence of creative ability analysis of data and results team-based organizational a		solving. Critically use lab skil to real-world problems. Demo	s and techniques and nstrate highly effective				
	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 cohe and logical thinking, and minimal competence in professional-level problem solving. Use lab skills and techniques and analys data and results ineffectively, leading generally to inappropriate and usually erroneous conclusions to real-world proble Demonstrate ineffectiveness team-based organizational and presentational skills.								
Course Type	Laboratory	and workshop course							
Course Teaching	Activities	i	Details		No. of Hours				
& Learning Activities	Laborator	у			48				
	Group wo	rk	80-100 hours group project work		100				
	Tutorials		6 lectures + 6 tutorials	12					
	Reading /	Self study			100				
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping				
	Assignments		Assignments assessment of group product development project including food product presentation	100	CLO 1,2,3,4,5				
Required/recommended reading and online materials	E. Graf an	d I. S. Saguy: Food Prod	ping New Food Products for a Changir duct Development (Avi Books, 1991) evelopment (CRC Press, 2005)	ng Marketplace (CRC Pr	ess, 2007)				
Course Website		dle.hku.hk/	. , ,						
Additional Course	This cours	e will be offered subject	to a minimum enrollment number and	availability of teachers.					
Information		,		•					

BIOL4962	Food & nutritional science internship (6 credits)	Academic Year	2019			
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 und their knowledge and skills obtained from the Food & Nutritional Science Major the field of Food & Nutritional Science 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 a	t least 20 working	days within the			

& 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 relevant field to the Food & Nutritional Science Major that the students are taking and prior approval by the course coordinator is required						
Course Learning Outcomes	CLO 1 ga CLO 2 ap pla CLO 3 ac	On successful completion of this course, students should be able to: 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 (and Co-requisites and Impermissible combinations)	BIOL4XXX This capst	() in the Food & Nutrition () in the Food () in the Food	onal Science Major. & Nutritional Science Majo	core/elective biological sciences cou or students only. course is their year 3 study.	urses (BIOL3XXX or		
Offer in 2019 - 2020	Y 1st	sem 2nd sem Sum	mer Offer in 2020 - 2021	: Y Examination	No Exam		
Grade Descriptors (Pass /Pass with distinction /Fail)	Pass	assigned by supervisor(s). the job. Successfully fulfills and evaluation by superviof "Distinction".	Establishes effective collaboration the requirements set out in the sor(s), etc. Students demonstrate	 Successfully handles and carries out the w ion and communication with supervisor(s), c Course Description regarding working hours ting excellent performance in the above wo 	colleagues, and clients in s, written and oral report, uld be awarded a grade		
	Fail	by supervisor(s). Fails to e	stablish effective collaboration of quirements set out in the Cour	 Fails to handle or carry out the work requir r communication with supervisor(s), other col se Description regarding working hours, wr 	lleagues, or clients in the		
Course Type	Internship						
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Internship	work	at least160 hours (lund working days	160			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Oral prese	entation		25	CLO 1,2,3,4		
	Superviso	r's feedback		50	CLO 1,2,3,4		
	Written re	port		25	CLO 1,2,3,4		
Course Website	http://mood	dle.hku.hk					
Additional Course Information	presentatic supervisor the Univer- Satisfactor be recorde interested Enrolment	on about their internshi at work i.e. the institut sity. y completion of this co ed on the student's tra to enrol in this course of of this course is not co	ps, which will be assessed ion offering the internship urse can be counted towa anscript. This course will should contact the Departr anducted via the online co	of not less than 1,000 words and an and by internal supervisors. Student's will also submit an assessment reported the Capstone requirement. Detailed be assessed on "Pass/Fail" basisment to obtain the approval. Solution burse selection system and should be obtained from the course coordinate.	tails of internship will . Students who are the made through the		

BIOL4963	Molecul	lar biology & I	oiotechr	nology internship (6 credits)	Academic Ye	ar 2019			
Offering Department	Biological	I Sciences			Quota				
Course Co-ordinator	Dr A Yan	Or A Yan, Biological Sciences <i>(ayan8</i> @ <i>hku.hk)</i>							
Teachers Involved	(All acade	(All academic staff in Molecular Biology & Biotechnology Major Biological Sciences)							
Course Objectives	and apply work expe	To provide a stimulating experience for all Molecular Biology & Biotechnology Major undergraduates to integrate and apply their knowledge and skills obtained from the Molecular Biology & Biotechnology Major through gaining work experience in the field of Molecular Biology & Biotechnology that are related to the major of study.							
Course Contents & Topics	University arranged field to the	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 Molecular Biology & Biotechnology Major that the students are taking and prior approval by the course coordinator is required.							
Course Learning	On succe	essful completion	of this co	urse, students should be able to:					
Outcomes	CLO 1 ga	ain first hand wor	k experie	nce in a job placement related to	their Molecular Biology & I	Biotechnology Major			
		pply the knowled	ge in thei	r Molecular Biology & Biotechnolo	ogy Major in solving practi	cal problems in the			
	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 a	at least 24 cred	its of adv	anced level disciplinary core /	elective courses in the M	lolecular Biology &			
and Co-requisites		ology Major.		,		3,7			
and Impermissible			r Molecul	ar Biology & Biotechnology Major	students only.				
combinations)	The earlie	est that a student	is allowe	d to take this capstone course is t	heir year 3 study.				
Offer in 2019 - 2020	Y 1st	t sem 2nd sem	Summe	er Offer in 2020 - 2021 : Y	Examination	No Exam			
Grade Descriptors	Pass			lve problems in the workplace. Successfu		ork required in the job or			
(Pass /Pass with distinction /Fail)		the job. Successfu	ılly fulfills th	stablishes effective collaboration and com e requirements set out in the Course Des (s), etc. Students demonstrating excellen	cription regarding working hours	olleagues, and clients in , written and oral report,			
(Pass /Pass with distinction	Fail	the job. Successfu and evaluation by of "Distinction". Very limited or no by supervisor(s). I	ability to so ability to so als to esta fy the requi	e requirements set out in the Course Des (s), etc. Students demonstrating excellen live problems in the workplace. Fails to ha blish effective collaboration or communica rements set out in the Course Description	cription regarding working hours t performance in the above work andle or carry out the work requir- tion with supervisor(s), other col	olleagues, and clients in , written and oral report, ald be awarded a grade and in the job or assigned leagues, or clients in the			
(Pass · /Pass with distinction /Fail)	Fail Internship	the job. Successfu and evaluation by of "Distinction". Very limited or no by supervisor(s). I job. Fails to satis evaluation by supe	ability to so ability to so als to esta fy the requi	e requirements set out in the Course Des (s), etc. Students demonstrating excellen live problems in the workplace. Fails to ha blish effective collaboration or communica rements set out in the Course Description	cription regarding working hours t performance in the above work andle or carry out the work requir- tion with supervisor(s), other col	olleagues, and clients in , written and oral report, ald be awarded a grade and in the job or assigned leagues, or clients in the			
(Pass /Pass with distinction		the job. Successfu and evaluation by of "Distinction". Very limited or no by supervisor(s). I job. Fails to satis evaluation by supe	ally fulfills the supervisor ability to so fails to estate fy the requiervisor(s), et	e requirements set out in the Course Des (s), etc. Students demonstrating excellen live problems in the workplace. Fails to ha blish effective collaboration or communica rements set out in the Course Description	cription regarding working hours t performance in the above work andle or carry out the work requir- tion with supervisor(s), other col	olleagues, and clients in , written and oral report, ald be awarded a grade and in the job or assigned leagues, or clients in the			
(Pass	Internship	the job. Successfu and evaluation by of "Distinction". Very limited or no by supervisor(s). If job. Falls to satis evaluation by super p	ability fulfils the supervisor ability to so Fails to esta fy the requiervisor(s), et	e requirements set out in the Course Des (s), etc. Students demonstrating excellen live problems in the workplace. Fails to ha blish effective collaboration or communica rements set out in the Course Description	cription regarding working hours t performance in the above work ndle or carry out the work requir- tion with supervisor(s), other col on regarding working hours, wr	olleagues, and clients in , written and oral report, ald be awarded a grade ad in the job or assigned leagues, or clients in the tten and oral report, or			

				to CLO Mapping
	Written report	written report, supervisor's feedback and oral presentation	100	CLO 1,2,3,4
Course Website	http://moodle.hku.hk			
Additional Course Information	presentation about their into supervisor at work i.e. the into the University. Satisfactory completion of the be recorded on the stude interested to enrol in this co Enrolment of this course is	have to submit a written report of not less that ernships, which will be assessed by internal sunstitution offering the internship will also submithis course can be counted towards the Capstint's transcript. This course will be assessed ourse should contact the Department to obtain not conducted via the online course selection of office after approval has been obtained from	upervisors. Student lit an assessment re tone requirement. on "Pass/Fail" ba the approval. n system and shoul	eport to Details of internship will sis. Students who are lid be made through the

BIOL4964	Biologic	al sciences interns	hip (6 credits)	Academic Yea	r 2019				
Offering Department	Biological	Sciences		Quota					
Course Co-ordinator	Dr S Cann	Dr S Cannicci, Biological Sciences (cannicci @hku.hk)							
Teachers Involved	(All acade	mic staff in Biological So	ciences Major,Biological Sciences)					
Course Objectives	knowledge	To provide a stimulating experience for all Biological Sciences major undergraduates to integrate and apply their knowledge and skills obtained from the Biological Sciences Major through gaining work experience in the field of Biological Sciences that are related to the major of study.							
Course Contents & Topics	University arranged b	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 Biological Sciences major that the students are taking and prior approval by the course coordinator is required.							
Course Learning		sful completion of this	course, students should be able to	:					
Outcomes			rience in a job placement related to		lajor				
	CLO 2 ap	ply the knowledge in th	neir Biological Sciences Major in sc	olving practical problems in the	ne work place				
	CLO 3 ac	quire an understanding	and appreciation of the real work	environment					
	CLO 4 ex	tend their network in th	eir field of study						
Pre-requisites (and Co-requisites and Impermissible combinations)	BIOL4XXX This capts	() in the Biological Scier one course is for Biolog	ranced level disciplinary core/elec nces Major. gical Sciences Major students only ved to take this capstone course is		ses (BIOL3XXX or				
Offer in 2019 - 2020			mer Offer in 2020 - 2021 : Y	Examination	No Exam				
Grade Descriptors (Pass /Pass with distinction /Fail)	Pass Fail	assigned by supervisor(s). the job. Successfully fulfills and evaluation by supervisor of "Distinction". Very limited or no ability to by supervisor(s). Fails to es	solve problems in the workplace. Success Establishes effective collaboration and co the requirements set out in the Course De ior(s), etc. Students demonstrating excelle solve problems in the workplace. Fails to I stablish effective collaboration or communic quirements set out in the Course Descrip-	mmunication with supervisor(s), co escription regarding working hours, ent performance in the above woul nandle or carry out the work require cation with supervisor(s), other colle	lleagues, and clients in written and oral report, d be awarded a grade d in the job or assigned eagues, or clients in the				
Course Type	Internship	evaluation by supervisor(s),	, 0.00						
Course Teaching	Activities		Details		No. of Hours				
& Learning Activities	Internship		at least160 hours (lunch hour working days	excluded) in at least 20	160				
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping				
	Written re	port	written report, employer's feeback and oral presentation	100	CLO 1,2,3,4				
Course Website	http://moo	dle.hku.hk							
Additional Course Information	presentation supervisor the Univer Satisfactor	nttp://moodle.hku.hk 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 he 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.							

BIOL4991	Ecology & biodiversity project (12 credits) Academic Year 2019							
Offering Department	Biological Sciences Quota							
Course Co-ordinator	Dr M Yasuhara, Biological Sciences (yasuhara@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 Major / Ecology & Biodiversity Major (Intensive) undergraduates to integrate and apply their knowledge and skills obtained from the Ecology & Biodiversity Major / Ecology & Biodiversity (Intensive) through planning and carrying out a 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 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	n						
	CLO 3 develop and formulate innovative scientific hypotheses to test this questi	on						

	CLO 4 d	design and undertake pr	actical research work to formally test	the hypotheses propose	d			
	CLO 5 a		e data collected to test the hypothes					
	CLO 6 draw an objective series of conclusions based on the experimental work							
	CLO 7 highlight and critically discuss their research findings and place them into a holistic scientific context							
	CLO 8 s	submit their work following	ng a specified journal format, presen	t their work as a scientific	conference talk			
Pre-requisites	Pass in	at least 24 credits of a	advanced level disciplinary core / e	ective courses in the Ed	cology & Biodiversity			
and Co-requisites		Cology & Biodiversity M						
and Impermissible			ogy & Biodiversity Major / Ecology &		sive) students only.			
combinations)			wed to take this capstone course is	heir year 3 study.				
Offer in 2019 - 2020	Y Ye	ear long Offer in 2020		Examination				
Grade Descriptors (A+ to F)	A	attainment of all learning hypothesis. Well designed	near-complete understanding and a thoro g outcomes. Excellent critique and knowled d experimental approach to test research hyp twork techniques. Demonstrate comprehen work.	ge of relevant literature and pothesis. Show excellent organ	identification of research nizational 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	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	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.						
Course Type	Project-b	ased course						
Course Teaching	Activitie	es	Details		No. of Hours			
& Learning Activities	Reading	/ Self study	formal lectures, seminars & practi	cal work	144			
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Disserta	tion		80	CLO 1,2,3,4,5,6,7,8			
	Oral pre	sentation	may be through submission of recorded file	20	CLO 1,2,3,4,5,6,7			
Course Website	http://mo	odle.hku.hk						
Additional Course Information			00 words (80% weighting) and a res	earch seminar (20% weig	hting).			

BIOL4992	Food & r	nutritio	nal sciend	ce proje	ct (12 d	credits)			Academic Yea	ar	2019
Offering Department	Biological	Biological Sciences							Quota		
Course Co-ordinator	Dr J C Lee	e, Biologi	cal Science	s (jettylee	e @hku.h	ık)					
Teachers Involved	(All acader	emic staff	in Food & N	Nutritional	Science	Major,B	iological S	Sciences)			
Course Objectives	and apply	y their kn		nd skills c	btained	from the	Food &	Nutritional	ce Major undergra Science Major thr		
Course Contents & Topics	admission	n to the co		roved by	the cour				g this course. After complete their proje		
Course Learning	On succes	ssful com	pletion of th	nis course	e, studen	ts should	be able t	o:			
Outcomes	CLO 1 crit	ritique and	d review ap	oropriate	scientific	literatur	Э				
	CLO 2 us	se this inf	ormation to	generate	a scient	ifically re	levant res	earch que	stion		
	CLO 3 de	evelop an	d formulate	scientific	hypothe	eses to te	st this que	estion			
	CLO 4 de	esign and	undertake	practical	research	work to	formally to	est the hyp	otheses 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 hig	ighlight ar	nlight and discuss their research findings and place them into a holistic scientific context								
	CLO 8 su	ubmit thei	r work follov	ving a sp	ecified jo	ournal for	mat, pres	ent their wo	ork as a scientific c	ont	erence talk
Pre-requisites (and Co-requisites and Impermissible combinations)	BIOL4XXX Cumulative This capst	X) in the live GPA of stone cour	credits of Food & Nuti f 3.0 or aborese is for Fo student is a	ritional So ve. od & Nuti	cience M ritional S	ajor; and cience M	ajor stude	ents only.	gical sciences cou	rse	s (BIOL3XXX c
Offer in 2019 - 2020			Offer in 202			-		,	Examination		No Exam
Grade Descriptors (A+ to F)	A Evidence of complete or near-complete understanding and a thorough grasp of the subject matter as demonstrated by attainment of all learning outcomes. Excellent critique and knowledge of relevant literature and identification of research hypothesis. Well designed experimental approach to test research hypothesis. Show excellent organizational and/or analytical skills and laboratory/fieldwork techniques. Demonstrate comprehensive, critical, assessment of results and professional presentation of research work.										
	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 experimental approach to test research hypothesis. Show good organizational and/or analytical skills and laboratory/fieldwork techniques. Demonstrate effective, critical, assessment of results and good presentation of research work.										
	С	most of the	he learning out	tcomes. Acc	ceptable cr	itique and l	knowledge d	f relevant liter	strated by general but in rature and identification fair organizational and	of I	esearch hypothesis

		aboratory/fieldwork techniq esearch work.	ues. Demonstrate adequa	ate but not necessari	ily critical, assessment of res	sults and presentation of		
	le de la	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.						
	at ex la	Evidence of poor or inadequate understanding and grasp of the subject matter such that most of the learning out attained. Poor critique and knowledge of relevant literature and identification of research hypothesis. Be experimental approach to test research hypothesis. Show little evidence of appropriate organizational and/or analy laboratory/fieldwork techniques. Demonstrate incorrect interpretation and assessment of results and poor presearch work.						
Course Type	Project-base	d course						
Course Teaching	Activities		Details		No. of Hours			
& Learning Activities	Reading / Se	elf study	formal lectures, seminars & practical work			144		
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 present	tation			20	CLO 5,7		
Course Website	http://moodle	e.hku.hk/						
Additional Course Information	As BIOL4992	A dissertation of about 9,000 - 12,000 words (80% weighting) and a research seminar (20% weighting). As BIOL4992 "FNS project"is a whole year course, students should enrol this course during the course selection period or the add/drop period in the 1st Semester only.						

BIOL4993	Molecular biology & biotechnology project (12 credits) Academic Year 2019						
Offering Department		Biological Sciences Quota					
Course Co-ordinator	Dr A Yan,	Biological Sciences (a	yan8@hku.hk)				
Teachers Involved	(All acade	mic staff in MBB Major	/ MBB Intensive Major, Biological Science	ences)			
Course Objectives	& Biotech the Molec planning a	To provide a stimulating capstone experience for all Molecular Biology & Biotechnology Major / Molecular Biology & Biotechnology Major (Intensive) undergraduates to integrate and apply their knowledge and skills obtained from the Molecular Biology & Biotechnology Major / Molecular Biology & Biotechnology Major (Intensive) through planning and carrying out a 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 this	course, students should be able to:				
Outcomes	CLO 1	critique and review appr	ropriate scientific literature				
	CLO 2	use this information to g	generate a scientifically relevant resea	arch question			
	CLO 3	develop and formulate s	scientific hypotheses to test this quest	tion			
			ractical research work to formally test		ed		
			ne data collected to test the hypothese				
		•	ssional manner to illustrate the outcom				
			s of conclusions based on the experin				
Pre-requisites			eir research findings and place them				
(and Co-requisites and Impermissible combinations)	Cumulativ This caps (Intensive	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.					
Offer in 2019 - 2020		ar long Offer in 2020	· · · · · · · · · · · · · · · · · · ·	Examination	No Exam		
Grade Descriptors (A+ to F)	A	hypothesis. Well designed	outcomes. Excellent critique and knowledg dexperimental approach to test research hypo	othesis. Show excellent organization			
	В	presentation of research w Evidence of near-complete of learning outcomes. Goo designed experimental a laboratory/fieldwork techni Evidence of adequate und most of the learning outco Adequately designed expe	e understanding and a good grasp of the subje d critique and knowledge of relevant literature approach to test research hypothesis. Sho ques. Demonstrate effective, critical, assessme lerstanding and grasp of the subject matter as mes. Acceptable critique and knowledge of rele erimental approach to test research hypothes	ect matter as demonstrated by a and identification of research w good organizational and/cent of results and good presents demonstrated by general but want literature and identificatio is. Show fair organizational and	esults and professional attainment of the majority hypothesis. Appropriately or analytical skills and attion of research work. incomplete attainment or nof research hypothesis id/or analytical skills and		
		presentation of research w Evidence of near-complete of learning outcomes. Goo designed experimental a laboratory/fieldwork techni Evidence of adequate und most of the learning outcon Adequately designed exp laboratory/fieldwork techni research work. Evidence of limited under- learning outcomes. Limite designed experimental a laboratory/fieldwork techni research work. Evidence of poor or inade- attained. Poor critique a experimental approach to laboratory/fieldwork techni	ork. e understanding and a good grasp of the subjet of critique and knowledge of relevant literature approach to test research hypothesis. Sho ques. Demonstrate effective, critical, assessme lerstanding and grasp of the subject matter as mes. Acceptable critique and knowledge of rele	ect matter as demonstrated by a rand identification of research w good organizational and/cent of results and good presents of demonstrated by general but evant literature and identification is. Show fair organizational anarily critical, assessment of rest demonstrated by incomplete at ure and identification of rese ow fair organizational and/onized assessment of results ar matter such that most of the leentification of research hypo of appropriate organizational a	attainment of the majority hypothesis. Appropriately or analytical skills and atton of research work. incomplete attainment of n of research hypothesis d/or analytical skills and sults and presentation of tearch hypothesis. Poorly r analytical skills and dimitted presentation of the arch hypothesis. Poorly rangifical skills and not limited presentation of thesis. Badly designed nd/or analytical skills and nd/or analytical skills and		
Course Tun-	C D Fail	presentation of research w Evidence of near-complete of learning outcomes. Goo designed experimental a laboratory/fieldwork techni Evidence of adequate und most of the learning outcor Adequately designed exp laboratory/fieldwork techni research work. Evidence of limited under learning outcomes. Limite designed experimental a laboratory/fieldwork techni research work. Evidence of poor or inade attained. Poor critique a experimental approach to laboratory/fieldwork techni research work.	vork. e understanding and a good grasp of the subject of critique and knowledge of relevant literature approach to test research hypothesis. Sho ques. Demonstrate effective, critical, assessme derstanding and grasp of the subject matter as mes. Acceptable critique and knowledge of releventiques. Demonstrate adequate but not necessificated and grasp of the subject matter as a distribute and knowledge of relevant literat approach to test research hypothesis. Sho ques. Demonstrate adequate but not necessificated approach to test research hypothesis. Sho ques. Demonstrate confused and poorly organ quate understanding and grasp of the subject and knowledge of relevant literature and id test research hypothesis. Show little evidence	ect matter as demonstrated by a rand identification of research w good organizational and/cent of results and good presents of demonstrated by general but evant literature and identification is. Show fair organizational anarily critical, assessment of rest demonstrated by incomplete at ure and identification of rese ow fair organizational and/onized assessment of results ar matter such that most of the leentification of research hypo of appropriate organizational a	attainment of the majority hypothesis. Appropriately or analytical skills and atton of research work. incomplete attainment of n of research hypothesis d/or analytical skills and sults and presentation of tearch hypothesis. Poorly r analytical skills and dimitted presentation of the arch hypothesis. Poorly rangifical skills and not limited presentation of thesis. Badly designed nd/or analytical skills and nd/or analytical skills and		
71	C D Fail	presentation of research w Evidence of near-complete of learning outcomes. God designed experimental a laboratory/fieldwork techni Evidence of adequate und most of the learning outcor Adequately designed exp laboratory/fieldwork techni research work. Evidence of limited under learning outcomes. Limite designed experimental a laboratory/fieldwork techni research work. Evidence of poor or inade attained. Poor critique a experimental approach to laboratory/fieldwork techni research work. ased course	ork. e understanding and a good grasp of the subject of critique and knowledge of relevant literature approach to test research hypothesis. Sho ques. Demonstrate effective, critical, assessme terstanding and grasp of the subject matter as mes. Acceptable critique and knowledge of relevimental approach to test research hypothesiques. Demonstrate adequate but not necessificated by the subject matter as of the subject matter and ideast research hypothesis. Show little evidence iques. Demonstrate incorrect interpretation as	ect matter as demonstrated by a rand identification of research w good organizational and/cent of results and good presents of demonstrated by general but evant literature and identification is. Show fair organizational anarily critical, assessment of rest demonstrated by incomplete at ure and identification of rese ow fair organizational and/onized assessment of results ar matter such that most of the leentification of research hypo of appropriate organizational a	esults and professional attainment of the majority hypothesis. Appropriately or analytical skills and atton of research work. incomplete attainment of nof research hypothesis d/or analytical skills and sults and presentation of tatainment of many of the arch hypothesis. Poorly r analytical skills and imited presentation of thesis. Badly designed ind/or analytical skills and and poor presentation of		
Course Teaching	C D Fail Project-ba Activities	presentation of research w Evidence of near-complete of learning outcomes. God designed experimental a laboratory/fieldwork techni Evidence of adequate und most of the learning outcor Adequately designed exp laboratory/fieldwork techni research work. Evidence of limited under learning outcomes. Limite designed experimental a laboratory/fieldwork techni research work. Evidence of poor or inade attained. Poor critique a experimental approach to laboratory/fieldwork techni research work. ased course	ork. e understanding and a good grasp of the subject of critique and knowledge of relevant literature approach to test research hypothesis. Sho ques. Demonstrate effective, critical, assessme terstanding and grasp of the subject matter as mes. Acceptable critique and knowledge of relerimental approach to test research hypothesiques. Demonstrate adequate but not necessificated and grasp of the subject matter as of a critique and knowledge of relevant literat approach to test research hypothesis. Sho iques. Demonstrate confused and poorly orgal quate understanding and grasp of the subject and knowledge of relevant literature and id test research hypothesis. Show little evidence iques. Demonstrate incorrect interpretation a Details	ect matter as demonstrated by a and identification of research is we good organizational and/cent of results and good presents of demonstrated by general but evant literature and identification is. Show fair organizational an arrily critical, assessment of residemonstrated by incomplete at ure and identification of rese ow fair organizational and/onized assessment of results ar matter such that most of the letentification of research hypo of appropriate organizational a and assessment of results ar	esults and professional attainment of the majority hypothesis. Appropriately or analytical skills and attoin of research work. incomplete attainment or no fresearch hypothesis d/or analytical skills and sults and presentation of tatainment of many of the arch hypothesis. Poorly r analytical skills and imited presentation of the size and professional dimited presentation of the size and poor poor poor poor poor poor poor poo		
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Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	C D Fail Project-ba Activities	presentation of research w Evidence of near-complete of learning outcomes. God designed experimental a laboratory/fieldwork techni Evidence of adequate und most of the learning outcor Adequately designed exp laboratory/fieldwork techni research work. Evidence of limited under learning outcomes. Limite designed experimental a laboratory/fieldwork techni research work. Evidence of poor or inade attained. Poor critique a experimental approach to laboratory/fieldwork techni research work. ased course Self study	ork. e understanding and a good grasp of the subject of critique and knowledge of relevant literature approach to test research hypothesis. Sho ques. Demonstrate effective, critical, assessme terstanding and grasp of the subject matter as mes. Acceptable critique and knowledge of relerimental approach to test research hypothesiques. Demonstrate adequate but not necessificated and grasp of the subject matter as of a critique and knowledge of relevant literat approach to test research hypothesis. Sho iques. Demonstrate confused and poorly orgal quate understanding and grasp of the subject and knowledge of relevant literature and id test research hypothesis. Show little evidence iques. Demonstrate incorrect interpretation a Details	ect matter as demonstrated by a and identification of research is we good organizational and/cent of results and good presents of demonstrated by general but evant literature and identification is. Show fair organizational an arrily critical, assessment of residemonstrated by incomplete at ure and identification of rese ow fair organizational and/onized assessment of results ar matter such that most of the letentification of research hypo of appropriate organizational a and assessment of results ar	attainment of the majority hypothesis. Appropriately or analytical skills and attainment of the majority or analytical skills and atton of research work. Incomplete attainment of no fresearch hypothesis (d/or analytical skills and sults and presentation of the arch hypothesis. Poorly reallytical skills and attainment of many of the arch hypothesis. Poorly reallytical skills and the majority of the arch hypothesis. Poorly reallytical skills and attainment of presentation of the sis. Badly designed and/or analytical skills and not poor presentation of the sis. Badly designed hypothesis. Badly designed hypothesis. Badly designed hypothesis and poor presentation of the sis. Badly designed the sis. Badly designed the sis and poor presentation of the sis and present		
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Course Teaching & Learning Activities Assessment Methods	C D Fail Project-ba Activities Reading	presentation of research w Evidence of near-complete of learning outcomes. God designed experimental a laboratory/fieldwork techni- Evidence of adequate und most of the learning outcor Adequately designed exp laboratory/fieldwork techni- research work. Evidence of limited under- learning outcomes. Limite designed experimental a laboratory/fieldwork techni- research work. Evidence of poor or inade- attained. Poor critique a experimental approach to laboratory/fieldwork techni- research work. aexperimental approach to laboratory/fieldwork techni- research work. Sed course S / Self study	ork. e understanding and a good grasp of the subject of critique and knowledge of relevant literature approach to test research hypothesis. Sho ques. Demonstrate effective, critical, assessme terstanding and grasp of the subject matter assemes. Acceptable critique and knowledge of relevintal approach to test research hypothesiques. Demonstrate adequate but not necessificated critique and knowledge of relevant literat approach to test research hypothesis. Sho iques. Demonstrate confused and poorly organ quate understanding and grasp of the subject and knowledge of relevant literatives. Demonstrate confused and poorly organ quate understanding and grasp of the subject and knowledge of relevant literature and id test research hypothesis. Show little evidence iques. Demonstrate incorrect interpretation at the properties of the subject in the propert	and identification of research is and identification of research with good organizational and/cent of results and good presents of demonstrated by general but evant literature and identification is. Show fair organizational anarily critical, assessment of residemonstrated by incomplete at ure and identification of research with a complete and identification of results are matter such that most of the leentification of research hypo of appropriate organizational anard assessment of results are matter such that most of the leentification of research hypo of appropriate organizational and assessment of results are all work Weighting in final	attainment of the majority hypothesis. Appropriately or analytical skills and attainment of the majority hypothesis. Appropriately or analytical skills and attorn of research hypothesis (d/or analytical skills and sults and presentation of teaminent of many of the arch hypothesis. Poorly or analytical skills and all limited presentation of thesis. Badly designed nd/or analytical skills and nd poor presentation of the sis. Badly designed nd/or analytical skills and nd/or analytical skills and nd/or presentation of the sis. Badly designed nd/or presentation of the sis. The sis and poor presentation of the sis and presentation o		

Course Website	http://moodle.hku.hk/
Additional Course Information	A dissertation of about 9,000 - 12,000 words (80% weighting) and a research seminar (20% weighting).

BIOL4994	Biologi	cal sciences pr	oject (12 credits)	Academic Ye	ar 2019			
Offering Department		l Sciences		Quota				
Course Co-ordinator	Dr S Car	Dr S Cannicci, Biological Sciences (cannicci@hku.hk)						
Teachers Involved	(All academic staff in Biological Sciences Major, Biological Sciences)							
Course Objectives	apply the research	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 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 thei supervisor.							
Course Learning Outcomes	On succe	essful completion o	f this course, students should be	able to:				
	CLO 1	critique and review	appropriate scientific literature					
	CLO 2	use this informatio	n to generate a scientifically relev	ant research question				
			late scientific hypotheses to test					
				mally test the hypotheses propose	d			
	CLO 5	analyse and evalu	ate the data collected to test the h	nypotheses				
	CLO 6	present data in a p	rofessional manner to illustrate th	ne outcomes				
	CLO 7	draw an objective	series of conclusions based on th	e experimental work				
	CLO 8	highlight and discu	iss their research findings and pla	ace them into a holistic scientific co	ntext			
Pre-requisites and Co-requisites and Impermissible combinations)	BIOL4XX Cumulati This cap	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.						
			s allowed to take this capstone co					
Offer in 2019 - 2020 Grade Descriptors	Y Ye	ear long Offer in 2		Examination d a thorough grasp of the subject matter	No Exam			
(A+ to F)	В	hypothesis. Well designed experimental approach to test research hypothesis. Show excellent organizational and/or analytical skills and laboratory/fieldwork techniques. Demonstrate comprehensive, critical, assessment of results and professional presentation of research work. 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 experimental approach to test research hypothesis. Show good organizational and/or analytical skills and laboratory/fieldwork techniques. Demonstrate effective, critical, assessment of results and good presentation of research work.						
	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	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	attained. Poor criti experimental approa	que and knowledge of relevant literat ach to test research hypothesis. Show littl	the subject matter such that most of the le- ure and identification of research hypot e evidence of appropriate organizational ar expretation and assessment of results an	hesis. Badly designe nd/or analytical skills a			
Course Type	Project-b	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	Method	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin			
	Disserta	tion		80	CLO 1,2,3,4,5,6,7,8			
	·	sentation		20	CLO 1,2,3,4,5,6,7,8			
Course Website								
Additional Course	A dissert	http://moodle.hku.hk/ A dissertation of about 9,000 - 12,000 words (80% weighting) and a research seminar (20% weighting).						

ENVS1301	Environmental life science (6 credits)	Academic Year	2019				
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 environmental biology/life science and importantly the relationship (connection) between environment and life. Here you will learn about the various biological/ecological principles and concepts of environmental science which are needed for critical discussion and evaluation of current global environmental issues including human ecology, urbanization, ecological economics,						
Course Contents & Topics	and climate change. 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						

Carrea Lagrerina	science.	On successful completion of this course, students should be able to:									
Course Learning Outcomes				e able to:							
Outcomes			ment and their interactions								
				man-induced environmental ch	ange						
				ent environ-life science issues							
				rironmental science questions a	and to choose	e advanced					
	1	vironmental science of	courses								
Pre-requisites (and Co-requisites and Impermissible	NIL	NIL STATE OF THE S									
combinations)	Y 2nd	oam Offer in 2020	2024 - V	Fyramina	tion May						
Offer in 2019 - 2020		sem Offer in 2020 -		Examina							
Grade Descriptors (A+ to F)	A	multidimensional thinking outcomes. Demonstrate	about the study subject. Extensive excellent ability to apply what y	mental life science issues. Show evid the knowledge and skills required for at the class room the class room anizational, presentational and field trip	taining all the c to critically and	ourse learning					
	В	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.									
	С	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.									
	D 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.									
Course Type	Lecture wi	th laboratory compone	•	, , , , , , , , , , , , , , , , , , , ,							
Course Teaching	Activities	•	Details		No.	of Hours					
& Learning Activities	Lectures					24					
_	Field work	(3-12 hours field work			12					
	Tutorials										
	Reading /	Self study				100					
Assessment Methods and Weighting	Methods	,	Details	Weighting in fin course grade (%	6) M	essment ethods O Mapping					
	Examination			100		LO 1,3					
Required/recommended reading and online materials			andouts will be provided du			1,0					
	http://moodle.hku.hk										
Course Website	http://mood	dle hku hk				http://moodle.hku.hk This course will be offered subject to a minimum enrollment number and availability of teachers.					

ENVS2001	Methods	Methods in environmental science (6 credits) Academic Year 2019						
Offering Department	Biological	Sciences	Quota	42				
Course Co-ordinator	Dr D M Baker, Biological Sciences (dmbaker@hku.hk)							
Teachers Involved	(Dr D M Baker,Biological Sciences)							
Course Objectives	science. T reporting,	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	cover basi based exp the biospl experience	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 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 2019 - 2020	Y 1st	sem Offer in 2020 - 2021 : 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. Apply highly effective lab / 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 grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Apply effective lab / fieldwork skills and techniques. 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 sapply moderately effective lab / fieldwork skills and techniques. Mostly draw appropriate conclusions. Apply moderately effective organizational	correct but some erroneous use					
	D	Demonstrate partial but limited grasp, with retention of some relevant info	ormation of the subject. Evidence	of some coherent and				

	Fail Demonstrate evide analytical and crit techniques. Misuse minimally effective	use data and results to draw approprists. s. ence of little or no grasp of the know ical abilities, logical and coherent think e of data and results and/or unable to d or ineffective.	bilities. Apply partially effective lab / fieldwo iate conclusions. Apply limited or barely effective and understanding of the subject. Evi king. Apply minimally effective or ineffective lraw appropriate conclusions. Organization an	dence of little or lack of lab / fieldwork skills and
Course Type	Laboratory and workshop	course		
Course Teaching	Activities	Details		No. of Hours
& Learning Activities	Laboratory			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
	Assignments		10	CLO 1,2,3
	Laboratory reports		20	CLO 1,2,3,4
	Presentation		20	CLO 2,3
	Project reports		50	CLO 1,2,3,4
Course Website	http://moodle.hku.hk		·	

ENVS2002	Environ	mental data analy	sis (6 credits)	Academic Yea	ar 2019		
Offering Department		l Sciences	<u> </u>	Quota	65		
Course Co-ordinator	Dr T C Bo	Dr T C Bonebrake, Biological Sciences (tbone@hku.hk)					
Teachers Involved	(Dr M Ya	(Dr M Yasuhara, School of Biological Sciences)					
	(Dr T C Bonebrake, School of Biological Sciences)						
Course Objectives	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				outions, uncertainty, probabili	itv. and hypothesi		
& Topics	The course will feature lectures on aspects of sampling, distributions, uncertainty, probability, and hypothesis testing in addition to lectures on advanced analysis topics. Special emphasis will be placed on qualities inherent to most environmental datasets such as large size, multivariate, and spatial. All material will be applied and practiced in environmental science contexts (e.g. chemistry, ecology, geology and oceanography) using a variety of datasets in a computer laboratory setting using the 'R Project for Statistical Computing' software (a graphical user interface will be implemented such that prior knowledge of coding or computer science is not required).						
Course Learning			s course, students should be able	• • •			
Outcomes	CLO 1		ethods and approaches in the scie				
	CLO 2		a analyses in the environmental sc				
	CLO 3		appropriate statistical analyses or				
	CLO 4		large datasets using applied softw	•			
	CLO 5		a analyses in a clear and transpare	, , ,			
Pre-requisites			,				
and Co-requisites and Impermissible combinations)	1 400 111 2	Pass in BIOL1309 or EASC1401 or ENVS1301 or ENVS1401					
Offer in 2019 - 2020	Y 2n	d sem Offer in 2020	- 2021 : Y	Examination	May		
Grade Descriptors	Α		rasp of the subject and skills required for				
(A+ to F)	В	analytical and critical abilities and logical thinking, with evidence of original thought. Apply a 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	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.					
	Demonstrate partial and limited 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, but with limited analytical and critical abilities. Apply limited or barely effective computational skills and techniques for basic statistical analyses. Demonstrate limited ability to use data and statistical results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.						
	Fail	evidence of little or lack computational skills and	to grasp of the subject and skills required of analytical and critical abilities, logical of techniques for basic statistical analyses. te conclusions. Apply minimally effective or	or coherent thinking. Apply minimally Demonstrate misuse of data and s	effective or ineffection and/		
Course Type	Lecture w	vith laboratory compon	ent course				
ourse Teaching	Activitie	s	Details		No. of Hours		
Learning Activities	Lectures				24 24		
	Laborato	,	problem-based learning/compu	problem-based learning/computer laboratory			
	Tutorials						
		/ Self study			100		
Assessment Methods and Weighting	Methods	3	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin		
0 0				0.5			
0 0	Examina	tion		25	CLO 1.2.3		
	Examina Project re			25 25	CLO 1,2,3 CLO 1,2,3,4,5		
ŭ ŭ	Examina Project re Test		problem-based exercises	25 25 50	CLO 1,2,3 CLO 1,2,3,4,5 CLO 1,2,3,4,5		

reading and online materials	Shahbaba, B. 2012. Biostatistics with R: An Introduction to Statistics through Biological Data. Springer, New York. Reimann, C. et al. 2007. Statistical Data Analysis Explained: Applied Environmental Statistics with R. John Wiley & Sons, Chichester.
	References: Zhang C. 2007. Fundamentals of Environmental Sampling and Analysis. John Wiley & Sons, New Jersey.
Course Website	http://moodle.hku.hk

	Urban e	ecology (6 credits)	Academic Yea	ar 2019				
Offering Department	Biologica	al Sciences	Quota	75				
Course Co-ordinator	Dr T C B	onebrake, Biological Sciences (tbone@hku.hk)						
Teachers Involved	,	(Dr C Dingle,School of Biological Sciences)						
		(Dr T C Bonebrake, School of Biological Sciences)						
Course Objectives	course w	rse will provide students with an understanding and knowle rill highlight the role of cities in a world under environmental	change and rapid developm	nent.				
Course Contents & Topics	concepts developn effects),	Ecological systems within cities and cities as ecological systems will both be covered in this course. Ecological 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 island effects), invasive species, infectious diseases and pollution. Examples will be taken globally but special emphasis will be placed on Hong Kong.						
Course Learning		essful completion of this course, students should be able to:						
Outcomes	CLO 1 d	lescribe and evaluate the processes and patterns that chara	acterize urban ecological sy	stems				
		ınderstand biodiversity and ecosystem responses to urbaniz						
		ecognize energy flows within urban ecosystems and how environmental quality	energy use and waste imp	rove or deteriorate				
	CLO 4 c	ritically evaluate management and policy solutions to urban	ecological problems					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	BIOL2306 or ENVS2001 or ENVS2002						
Offer in 2019 - 2020	Y 1s	t sem Offer in 2020 - 2021 : N	Examination	Dec				
Grade Descriptors	Α	Demonstrate thorough mastery at an advanced level of extensive kno						
(A+ to F)		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.						
	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, 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 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						
		familiar situations. Apply moderately effective presentational skills. Lit						
	D		tle evidence of clear attention to uired for attaining some of the co nited analytical and critical abiliti	thoughtful and reflective urse learning outcomes. es and little attempt at				
	D Fail	familiar situations. Apply moderately effective presentational skills. Lit thinking. Demonstrate partial but limited command of knowledge and skills req Show evidence of some coherent and logical thinking, but with lin integration. Show limited ability to apply knowledge to solve problems. attention to thoughtful and reflective thinking. Demonstrate little or no evidence of command of knowledge and skills of analytical and critical abilities, logical and coherent thinking. Sh	tle evidence of clear attention to uired for attaining some of the co inted analytical and critical abiliti Apply limited effectiveness in pres required for attaining the course ow very little or no ability to app	thoughtful and reflective urse learning outcomes. es and little attempt at sentational skills. Lack of learning outcomes. Lack				
Course Type	Fail	familiar situations. Apply moderately effective presentational skills. Lit thinking. Demonstrate partial but limited command of knowledge and skills req Show evidence of some coherent and logical thinking, but with lin integration. Show limited ability to apply knowledge to solve problems attention to thoughtful and reflective thinking. Demonstrate little or no evidence of command of knowledge and skills of analytical and critical abilities, logical and coherent thinking. She problems. Organization and presentational skills are minimally effective.	tle evidence of clear attention to uired for attaining some of the co inted analytical and critical abiliti Apply limited effectiveness in pres required for attaining the course ow very little or no ability to app	thoughtful and reflective urse learning outcomes. es and little attempt at sentational skills. Lack of learning outcomes. Lack				
• • • • • • • • • • • • • • • • • • • •	Fail Lecture-l	familiar situations. Apply moderately effective presentational skills. Lit thinking. Demonstrate partial but limited command of knowledge and skills req Show evidence of some coherent and logical thinking, but with lin integration. Show limited ability to apply knowledge to solve problems attention to thoughtful and reflective thinking. Demonstrate little or no evidence of command of knowledge and skills of analytical and critical abilities, logical and coherent thinking. She problems. Organization and presentational skills are minimally effective passed course.	tle evidence of clear attention to uired for attaining some of the co inted analytical and critical abiliti Apply limited effectiveness in pres required for attaining the course ow very little or no ability to app	thoughtful and reflective urse learning outcomes. es and little attempt at sentational skills. Lack of learning outcomes. Lack oly knowledge to solve				
Course Teaching	Fail	familiar situations. Apply moderately effective presentational skills. Lit thinking. Demonstrate partial but limited command of knowledge and skills req Show evidence of some coherent and logical thinking, but with lin integration. Show limited ability to apply knowledge to solve problems. attention to thoughtful and reflective thinking. Demonstrate little or no evidence of command of knowledge and skills of analytical and critical abilities, logical and coherent thinking. She problems. Organization and presentational skills are minimally effective cased course Details	tle evidence of clear attention to uired for attaining some of the co inted analytical and critical abiliti Apply limited effectiveness in pres required for attaining the course ow very little or no ability to app	thoughtful and reflective urse learning outcomes. es and little attempt at sentational skills. Lack of learning outcomes. Lack				
Course Teaching	Fail Lecture-k	familiar situations. Apply moderately effective presentational skills. Lit thinking. Demonstrate partial but limited command of knowledge and skills req Show evidence of some coherent and logical thinking, but with lin integration. Show limited ability to apply knowledge to solve problems attention to thoughful and reflective thinking. Demonstrate little or no evidence of command of knowledge and skills of analytical and critical abilities, logical and coherent thinking. She problems. Organization and presentational skills are minimally effective passed course Details Details	tle evidence of clear attention to uired for attaining some of the co inted analytical and critical abiliti Apply limited effectiveness in pres required for attaining the course ow very little or no ability to app	thoughtful and reflective urse learning outcomes. es and little attempt at sentational skills. Lack of learning outcomes. Lack oly knowledge to solve				
Course Type Course Teaching & Learning Activities	Fail Lecture-lectures Tutorials	familiar situations. Apply moderately effective presentational skills. Lit thinking. Demonstrate partial but limited command of knowledge and skills req Show evidence of some coherent and logical thinking, but with lin integration. Show limited ability to apply knowledge to solve problems attention to thoughful and reflective thinking. Demonstrate little or no evidence of command of knowledge and skills of analytical and critical abilities, logical and coherent thinking. She problems. Organization and presentational skills are minimally effective passed course Details Details	tle evidence of clear attention to uired for attaining some of the co inted analytical and critical abiliti Apply limited effectiveness in pres required for attaining the course ow very little or no ability to app	thoughtful and reflective urse learning outcomes. es and little attempt at sentational skills. Lack of learning outcomes. Lack oly knowledge to solve No. of Hours 36				
Course Teaching & Learning Activities Assessment Methods	Fail Lecture-lectures Tutorials	familiar situations. Apply moderately effective presentational skills. Lit thinking. Demonstrate partial but limited command of knowledge and skills req Show evidence of some coherent and logical thinking, but with lin integration. Show limited ability to apply knowledge to solve problems. attention to thoughtful and reflective thinking. Demonstrate little or no evidence of command of knowledge and skills of analytical and critical abilities, logical and coherent thinking. She problems. Organization and presentational skills are minimally effective passed course Details Details	tle evidence of clear attention to uired for attaining some of the co inted analytical and critical abiliti Apply limited effectiveness in pres required for attaining the course ow very little or no ability to app	thoughtful and reflective urse learning outcomes. es and little attempt at sentational skills. Lack of learning outcomes. Lack oly knowledge to solve No. of Hours 36 12 100 Assessment Methods				
Course Teaching & Learning Activities Assessment Methods	Fail Lecture-t Activitie Lectures Tutorials Reading	familiar situations. Apply moderately effective presentational skills. Lit thinking. Demonstrate partial but limited command of knowledge and skills req Show evidence of some coherent and logical thinking, but with lin integration. Show limited ability to apply knowledge to solve problems. attention to thoughtful and reflective thinking. Demonstrate little or no evidence of command of knowledge and skills of analytical and critical abilities, logical and coherent thinking. Shiproblems. Organization and presentational skills are minimally effective cased course Details Jetion Mid-term exam (20%), Final	tle evidence of clear attention to uired for attaining some of the conited analytical and critical abiliti. Apply limited effectiveness in pressure attaining the course low very little or no ability to appear or ineffective. Weighting in final	thoughtful and reflective urse learning outcomes. es and little attempt at sentational skills. Lack of learning outcomes. Lack oly knowledge to solve No. of Hours 36 12 100 Assessment				
Course Teaching Learning Activities Assessment Methods	Fail Lecture-t Activitie Lectures Tutorials Reading Methods	familiar situations. Apply moderately effective presentational skills. Lit thinking. Demonstrate partial but limited command of knowledge and skills req Show evidence of some coherent and logical thinking, but with lin integration. Show limited ability to apply knowledge to solve problems. attention to thoughtful and reflective thinking. Demonstrate little or no evidence of command of knowledge and skills of analytical and critical abilities, logical and coherent thinking. She problems. Organization and presentational skills are minimally effective cased course Details Signature Details Mid-term exam (20%), Final exam (30%)	tle evidence of clear attention to uired for attaining some of the conited analytical and critical abilitic Apply limited effectiveness in pressure required for attaining the course low very little or no ability to appear or ineffective. Weighting in final course grade (%)	thoughtful and reflective urse learning outcomes, less and little attempt at sentational skills. Lack of learning outcomes. Lack oly knowledge to solve No. of Hours 36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4				
Course Teaching Learning Activities Assessment Methods	Fail Lecture-I Activitie Lectures Tutorials Reading Methods	familiar situations. Apply moderately effective presentational skills. Lit thinking. Demonstrate partial but limited command of knowledge and skills req Show evidence of some coherent and logical thinking, but with lin integration. Show limited ability to apply knowledge to solve problems. attention to thoughtful and reflective thinking. Demonstrate little or no evidence of command of knowledge and skills of analytical and critical abilities, logical and coherent thinking. She problems. Organization and presentational skills are minimally effective cased course Details Details Mid-term exam (20%), Final exam (30%)	tle evidence of clear attention to uired for attaining some of the conited analytical and critical abiliti. Apply limited effectiveness in preserved in the course of the	thoughtful and reflective urse learning outcomes. es and little attempt at sentational skills. Lack of learning outcomes. Lack oly knowledge to solve No. of Hours 36 12 100 Assessment Methods to CLO Mapping				
Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommender reading and	Fail Lecture-t Activitie Lectures Tutorials Reading Methods Examina Presenta Project r Textbook Niemela	familiar situations. Apply moderately effective presentational skills. Lit thinking. Demonstrate partial but limited command of knowledge and skills req Show evidence of some coherent and logical thinking, but with lin integration. Show limited ability to apply knowledge to solve problems. attention to thoughtful and reflective thinking. Demonstrate little or no evidence of command of knowledge and skills of analytical and critical abilities, logical and coherent thinking. She problems. Organization and presentational skills are minimally effective problems. Details Significant of the problems of the problems of the problems of the problems of the problems. Mid-term exam (20%), Final exam (30%) ation eports (S: J, Breuste JH, Elmqvist T, Guntenspergen PJ, McIntyre N	tle evidence of clear attention to uired for attaining some of the conited analytical and critical abilitic Apply limited effectiveness in pressure required for attaining the course low very little or no ability to appear or ineffective. Weighting in final course grade (%) 50 20 30	thoughtful and reflective urse learning outcomes. es and little attempt at sentational skills. Lack of learning outcomes. Lack oly 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 1,2,3,4				
Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommender reading and	Fail Lecture-t Activitie Lectures Tutorials Reading Methods Examina Presenta Project r Textbook Niemela and Appl	familiar situations. Apply moderately effective presentational skills. Lit thinking. Demonstrate partial but limited command of knowledge and skills req Show evidence of some coherent and logical thinking, but with lin integration. Show limited ability to apply knowledge to solve problems. attention to thoughtful and reflective thinking. Demonstrate little or no evidence of command of knowledge and skills of analytical and critical abilities, logical and coherent thinking. She problems. Organization and presentational skills are minimally effective cased course Details Signature Mid-term exam (20%), Final exam (30%) Mid-term exam (20%), Final exam (30%) Station Peports Station Apply moderately effective presents and solve in the problems. Details Graph of the problems of the p	tle evidence of clear attention to uired for attaining some of the conited analytical and critical abiliti. Apply limited effectiveness in pressure a required for attaining the course low very little or no ability to apply or ineffective. Weighting in final course grade (%) 50 20 30 NE (2011) Urban Ecology: F	thoughtful and reflective urse learning outcomes. es and little attempt at sentational skills. Lack of learning outcomes. Lack oly 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 1,2,3,4				
Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended eading and online materials	Fail Lecture-t Activitie Lectures Tutorials Reading Methods Examina Presenta Project r Textbook Niemela and Appl Referenc Gaston k	familiar situations. Apply moderately effective presentational skills. Lit thinking. Demonstrate partial but limited command of knowledge and skills req Show evidence of some coherent and logical thinking, but with lin integration. Show limited ability to apply knowledge to solve problems. attention to thoughtful and reflective thinking. Demonstrate little or no evidence of command of knowledge and skills of analytical and critical abilities, logical and coherent thinking. Ship problems. Organization and presentational skills are minimally effective cased course Bes Details 3. J Self study Mid-term exam (20%), Final exam (30%) Ation Mid-term exam (30%) To be a sum (30%) To be a	tle evidence of clear attention to uired for attaining some of the conited analytical and critical abiliti. Apply limited effectiveness in pressure a required for attaining the course low very little or no ability to apply or ineffective. Weighting in final course grade (%) 50 20 30 NE (2011) Urban Ecology: F	thoughtful and reflective urse learning outcomes. es and little attempt at sentational skills. Lack of learning outcomes. Lack oly 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 1,2,3,4				
Course Teaching	Fail Lecture-t Activitie Lectures Tutorials Reading Methods Examina Presenta Project r Textbook Niemela and Appl Referenc Gaston k http://mo	familiar situations. Apply moderately effective presentational skills. Lit thinking. Demonstrate partial but limited command of knowledge and skills req Show evidence of some coherent and logical thinking, but with lin integration. Show limited ability to apply knowledge to solve problems. attention to thoughtful and reflective thinking. Demonstrate little or no evidence of command of knowledge and skills of analytical and critical abilities, logical and coherent thinking. She problems. Organization and presentational skills are minimally effective cased course Details Signature Mid-term exam (20%), Final exam (30%) Mid-term exam (20%), Final exam (30%) Station Peports Station Apply moderately effective presents and solve in the problems. Details Graph of the problems of the p	tle evidence of clear attention to uired for attaining some of the conited analytical and critical abilitic Apply limited effectiveness in pressure required for attaining the course low very little or no ability to appear or ineffective. Weighting in final course grade (%) 50 20 30 NE (2011) Urban Ecology: Fubridge.	thoughtful and reflective urse learning outcomes. Les and little attempt at sentational skills. Lack of learning outcomes. Lack oly 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 1,2,3,4 Patterns, Processes				

ENVS3020	Global change ecology (6 credits)	Academic Year	2019				
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 global environmental change affects biodiversity from organisms to ecosystems. This course will explore the contributions that human population growth and globalization have made to increases in greenhouse gases and associated climate change, biological invasions, land degradation, disease, and, ultimately, impacts on biological systems.						
Course Contents & Topics	Environmental change is a natural phenomenon, with ecosystems continually shifting, rearranging, emerging, and disappearing through geologic time with changes in climatic conditions. The activities of humans have added to this						

. waitional oouldt		tp://moodle.hku.hk/ nis course will be offered subject to a minimum enrollment number and availability of teachers. ffer in alternate year from 2016-2017					
Course Website Additional Course			oct to a minimum enrollment number an	d availability of teachers			
	Required articles: Araujo, M.B., and Rahbek, C. 2006. How does climate change affect biodiversity? Science 313:1: Grimm, N.B., Faeth, S.H., Golubiewski, N.E., Redman, C.L., Wu J., Bai, X., and Briggs, J.M. 20: and the ecology of cities. Science 319:756-760. Schlesinger, W.H. 2006. Global change ecology. Trends in Ecology and Evolution 21:348-351.						
reading and online materials	Recommended books: Lovejoy, T.E. and Hannah, L. 2005. Climate Change and Biodiversity. Yale University Press, New Haven, CT, USA. Newman et al. 2011. Climate Change Biology. CAB International, Oxford,UK.						
Required/recommended	Test		Mid-term test	20	CLO 1,2,3,4		
	Examinati	on	255ay and procentation	30	CLO 1,2,3,4		
	Assignme Essay	nts	continuous assessment (10%) Essay and presentation	20 30	CLO 1,2,3,4 CLO 1,2		
Assessment Methods and Weighting	Methods		Details problem-based exercises (10%),	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
A	Reading /	Self study			100		
	Project wo	ork	Problem-based exercises	20			
	Tutorials			12			
& Learning Activities	Activities Lectures		Details		No. of Hours		
Course Type Course Teaching		sed course	Detaile		No of Harry		
		of analytical and critical problems. Organization a	abilities, logical and coherent thinking. Show and presentational skills are minimally effective or	very little or no ability to app			
	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 evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack						
	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.						
	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						
	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						
Grade Descriptors (A+ to F)	Α	outcomes. Show strong a	astery at an advanced level of extensive knowled	, with evidence of original tho	ought, ability to integrate		
combinations) Offer in 2019 - 2020	N Offe	er in 2020 - 2021 : Y		Examination			
Pre-requisites (and Co-requisites and Impermissible	Pass in BI	OL2306 or ENVS200 ²	or ENVS2002				
			es between climate change on a geolog ships between humans and global chan		t climate change		
	CLO 2 ex	•	re manifested on a global scale global change affects organisms' traits	and distributions, and	biodiversity at the		
Course Learning Outcomes	CLO 1 de	velop a basic underst	s course, students should be able to: anding of climate change and other hu	man-associated impacts	s, such as land use		
	topics reg synergistic how it is m use chang investigate organisms ecosystem	istering on a global strinteractions between the interactions between the interaction of	of climate change on organisms and scale including land use change, biolorall of the environmental stressors. We mate warming, sea level rise, and occasion has contributed to the spread of a saused stressors affect the morphology on ecosystem functioning and biodiversity.	ogical invasions, and powill explore (1) what cling a cidification; (2) types alien species and diseaty, phenology, distribution	ollution, as well as mate change is and and extents of land se. The course will n, and evolution of		

ENVS3022	Environ	mental science	field course (6	credits)	Academic Year	2019		
Offering Department	Biological	Sciences			Quota	10		
Course Co-ordinator	Dr M Yasuhara, Biological Sciences (yasuhara@hku.hk)							
Teachers Involved	(Dr M Yas	(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	residentia ecologica	l field trip may ir l, paleoecology an	iclude marine envii d environmental pr	e Hong Kong to learn about env ronmental survey, sediment co oblems, environmental geology pendent report on the learning o	re sampling, prac /paleontology exc	ctical learning of ursion, and other		
Course Learning	On succe	ssful completion of	this course, studen	its 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 communicate their field observations and findings							
Pre-requisites	Pass in E	NVS2001 or						

(and Co-requisites and Impermissible combinations)	Either pass in ENVS2002 or concurrently enrolled in ENVS2002					
Offer in 2019 - 2020	N Of	fer in 2020 - 2021 : Y		Examination		
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. Apply highly effective lab / fieldwork 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 grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Ap fieldwork skills and techniques. Correct use of data of results to draw appropriate conclusions. Apply effective o presentational skills.				
	С	Apply moderately effective I	complete grasp of the subject. Evidence of ab / fieldwork skills and techniques. Most s. Apply moderately effective organizations	ly correct but some erroneous us		
	D	logical thinking, but with lim	ed grasp, with retention of some relevant i nited analytical and critical abilities. Appl and results to draw appropriate conclusi	y partially effective lab / fieldwor	k skills and techniques.	
	Fail	analytical and critical abilitie techniques. Misuse of data a minimally effective or ineffec	tle or no grasp of the knowledge and u es, logical and coherent thinking. Apply r and results and/or unable to draw appropri tive.	ninimally effective or ineffective la	ab / fieldwork skills and	
Course Type	Laborato	ry and workshop course				
Course Teaching	Activitie	S	Details		No. of Hours	
& Learning Activities	Field work		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	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Laborato	ry reports	field reports	30	CLO 1,2,3	
	Presenta	tion	group presentations	30	CLO 1,2,3	
	Project reports		individual report	40	CLO 1,2,3	
Course Website	http://ww	w.biosch.hku.hk/ecology/l	lsc/			
Additional Course Information	quota set to Dr M Y semester The prop course; (path; (3) photogral The selection of the trip (plt will be gill to be gill	So, interested student na Casuhara (yasuhara@hkucourse, but we need ap osal should include the fallow the fall	capacity of this course is limited nust apply for the course with a sl h.hk) and Ms. Maria Lo (gylo@hku plications well in advance, by this following: (1) specific reason(s)/m to receive from this course, espemic interests. The CV should in isite courses taken & grades rece on the quality of proposal and thous through this application procesanized in the reading week. Stude its & financial difficulty). Defore taking the final year project to a minimum enrollment no. and	nort proposal (2 pages max hk) not later than 1st Augus date). Late applications we otivation why you are inter- lecially regarding your futural clude: (1) Personal & acactived. le justification of academic is ss will be able to register the lents will need to pay for the to have relevant hands-on	and CV via e-mail ust (Note: this is 2nd vill not be accepted. ested in joining this re academic/career demic details; (2) ID merit, in considering is course.	

ENVS3028	Coastal S	Sustainability (6 credits) Academic Year	2019			
Offering Department	Biological S	Sciences Quota	8			
Course Co-ordinator	Dr T Venga	atesen, Biological Sciences (rajan@hku.hk)				
Teachers Involved		atesen,School of Biological Sciences) Villiams,School of Biological Sciences)				
Course Objectives	ecosystems - Gain an a and stress f - Better und and/or facili - Appreciate	nd the primary drivers of biodiversity and ecosystem function in rocky intertidal, mangres in USA and SE Asia. appreciation for how urban ecosystems in this region are being affected by climate chafrom pollution derstand how history and governance structures of Hong Kong, Malaysia and New litate coastal adaptation strategies the how cultural practices such as seafood preferences and traditional medicine afficies, and how this impacts coastal biodiversity	nge, developmer England constrai			
Course Contents & Topics	The majority of the Earth's population now lives in coastal cities, where people not only depend on ocear 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 of 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 those societies have (or have not) enacted solutions to those challenges.					
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 SE Asia and in comparable habitats in the U.S.A. CLO 2 Reading and synthesizing review articles in the primary literature in marine science and social science literature, and explain the connections among these diverse approaches CLO 3 Articulating arguments about how traditional Chinese, Malaysian and American culture affect human impacts on the environment, and to develop potential solutions to these issues based on conversations with peers					
	CLO 4 Bec	coming comfortable collaborating with peers from U.S.A, and gain a greater unde	erstanding of the			

Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	BIOL2306 or BIOL3301 or	BIOL3305 or BIOL3318 or ENVS200	1 or ENVS2002 or EAS	C3020		
Offer in 2019 - 2020	N O	fer in 2020 - 2021 : 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 complex issue of sustainable coastal management in economically and socially developed and developing places.					
	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 a complex issue of sustainable coastal management in economically and socially developed and developing places					
	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 a complex issue of sustainable coastal management in economically and socially developed and developing places.					
	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		ence of command of knowledge and skills requies, logical and coherent thinking. Show very				
Course Type	Field car	nps					
Course Teaching	Activitie	es	Details		No. of Hours		
& Learning Activities	Lectures			40			
	Field work			80			
	Laboratory work		including hands on training	30			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments		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		F.1.2.2.2)	30	CLO 2,3,4		
Course Website	http://moodle.hku.hk/						
Additional Course Information	- All field - Course 1st week 2nd wee 3rd and 4 This is al especiall sciences "Note: Fi	fee - plase contact the contac	as trip to Malaysia and USA, are com	ong, Hong Kong (Malaysia) lew England (Boston, Usor all science students a ence, ecology & biodiv	as free elective. it is versity or biological herefore, those field		

ENVS3402		Qualitative data, social science methods and decision- making in environmental science (6 credits)			2019		
Offering Department	Biologica	Sciences		Quota	30		
Course Co-ordinator	Dr Hannah Mumby, Biological Sciences (hsmumby@hku.hk)						
Teachers Involved	(Dr Hannah Mumby,Biological Sciences)						
Course Objectives	This course will introduce social science and qualitative approaches in environmental science. The course will begin with an introduction to the philosophical and epistemological background to different approaches to environmental sciences. The course will then take a problem-based approach, using case studies to introduce methodologies, including the collection and analysis of qualitative and quantitative data from focus groups, surveys, and questionnaires to ethnographic approaches, grounded theory and discourse analysis. We will also investigate how these data are or can be integrated into decision-making processes, linking different approaches that can be used for decision-making.						
Course Contents & Topics	-Research philosophy- how researchers approach questions in environmental science -Research methodology- the rationale and framework for research -Concepts of 'bias', objectivity, truths and the role of the researcher -Methodologies including biography, ethnography, case study, grounded theory -Methods, data and working through case studies, including questionnaires and surveys, interviews, focus groups, and decision-making tools.						
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)	ENVS2002						
Offer in 2019 - 2020	N Offer in 2020 - 2021 : Y Examination						
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery of the course material. Show streevidence of original thought, and ability to apply knowledge to a Demonstrate highly effective organizational and presentational skills	wide range of co				
	В	Demonstrate substantial command of the course material and an situations. Show evidence of analytical, critical thought to so	ability to apply ki				

	С	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.					
	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		Demonstrate little or no evidence of command of course material with very little or no ability to app problems. Lack of critical thinking abilities and incoherent thinking. Organization and presentational skills				
Course Type	Lecture-l	based course					
Course Teaching	Activities		Details	No. of Hours			
& Learning Activities	Lectures			24			
	Tutorials		Lab sessions		24		
	Reading / Self study				100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments			60			
	Examination			40			
Required/recommended reading and online materials	Methods in Ecology and Evolution (2018) Special Feature: Qualitative methods for eliciting judgements for decision making, Volume 9, Issue 1, pp 1-206. This entire special issue contains papers on the topic. Moon et al. (2019) Expanding the role of social science in conservation through an engagement with philosophy, methodology, and methods. Methods in Ecology and Evolution. Volume 10 pp 294-302. Mukherjee et al. (2019) Response to Expanding the role of social science in conservation through an engagement with philosophy, methodology and methods. Methods in Ecology and Evolution. Volume 10 pp 303-307						

ENVS4110	Enviror	nmental remed	iation (6 credits)	Academic Yea	r 2019		
Offering Department	Biologica	l Sciences		Quota	30		
Course Co-ordinator		Dr J D Gu, Biological Sciences (jdgu@hku.hk)					
Teachers Involved	(Dr J D Gu,Biological Sciences)						
Course Objectives	To introduce students with the environmental fate information of different pollutants/contaminants in the environment To understand the technologies available for environmental remediation of pollutants in soils and water, and the characteristics of each techniques relevant to the pollutants of concern To learn the fundamental physical, chemical and biochemical reactions involved in the remediation process To obtain skills for critical analysis of the recent technological development and the proposed applications						
Course Contents & Topics	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 phytoremediation; 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	On succe	essful completion	of this course, students should be able to):			
Outcomes	CLO 1 explain the remediation technologies available to the type of pollutants of concern in reme CLO 2 propose remediation strategies for polluted sites with the best technologies available cor of pollutants and the cost involved CLO 3 differentiate the technologies available for the specific pollutants and the fundamental pr terms of the catalysts and the effectiveness CLO 4 describe several key chemical and biochemical processes used in environmental r adequate background information on their history and development						
Pre-requisites and Co-requisites and Impermissible combinations)	Pass in BIOL3109 or BIOL3110 or BIOL3401 or ENVS3042						
Offer in 2019 - 2020			2020 - 2021 : N	Examination	May		
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	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. 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 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, 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.						
Course Type	Lecture-based course						
Course Teaching	Activitie		Details		No. of Hours		
& Learning Activities	Lectures	;			24		
	Tutorials	3			12		
	Reading	/ Self study			100		
	rtodding				100		

				to CLO Mapping		
	Assignments		10	CLO 1,2,3,4		
	Essay		25	CLO 1,2,3,4		
	Examination		50	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 Environmental Microbiology (ASM Press, 2nd edition) S.C. McCutcheon & J.L. Schnoor: Phytoremediation: Transformation and Control of Contaminants (Wiley) R. Mitchell & J-D Gu: Environmental Microbiology (Wiley-Blackwell, 2nd edition)					
Course Website	http://moodle.hku.hk/					
Additional Course Information	The course will be offered subject to a minimum enrollment number and availability of teachers. Offer in alternative year from 2011-2012					

CAES1000	Core University English (6 credits) Academic Year 2019						
Offering Department	English			Quota			
Course Co-ordinator		Dr P Wong, English (pmtw2 @hku.hk)					
Teachers Involved	(Dr P Wo	(Dr P Wong,Centre for Applied English Studies)					
Course Objectives							
Course Contents & Topics	proficience Common written act for and u 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 Outcomes	CLO 1 id	lentify and distinguish b	ourse, students should be able to: etween main ideas and supporting of the arguments / facts exper-	S .	written texts and		
			ding of the arguments / facts expre I opinions through critical reading a				
	CLO 3 a		sition in a clear and structured way		hrough writing an		
		emonstrate control of gra	mmatical accuracy and lexical app	ropriacy in academic comm	unication		
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL						
Offer in 2019 - 2020	Y 1st	sem 2nd sem Offer i	n 2020 - 2021 : Y	Examination	Dec May		
Grade Descriptors	Α	Excellent to outstanding re	sult. Students are able to produce spok	en and written academic texts v	which are at all times		
	В	texts. Written language con comprehensible and fluent. Good to very good result. S with only minor errors. Stude argue for a detailed position speaking. They cite and refe with ease, although they ma systematic errors in complex Satisfactory to reasonably structured but there is some	ies. Students demonstrate an ability to full tains very few, if any, systematic errors in students are able to produce spoken and vents can almost always clearly and concise n. Students almost always use appropriate erence correctly with only a few non-system y miss some implied meanings and opinion of grammar and vocabulary. Spoken languag good result. Spoken and written academ of evidence of this ability. Students are some	rigrammar and vocabulary. Spok written academic texts which are a ly explain academic concepts and a academic sources to support the natic errors. Students can compret is. Written language is mostly accupe is mostly comprehensible and fluic texts produced by students are tetimes unable to clearly and conceptions.	appropriately structure almost always critical eir ideas in writing an enend and interpret tex- urate but contains a fe uent. To sometimes not-we sisely explain academ		
		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	may be some evidence of the for a position. There is sor Students often use sources are many systematic errors in a citation and referencing. the main ideas and writer's	ally satisfactory result. Spoken and written academic texts produced by students are often inappropriately structured but there be some evidence of this ability. Students are often unable to clearly and concisely explain academic concepts and argue a position. There is some evidence of an ability to explain academic concepts but not to critically argue for a position. Itents often use sources which are nonacademic and/or not appropriate to support their ideas in writing and speaking. There many systematic errors in citation and referencing however there is evidence of an understanding of some of the conventions tation and referencing. Students often have difficulty comprehending and interpreting texts, sometimes failing to understand main ideas and writer's views and attitudes. Written language is often inaccurate containing errors in a range of simple and plex grammar and vocabulary. Spoken language is only sometimes comprehensible and fluent, and strain is frequently ed on the listener.				
	Fail Unsatisfactory result. Productive skills are too limited to be able to successfully carry out spoken and written assessments. Texts are unstructured and unclear. Students are unable to follow and interpret texts. There are language errors in almost every sentence. Spoken language is often incomprehensible. Assessments may not have been attempted or contain plagiarism.						
Course Type	Lecture-b	ased course					
Course Teaching	Activitie	S	Details		No. of Hours		
& Learning Activities	Lectures				30		
	Tutorials				6		
	Reading	/ Self study			84		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignm	ents		65			
	Examina	tion		35			
	⊏xanıına	uon		33			

CAES9820	Academ	ic English for	science students (6 credits)	Academic Yea	r 2019		
Offering Department	English			Quota			
Course Co-ordinator	Dr E Law,	Dr E Law, English (ellielaw@hku.hk)					
Teachers Involved	(Dr E Law,Centre for Applied English Studies)						
Course Objectives	Faculty. Their studies within their	This six credit English-in-the-Discipline course will be offered to second year students studying in the Science Faculty. This course will help students develop the necessary skills to use both written and spoken English within their studies. Students will learn to better communicate and spontaneously discuss general and scientific concepts within their division, with other scientists as well as to a larger audience. Particular emphasis will be placed on enabling students to identify their own language needs and develop appropriate self-learning strategies to improve their proficiency.					
Course Contents & Topics	- Finding, - Compilin - Contrasti - Writing fo - Organizi grammar; - Critically	For professions, and the course will be: 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 grammar; and Critically examine their own language proficiency and analyze how that relates to their ability to perform successfully within their discipline. Developing self-directed learning strategies.					
Course Learning	On succes	ssful completion o	of this course, students should be able to	•			
Outcomes	CLO 1 ide	entify and summa	rize disciplinary sources related to a spe	cified topic			
		oduce texts (writte lowledge	en and spoken) appropriate for a cross-c	lisciplinary audience based o	on their disciplinar		
	CLO 3 ide	entify their own la	nguage learning needs and implement a	plan to meet those needs			
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL						
Offer in 2019 - 2020	Y 1st	sem 2nd sem	Offer in 2020 - 2021 : Y	Examination	No Exam		
Grade Descriptors (A+ to F)	A Excellent result. Consistently demonstrates ability to summarize salient points accurately from appropriate and reliable sources 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.						
	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.						
		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 reliable sources. Te	It. Does not demonstrate ability to summarize sa ext uses no sources and demonstrates serious gleaningful attempt to identify language learning nee	rammatical, lexical and/or organiza			
Course Type		ased course					
Course Teaching	Activities	3	Details		No. of Hours 36		
& Learning Activities	Tutorials		seminars	seminars			
		Self study					
	Assessme	ent	independent learning work		84		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents	independent learning work	20			
	Essay		other genres of writing	55			
	Test		5	25			
Required/recommended reading and conline materials	Course ma	aterials to be prov	rided electronically through course websi	ite.			
Course Website	http://caes	s.hku.hk/caes9820	0/				
Additional Course				http://caes.hku.hk/caes9820/ This a compulsory course for all students studying undergraduate degrees in the Faculty of Science.			

CAES9821		ional and technical o	communication for mathemati	cal Academic Yea	2019		
Offering Department	English			Quota			
Course Co-ordinator	Dr E Law	, English <i>(ellielaw@hku.h</i>	nk)				
Teachers Involved		v,Centre for Applied Engli	,				
Course Objectives	mathema	tical sciences.	ents' professional and technical con		. ,		
Course Contents & Topics	trends, jui 2. Oral pr 3. Indepe independe	 Case study report writing skills (report structure, language features, present and explain statistical data and trends, justify analyses and recommendations, etc.) Oral presentation skills (understanding of audience and purpose, effective delivery, etc.) Independent language learning (language learning goals setting, evaluating learning progress, reflecting on independent learning experience, etc.) 					
Course Learning	On succe	ssful completion of this c	ourse, students should be able to:				
Outcomes	CLO 2 or	rganize and articulate co ral presentation	ematical and statistical data and trend wherent ideas with appropriate langu- mendations convincingly in a case st	age devices in a case st	tudy report and an		
	CLO 4 id	lentify their own languag	ge learning needs, develop indepen own independent language learning	dent learning strategies			
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL		, 55				
Offer in 2019 - 2020	Y 1st	sem 2nd sem Offer i	n 2020 - 2021 : Y	Examination	No Exam		
Grade Descriptors (A+ to F)	A Wholly appropriate productive skills displaying a complete awareness of audience, purpose and structure across all disciplinary work. Students are able to critically analyse a case scenario, convincingly justify analyses and recommendations, and discuss data limitations when relevant. Students are able to successfully evaluate their language performance in all areas and propose specific and relevant future language learning plans. Spoken language is fully comprehensible and fluent. Written language contains a sophisticated range of grammar and vocabulary, with very few systematic errors.						
	В	Mostly appropriate productive skills displaying good awareness of audience, purpose and structure, although there are occasional lapses in areas. Students are able to analyse a case scenario, justify analyses and recommendations, and discuss data limitations when relevant. Students are able to evaluate their language performance in most areas and propose relevant future language learning plans. Spoken language is comprehensible and fluent. Written language contains a good range of grammar and vocabulary, making some systematic errors of language which generally do not impede understanding.					
	C Productive skills are generally appropriate for the intended audience. There is an overall sense that the work is communicating successfully. Purposes are generally clear and tone is generally suitable. Students are generally able to analyse a case scenario and make recommendations, but the analysis and recommendations need more justification. Students are able to evaluate their language performance in a limited number of areas and proposed future language learning plans are rather vague. Spoken language is generally comprehensible and fluent. Written language contains inaccuracies when complex grammar and vocabulary are used.						
	D						
	Fail	are unable to analyse a cas Students are not able to eva- language errors in both sim	or no awareness of audience or are too limite e scenario and make reasonable recommend aluate their language performance and propo ple and complex grammar in written work, wa aces considerable strain on the listener through the strain on the listener through the strain on the listener through the strain of the strain of the listener through the strain of the strain of the strain of the listener through the strain of the s	ations. Ideas are incoherent, v se future language learning pla rhich impede successful comp	ague and unstructured. ans. There are frequent rehension of ideas and		
Course Type	Lecture-b	ased course					
Course Teaching	Activitie	s	Details		No. of Hours		
& Learning Activities	Lectures		seminars		30		
	Tutorials		small group tutorials		6		
		/ 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		
	Assignme	ents		40			
	Presenta			30			
	Project re	eports		30			

CHEM1041	Founda	tions of chemis	try (6 credits)	Academic Yea	r 2019		
Offering Department	Chemistry			Quota	156		
Course Co-ordinator		Dr A P L Tong, Chemistry (apltong@hku.hk)					
Teachers Involved		Tong,Chemistry)					
Course Objectives	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			perties and Behaviour (6 hours) Gas inetic-molecular theory of gases.	pressure; the gas laws; the	ideal gas law and		
	Topic 2: Chemical Bonding and Structures (7 hours) Covalent, ionic and metallic bonds; bond energy chemical change; electronegativity and bond polarity; Lewis structures of molecules and ions; VSEPR Theorem molecular shape.						
	types of in	ntermolecular force	es: Liquids, Solids, and Phase Chang s; properties of liquid state; the solid s	tate: structure, properties, and	bonding.		
			Im (5 hours) The equilibrium state are nstants and reaction quotient; Le Chate		ne equilibrium law		
	nomencla	ture; stereoisomeri	nic Compounds (10 hours) An overvie sm in organic compounds.		structures; organi		
Course Learning Outcomes	CLO 1 de	•	this course, students should be able to edge and understanding in relation to		terminology and		
	CLO 2 de	emonstrate knowled be nature of gases,	dge and understanding of chemical st phase changes, chemical bonding and	d structures, and the nature of	chemical equilibri		
	OI	rganic compounds	c knowledge of organic compounds a				
	CLO 4 apply the theories and concepts introduced in the course to solve problems, perform calculations, make predictions and rationalize trends CLO 5 organize and present chemical ideas in a clear, logical and coherent way						
		emonstrate awarer veryday life	ness and appreciation of the relevan	nt applications of chemistry	in society and in		
Pre-requisites			Combined Science with Chemistry cor				
(and Co-requisites			ground but keen on taking this founda	ation chemistry course may ap	proach the cours		
and Impermissible combinations)		or for consideration	i. 5 or above in HKDSE Chemistry or hav	ing taken any level 1 Chemist	ry course or abov		
combinations)		uivalent Chemistry		ring taken any lever i Chemisi	iy course or abov		
Offer in 2019 - 2020		sem Offer in 202		Examination	Dec		
Grade Descriptors	Α		gh mastery at an advanced level of extensive				
(A+ to F)	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. 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 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.						
	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. 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. Apply limited or barely effective organizational and presentational skills.						
	Fail	evidence of little or n	no evidence of command of knowledge and ski to grasp of the knowledge and understanding of p. Show very little or no ability to apply knowled e or ineffective.	of the subject. Lack of analytical and	critical abilities, logica		
		evidence of little or nand coherent thinking	no grasp of the knowledge and understanding og. Show very little or no ability to apply knowled	of the subject. Lack of analytical and	critical abilities, logica		
Course Teaching		evidence of little or n and coherent thinking are minimally effective ased course	no grasp of the knowledge and understanding og. Show very little or no ability to apply knowled	of the subject. Lack of analytical and	critical abilities, logica		
Course Teaching	Lecture-b Activities Lectures	evidence of little or n and coherent thinking are minimally effective ased course	no grasp of the knowledge and understanding on g. Show very little or no ability to apply knowled e or ineffective.	of the subject. Lack of analytical and	critical abilities, logica nd presentational skill No. of Hours 36		
Course Teaching	Lecture-b Activities Lectures Tutorials	evidence of little or n and coherent thinking are minimally effective ased course	no grasp of the knowledge and understanding on g. Show very little or no ability to apply knowled e or ineffective.	of the subject. Lack of analytical and	critical abilities, logica nd presentational skill No. of Hours 36 12		
Course Teaching & Learning Activities	Lecture-b Activitie Lectures Tutorials Reading	evidence of little or n and coherent thinking are minimally effective ased course s	no grasp of the knowledge and understanding of the knowledge and understanding of the knowledge or ineffective. Details	of the subject. Lack of analytical and lge to solve problems. Organization a	critical abilities, logicand presentational skill No. of Hours 36 12 100		
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Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	Lecture-b Activitie Lectures Tutorials Reading Methods Assignme Examina Test	evidence of little or nand coherent thinking are minimally effective assed course s / Self study ents tion	po grasp of the knowledge and understanding of the knowledge and understanding of the knowledge or ineffective. Details Details	Weighting in final course grade (%) 20 65 15	nd presentational skill No. of Hours 36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5 CLO 1,2,3,4,5,6 CLO 1,2,3,4,5,6		
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CHEM1042	General chemistry I (6 credits)	Academic Year	2019		
Offering Department	Chemistry	Quota	375		
Course Co-ordinator	Dr A P L Tong, Chemistry (apltong@hku.hk)				
Teachers Involved	(Dr A P L Tong, Chemistry)				
Course Objectives	The course aims to provide students with a solid foundation of the basic princ	iples and concept	s of chemistry. It		

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everyday life or above in HKDSE Chen students having taken an stry course. st sem 2nd sem Offer Demonstrate thorough mas learning outcomes. Show it with ability to apply knowled techniques. Apply highly eff Demonstrate substantial co learning outcomes. Show se thinking, and ability to apply effective organizational and Demonstrate general but outcomes. Show general but logical thinking, and ability Apply moderately effective Demonstrate partial but lim	in 2020 - 2021 : Y stery at an advanced level of extensive k thorough grasp of the subject. Demonstrate todge to a wide range of complex, familiar an ffective organizational and presentational sk ommand of a broad range of knowledge ar substantial grasp of the subject. Demonstr y knowledge to familiar and some unfamiliar d presentational skills. incomplete command of knowledge and so to apply knowledge to most familiar situati organizational and presentational skills. inted command of knowledge and skills req	Examination Exami	Dec May attaining all the cours lities and logical thinkin nly effective lab skills an least most of the cours titical abilities and logic ills and techniques. App t of the course learnin al and critical abilities an ab skills and technique burse learning outcome		
everyday life or above in HKDSE Chen students having taken an stry course. st sem 2nd sem Offer Demonstrate thorough mas learning outcomes. Show the with ability to apply knowled techniques. Apply highly eff Demonstrate substantial could be a compared by the stricking, and ability to apply effective organizational and Demonstrate general but it	in 2020 - 2021 : Y Instery at an advanced level of extensive k thorough grasp of the subject. Demonstrate sidge to a wide range of complex, familiar an ffective organizational and presentational sk ommand of a broad range of knowledge at substantial grasp of the subject. Demonstr y knowledge to familiar and some unfamiliar d presentational skills. incomplete command of knowledge and	Examination (Incomplete the content of the content	Dec May attaining all the cours lities and logical thinkin hly effective lab skills an least most of the cours tical abilities and logic ills and techniques. App		
everyday life or above in HKDSE Chen students having taken an stry course. st sem 2nd sem Offer Demonstrate thorough mas learning outcomes. Show it with ability to apply knowled techniques. Apply highly eff Demonstrate substantial co learning outcomes. Shows s	in 2020 - 2021 : Y stery at an advanced level of extensive k thorough grasp of the subject. Demonstrate dge to a wide range of complex, familiar an ffective organizational and presentational sk ommand of a broad range of knowledge ai substantial grasp of the subject. Demonstr	Examination (Incomplete the content of the content	Dec May attaining all the cours lities and logical thinkin rily effective lab skills ar least most of the cours titical abilities and logic		
everyday life or above in HKDSE Chen students having taken an stry course. st sem 2nd sem Offer Demonstrate thorough mas learning outcomes. Show ti	in 2020 - 2021 : Y stery at an advanced level of extensive k thorough grasp of the subject. Demonstrate	Examination (converge and skills required for a strong analytical and critical ability)	Dec May attaining all the cours lities and logical thinkin		
everyday life or above in HKDSE Chen students having taken an try course.	ny level 1 Chemistry course (exce	pt for CHEM1041) or abov			
everyday life or above in HKDSE Chen students having taken an			e or any equivale		
everyday life or above in HKDSE Chem			ve or any equivale		
everyday life	mistry or equivalent or a pass in CH	HEM1041.			
	everyday life Level 3 or above in HKDSE Chemistry or equivalent or a pass in CHEM1041.				
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					
and interpret and evaluate	e the experimental data	·	. rations accurately		
predictions and rationalize	e trends				
as aqueous equilibria incl	luding acid-base equilibria	•			
			of reactions as we		
•			omic structure an		
ise concepts; equilibria ir					
nisms.	laws: differential and integrated rat	te laws; temperature and re	eaction rate; reaction		
nd work; the first law of th	nermodynamics; heat of reactions;	, ,	,		
on covalent, ionic and me	etallic bond. Covalent bonds and m	olecular structures (VSEPR	R, VB theory).		
m mechanical model of th	ne atom; quantum numbers, energ	y levels, and atomic orbital	ls; shapes of atom		
s: the quantum world	,	· ·			
1 1 /	1 1 7		,		
•	nod				
s. Students will be equipped					
1: ST 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	s, preparation, purification is. Students will be equipstudies in Chemistry. Inistry: its nature and methal properties; chemical convolume and temperature is and concentrations; under the endit of the convolume and temperature is and concentrations; under the quantum world magnetic radiation and in mechanical model of the convolument of the concentration of the convolument on covalent, ionic and megetics and kinetics of reach downk; the first law of the under the concepts of the concepts is and acid strength; acid cossful completion of this demonstrate a basic kinconcepts of chemical bor demonstrate knowledge as aqueous equilibria incomply the theories and copredictions and rationalized.	s, preparation, purification and characterization of chemicles. Students will be equipped with a good foundation of the studies in Chemistry. Inistry: its nature and method all properties; chemical changes and chemical properties; volume and temperature; atomic structure and subatomic is and concentrations; uncertainty in measurement and signifies: the quantum world magnetic radiation and matter; Planck's quantum theory; in mechanical model of the atom; quantum numbers, energing; electron configurations; periodic trends: atomic radii, ionic remical bonding and structures in on covalent, ionic and metallic bond. Covalent bonds and magetics and kinetics of reactions and work; the first law of thermodynamics; heat of reactions; under ereaction rate; rate laws: differential and integrated radishess. Base equilibria in solutions of weak acids and in ites and acid strength; acid-base properties of salt solutions; cessful completion of this course, students should be able to demonstrate a basic knowledge and understanding of the concepts of chemical bonding and their relationships with the demonstrate knowledge and understanding in relation to the as aqueous equilibria including acid-base equilibria apply the theories and concepts introduced in the course predictions and rationalize trends	nistry: its nature and method al properties; chemical changes and chemical properties; elements and compounds volume and temperature; atomic structure and subatomic particles; the mole concepts and concentrations; uncertainty in measurement and significant figures. The quantum world magnetic radiation and matter; Planck's quantum theory; the Bohr model of the him mechanical model of the atom; quantum numbers, energy levels, and atomic orbita; electron configurations; periodic trends: atomic radii, ionic radii, ionization energies, an inical bonding and structures on covalent, ionic and metallic bond. Covalent bonds and molecular structures (VSEPF getics and kinetics of reactions and work; the first law of thermodynamics; heat of reactions; spontaneity of changes. Ruence reaction rate; rate laws: differential and integrated rate laws; temperature and refises equilibria are concepts; equilibria in solutions of weak acids and in weak bases; ionization coies and acid strength; acid-base properties of salt solutions; buffer solutions; acid-base decessful completion of this course, students should be able to: demonstrate a basic knowledge and understanding of the microscopic nature of at concepts of chemical bonding and their relationships with the bulk properties of matter demonstrate knowledge and understanding in relation to thermodynamics and kinetics as aqueous equilibria including acid-base equilibria apply the theories and concepts introduced in the course to solve problems, perform		

CHEM1043	General chemistry II (6 credits)	Academic Year	2019
Offering Department	Chemistry	Quota	290
Course Co-ordinator	Dr A P L Tong, Chemistry (apltong@hku.hk)		
Teachers Involved	(Dr A P L Tong,Chemistry) (Prof D L Phillips,Chemistry)		
Course Objectives	This course is a continuation of CHEM1042 General Chemistry I. It aims to	further consolid	ate some of the

		repares students to	hemistry that underlie many topics pursue a major in chemistry or in			
Course Contents & Topics	1. Gases Simple gas laws; ideal gas equation; gases in chemical reactions; mixture of gases; kinetic-molecular theory of gases; diffusion and effusion; non-ideal gases. 2. Structure and Bonding: The Delocalized Approach: Molecular Orbital Theory Bonding in homonuclear and heteronuclear diatomic molecules of first and second period of elements; bonding in some simple polyatomic molecules; bonding in metals (band theory). 3. Solutions and their Properties					
	Types of gases; vononelectric 4. Solubility	solutions; intermole apor pressures of s rolyte solutions; solu lity and Complex-lor product constant; s of the Ksp concep	cular forces and the solution proces solutions; osmotic pressure; freezing tions of electrolytes; colloidal mixtu	ng-point depression and boilir res. d Ksp; common-ion effect in	ng-point elevation of solubility equilibria;	
	A quick r energy cl		nd the second & third laws of therm im; coupled reactions.	nodynamics. Standard Gibbs ei	nergy change; Gibbs	
	functions	of concentrations; b	eir measurement; standard electro patteries; corrosion; electrolysis; ind	lustrial electrolysis processes.	and K; Ecell as a	
Course Learning Outcomes	CLO 1 d	lemonstrate a knowl	this course, students should be abledge and understanding of the pro	perties and behavior of gases	and apply gas laws	
	CLO 2 d	lemonstrate a know	r theory to processes involving gase ledge and understanding in relation		erties, solubility and	
	CLO 3 a	pply molecular orbi	a, and also electrochemistry tal theory to explain the formation ments and of some simple polyator		olecules of first and	
	second period of elements and of some simple polyatomic 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 and Co-requisites and Impermissible combinations)		CHEM1042; and tudents in 2014-15 c	cohort or before having taken CHEM	12541.		
Offer in 2019 - 2020	Y 1s	t sem 2nd sem (Offer in 2020 - 2021 : Y	Examination	Dec May	
Grade Descriptors (A+ to F)	A	Demonstrate thoroug learning outcomes. S	h mastery at an advanced level of extens how thorough grasp of the subject. Demon- nowledge to a wide range of complex, familia	ive knowledge and skills required for strate strong analytical and critical abi	r attaining all the course lities and logical thinking,	
	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 ne	no evidence of command of knowledge and o grasp of the knowledge and understandir J. Show very little or no ability to apply know e or ineffective.	ng of the subject. Lack of analytical ar	nd critical abilities, logical	
Course Type	Lecture-b	pased course				
Course Teaching	Activitie		Details		No. of Hours	
& Learning Activities	Lectures	3			36 12	
Assessment Methods and Weighting	Methods	/ Self study s	Details	Weighting in final course grade (%)	Assessment Methods	
				334.30 grado (70)	to CLO Mapping	
	Assignm			30	CLO 1,2,3,4,5,6,7	
Doguisod/seeeess	Examina 1) Potrus		Pieceppotte: Canaral Object	Principles and Madern Applies	CLO 1,2,3,4,5,6,7	
Required/recommended reading and online materials	Pearson) Petrucci; Herring; Madura; Bissonnette: General Chemistry: Principles and Modern Applications, lates earson) Moore; Stanitski; Jurs: Chemistry: The Molecular Science, latest edition, Brookes/Cole				

CHEM1044	Mathematics in chemistry (6 credits) Academic Year 2019				
Offering Department	Chemistry Quota 80				
Course Co-ordinator	Prof C M Che, Chemistry (cmche@hku.hk)				
Teachers Involved	(Dr A M Y Yuen,Chemistry) (Dr J Yang,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, sur, Differential equation, in	ch as Algebra, Trigonor	netry, Calculus, Comple	ex number, Ve	ctor, Matrix, Linear		
Course Learning		essful completion of this						
Outcomes	CLO 1 c	lemonstrate knowledge a	and understanding of the	e essential mathematics	used in chemis	stry		
	CLO 2	apply mathematical skills	to solve basic problems	in chemistry				
		oe more capable of copion najor, in particular, in phy			in relevant cou	irses for chemistry		
Pre-requisites (and Co-requisites and Impermissible combinations)	Level 2 c	CHEM1042 or already er or above in Module 1 or N MATH1011			or			
Offer in 2019 - 2020	Y 2n	nd sem Offer in 2020 - 2	2021 : Y		Examination	May		
Grade Descriptors (A+ to F)	A	applications through correct	ctly analysing problems, clear	s and ideas by being able to in y and elegantly presenting co prrectly, and with some innova	rrect logical reason	ning 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.							
	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	•						
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		ing in final grade (%)	Assessment Methods to CLO Mapping		
	Assignm	nents			20	CLO 1,2,3		
	Examina				60	CLO 1,2,3		
	Test		(online)		20	CLO 1,2,3		
Required/recommended reading and online materials					est (online) 20 CLO 1,2,3 raham Doggett, Martin Cockett: Maths for Chemists, 2nd Edition, RSC ich Steiner: The Chemistry Maths Book, 2nd Edition, Oxford University Press			

CHEM2041	Principles of chemistry (6 credits)	Academic Year	2019			
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 be	asic principles of chemistry.				
Course Contents & Topics	Inis course is designed for non-chemistry major students covering basic principles of chemistry. Gas Laws and the Kinetic Theory of Gases Thermodynamics: work, heat, the zeroth and first law of thermodynamics, internal energy, enthalpy, hea capacities, thermochemistry, Hess's Law, Kirchhoff's Law, the second and third laws of thermodynamics, entropy Gibbs free energy, spontaneity, equilibrium, coupled reaction; Transport Phenomena: diffusion, viscosity of gases, diffusion in liquids and viscosity of liquids, ionic conduction; Chemical Kinetics: rate of reactions, orders of reactions, rate laws, reaction mechanism, experimental measurement of reaction rates, enzyme kinetics, enzyme inhibition, temperature effect on rates; Chemical Equilibrium; Equilibria in single-, and two component systems: phase transitions, phase diagrams and the phase rule, chemic potential; liquid/liquid systems; Introduction to acids and bases: calculation on concentration of different chemical species in a solution, diprot and polyprotic acids, activity; Introduction to Spectroscopy: UV/Visible absorption spectroscopy, Beer-Lambert Law; IR Spectroscopy identification of functional groups; NMR Spectroscopy, Larmor frequency & chemical shift, peak integral, spin-sp					
Course Learning Outcomes	coupling multiplicities; Mass Spectrometry, isotopic distribution, determination of molecular formulae. On successful completion of this course, students should be able to: CLO 1 explain the principles of the thermochemistry, chemical kinetics, chemical equilibrium, physical proof solutions and gases CLO 2 explain the principles of the spectroscopy, and spectrometry					
Pre-requisites (and Co-requisites and Impermissible combinations)	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.					
Offer in 2019 - 2020	N Offer in 2020 - 2021 : N	Examination				
Grade Descriptors (A+ to F)	Demonstrate thorough knowledge and understanding of essential facts chemistry, instrumentations and applications of spectrometry and spe apply and integrate knowledge and theory, and strong ability to analyze Demonstrate substantial command of knowledge and understanding of to the modern chemistry, instrumentations and applications of spect evidence to apply and integrate knowledge and theory, and ability spectroscopy. C Demonstrate general but incomplete command of knowledge and un theories relating to the modern chemistry, instrumentations and applianalysis. Show evidence of some abilities to apply and integrate knowle	ectroscopy for chemical analysis. Si problems related to general chemist essential facts, concepts, principles rometry and spectroscopy for chen to analyze problems related to ge derstanding of essential facts, concications of spectrometry and spectr	how strong ability try and spectroscopy and theories relatinical analysis. Showneral chemistry and peepts, principles and oscopy for chemical			

		situations to general chemistry and spectroscopy.					
	D	relating to the modern che Show evidence of limited a	emistry, instrumentations and	and understanding of essential facts, applications of spectrometry and specknowledge and theory, and limited a roscopy.	ectroscopy for chemical analysis.		
	Fail	theories relating to the me analysis. Show little or no	odern chemistry, instrumenta	wledge and understanding of essentiations and applications of spectrometry and integrate knowledge and theory, temistry and spectroscopy.	y and spectroscopy for chemical		
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 course grade			
	Assignme	ents		25	CLO 1,2		
	Examination			75	CLO 1,2		
Required/recommended reading and online materials	Spectrosc	opy for the biological so	cience, by Gordon G. Ha	ammes, Wiley-Interscience (20	05)		

CHEM2241	Analytic	al chemistry I (6 c	redits)	A	Academic Year	2019	
Offering Department	Chemistry		,	C	Quota	120	
Course Co-ordinator			Chu (2nd sem), Chemistry (ecmtse@hku.hk; ivank	chu @hku.hk)		
Teachers Involved		Tse,Chemistry)	, , , , , , , , , , , , , , , , , , , ,		,		
	(Dr I K Ch	u,Chemistry)					
Course Objectives	including reference The labor	he course aims to introduce the basic principles of chemical analysis. The principles of chemical measurement, icluding error analysis, quality assurance and calibration, data acquisition and processing, will be discussed with eference to methods of chemical analysis that are based on chemical equilibrium and stoichiometric reactions. he laboratory classes will include experiments demonstrating modern approaches of data acquisition and rocessing as well as chemical analysis based on chemical equilibrium.					
Course Contents & Topics		0 0	gital measurement, accuract are method for linear plots	y and precision, con	nparing means	and deviations	
		ssurance: validation of	analytical procedures nical analysis: aqueous solo	ution and chemical ed	uilibrium: analv	vsis hv acid-hase	
			ty, precipitation reactivity	ation and chemical ce	quiibrium, anaiy	7313 by acid-base	
Course Learning		n successful completion of this course, students should be able to:					
Outcomes		•	ples of chemical measureme				
			f classical methods of chemi		cid-base neutra	lization	
	CLO 3 u	ise laboratory apparati	us for chemical analysis	•			
Pre-requisites (and Co-requisites and Impermissible combinations)		HEM1042; and Pass i	s admitted in 2014-15 or bet in CHEM1043, or already e		for students ad	mitted in 2015-10	
Offer in 2019 - 2020	Y 1st	1st sem 2nd sem Offer in 2020 - 2021 : Y Examination Dec May					
Grade Descriptors	A Demonstrate thorough grasp of the subject. Show evidence of strong analytical abilities, logical and independent thinking, and						
Course Type	abilitity to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Demonstra and techniques and critical use of data and results to draw appropriate and insightful conclusions. I organization and presentation skills. B Demonstrate substantial grasp of the subject. Show evidence of analytical abilities and logical independent thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Der and techniques and correct use of data and results to draw appropriate conclusions. Demonstrat presentation skills. C Demonstrate general but incomplete grasp of the subject. Show evidence of some analytical abilitie evidence of independent thinking, and ability to apply knowledge to most familiar situations. Demons techniques and mostly correct but some erroneous use of data and results to draw appropriate moderately effective organization and presentation skills. D Demonstrate partial but limited grasp, with retention of some relevant information, of the subject analytical abilities, little or no evidence of independent thinking, and limited ability to use data and ronclusions. Demonstrate limited or barely effective organization and presentation skills. Fail Demonstrate ilittle or no grasp of the knowledge and understanding of the subject. Show little cabilities, logical and independent thinking, and very little or no ability to apply knowledge to so minimally effective or ineffective lab skills and techniques and misuse of data and results and/or conclusions. Demonstrate incoherent organization and pore presentation skills.				and logical thinking unations. Demonstrate effect alytical abilities and ons. Demonstrate at vappropriate conclif the subject. Show to apply knowledge data and results. Show little or no e eledge to solve pro	g, some evidence of the proficient lab skills tive organization and I logical thinking, little dequate lab skills an usions. Demonstrate v evidence of limited to solve problems to draw appropriate vidence of analytica bilems. Demonstrate	
Course Type		ith laboratory compone					
Course Teaching	Activities	5	Details			No. of Hours	
& Learning Activities	Lectures	un ,				24	
	Laborator Tutorials	у				24 6	
		/ Self study				100	
Assessment Methods			Details Weighting in final		na in fire!		
and Weighting	Methods		Details		grade (%)	Assessment Methods to CLO Mapping	
	Assignme				15	CLO 1,2	
	Examinat				65	CLO 1,2	
	Laborator	, ,			20	CLO 3	
Required/recommended reading and online materials	Skoog, W	est, Holler and Crouch	n, "Fundamentals of Analytic	al Chemistry", latest e	dition, Cengage	Learning	

Additional Cours	е
Information	

Laboratory classes are mandatory. Students must complete ALL experiments and laboratory reports to pass this course.

CHEM2341		ic chemistry I (6 cre	dits)	Academic Yea		
Offering Department	Chemistr		V A., V-, (C	Quota	120	
Course Co-ordinator Teachers Involved		, ,	Y Au Yeung (2nd sem), Cher	mistry (wwyam@hku.hk; hoyuay@	@hku.hk)	
reachers involved		′ Yuen,Chemistry) ′ W Yam / Dr H Y Au Yeι	ına.Chemistrv)			
Course Objectives	To provid	e students with the basic	principles and knowledge of	f inorganic chemistry and to introd	duce their relevanc	
		•	rials science. This course pro	ovides the foundation for further	studies in inorgani	
Course Contents	chemistry		handing of transition metal	complexes and main group con	nnounds: electroni	
& Topics		• •	•	hemical reactions of metal com	•	
				transition metal complexes and	•	
		nd materials.				
Course Learning Outcomes		•	course, students should be ab		their relevance to	
Jutcomes		-	ogical processes and materia	ganic chemistry and appreciate	their relevance to	
	CLO 2 d	emonstrate knowledge a	nd understanding of the acid	-base concept and definition		
				ucture and bonding of main grou		
		ansition metal complexe ansition metal complexes		e electronic absorption and mag	inetic properties o	
				modynamic stability of metal com	nplex formation and	
			netic aspects of substitution a		'	
			_	ole of main group elements an	nd transition meta	
Pro roquicitos		omplexes in bioinorganic	•	in CHEM2041, or already enrolle	d in this source (fe	
Pre-requisites and Co-requisites		admitted in 2014-15 or b	•	iii ⊙i i∟ivi∠o+ i, ∪i aiieauy eiif0lle	a in una course (ic	
and Impermissible	Pass in C	CHEM1042; and Pass in	CHEM1043, or already enro	olled in this course; and NOT for		
combinations)			,	udents admitted in 2015-16 or the		
Offer in 2019 - 2020 Grade Descriptors	Y 1st	sem 2nd sem Offer Demonstrate thorough know		Examination tial facts, concepts, principles, and theor	Dec May ries relating to the basi	
(A+ to F)	^	foundation knowledge of inc	rganic chemistry, especially those r	elated to acid-base concept; structure and	d bonding of main grou	
` ,				scopy, magnetic properties as well as the ance to biological processes and materia		
		ability to apply and integrat	te knowledge and theory relating to	the basic foundation knowledge of ino	rganic chemistry. Sho	
		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 inorganic chemistry. Demonstrate highly effective basic laboratory				
	_	skills and techniques, espec	ially in the synthesis and characterize	zation of inorganic compounds and metal	complexes.	
	B Demonstrate substantial command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the basic foundation knowledge of inorganic chemistry, especially those related to acid-base concept; structure and bonding of					
		main group compounds and metal complexes; electronic absorption spectroscopy, magnetic properties as well as thermodynamic and kinetic aspects of metal complexes and their reactions; and their relevance to biological processes and materials science. Show evidence to apply and integrate knowledge and theory relating to the basic foundation knowledge of inorganic 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 inorganic chemistry. Demonstrate effective basic laboratory skills and techniques, especially in the synthesis and characterization of inorganic compounds and metal complexes. Demonstrate general but incomplete command of knowledge and understanding of essential facts, concepts, principles, and				
	С					
		theories relating to the basic foundation knowledge of inorganic chemistry, especially those related to acid-base concerning and bonding of main group compounds and metal complexes; electronic absorption spectroscopy, magnetic proper and their relationship and their relationship and their relationship and their relationship and their relationship.				
		as well as thermodynamic and kinetic aspects of metal complexes and their reactions; and their relevance to biological processes and materials science. Show evidence of some abilities to apply and integrate knowledge and theory relating to the basic foundation knowledge of inorganic chemistry. Show 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 basic principles and knowledge of inorganic chemistry. Demonstrate moderately effective basic laboratory skills and techniques, especially in the synthesis and characterization of inorganic compounds and metal complexes. Demonstrate partial but limited command of knowledge and understanding of essential facts, concepts, principles, and theories relating to the basic foundation knowledge of inorganic chemistry, especially those related to acid-base concept; structure and				
	_					
	D					
		bonding of main group compounds and metal complexes; electronic absorption spectroscopy, magnetic properties as well as thermodynamic and kinetic aspects of metal complexes and their reactions; and their relevance to biological processes and				
		materials science. Show evidence of limited abilities to apply and integrate knowledge and theory relating to the basic 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 basic principles and knowledge of				
		inorganic chemistry. Demonstrate partially effective basic laboratory skills and techniques, especially in the synthesis and				
	characterization of inorganic compounds and metal complexes. Fail Demonstrate little or no evidence of command of knowledge and understanding of essential facts, concepts, principles, and					
	∥⊦aii		idence of command of knowledge	and understanding of essential facts, co	ciples and knowledge of y in the synthesis and oncepts, principles, and	
	Faii		sic foundation knowledge of inorga	anic chemistry, especially those related	ciples and knowledge of y in the synthesis and oncepts, principles, and to acid-base concept	
	Faii	structure and bonding of ma as well as thermodynamic	sic foundation knowledge of inorga ain group compounds and metal cor and kinetic aspects of metal cor	anic chemistry, especially those related nplexes; electronic absorption spectrosconplexes and their reactions; and their	ciples and knowledge of y in the synthesis and concepts, principles, and to acid-base concept to ppy, magnetic propertie relevance to biological	
	Fall	structure and bonding of ma as well as thermodynamic processes and materials sc	sic foundation knowledge of inorgation group compounds and metal cortion and kinetic aspects of metal cortience. Show little or no evidence of	anic chemistry, especially those related inplexes; electronic absorption spectrosco- inplexes and their reactions; and their abilities to apply and integrate knowledge	ciples and knowledge of y in the synthesis and concepts, principles, and to acid-base concept pyp, magnetic propertie relevance to biologically and theory relating to	
	Fail	structure and bonding of ma as well as thermodynamic processes and materials sc the basic foundation knowle and erroneous use of data	sic foundation knowledge of inorga- ain group compounds and metal cor and kinetic aspects of metal cor ience. Show little or no evidence of edge of inorganic chemistry. Show a and experimental results to dray	anic chemistry, especially those related mplexes; electronic absorption spectrosco- mplexes and their reactions; and their abilities to apply and integrate knowledgo little or no ability to analyze problems to w appropriate conclusions relating to the	ciples and knowledge of yin the synthesis and concepts, principles, and to acid-base concept oppy, magnetic propertie relevance to biologicale and theory relating to most familiar situation to basic principles and	
	Fall	structure and bonding of ma as well as thermodynamic processes and materials so the basic foundation knowle and erroneous use of data knowledge of inorganic che	sic foundation knowledge of inorga- ain group compounds and metal cor and kinetic aspects of metal cor ience. Show little or no evidence of edge of inorganic chemistry. Show a and experimental results to dray	anic chemistry, especially those related mplexes; electronic absorption spectroscor mplexes and their reactions; and their abilities to apply and integrate knowledg little or no ability to analyze problems to w appropriate conclusions relating to the ective basic laboratory skills and techni	ciples and knowledge of in the synthesis and concepts, principles, and to acid-base conceptopy, magnetic propertie relevance to biologicate and theory relating to most familiar situation the basic principles and	
		structure and bonding of ma as well as thermodynamic processes and materials so the basic foundation knowle and erroneous use of data knowledge of inorganic che	sic foundation knowledge of inorgain group compounds and metal cor and kinetic aspects of metal cor ience. Show little or no evidence of edge of inorganic chemistry. Show a and experimental results to draw emistry. Demonstrate minimally effon of inorganic compounds and met	anic chemistry, especially those related mplexes; electronic absorption spectroscor mplexes and their reactions; and their abilities to apply and integrate knowledg little or no ability to analyze problems to w appropriate conclusions relating to the ective basic laboratory skills and techni	ciples and knowledge of in the synthesis and concepts, principles, and to acid-base conceptopy, magnetic propertie relevance to biologicate and theory relating to most familiar situation the basic principles and	
Course Teaching		structure and bonding of ma as well as thermodynamic processes and materials so the basic foundation knowle and erroneous use of data knowledge of inorganic ch synthesis and characterizati vith laboratory componen	sic foundation knowledge of inorgain group compounds and metal cor and kinetic aspects of metal cor ience. Show little or no evidence of edge of inorganic chemistry. Show a and experimental results to draw emistry. Demonstrate minimally effon of inorganic compounds and met	anic chemistry, especially those related mplexes; electronic absorption spectroscor mplexes and their reactions; and their abilities to apply and integrate knowledg little or no ability to analyze problems to w appropriate conclusions relating to the ective basic laboratory skills and techni	ciples and knowledge of in the synthesis and concepts, principles, and to acid-base conceptopy, magnetic propertie relevance to biologicate and theory relating to most familiar situation the basic principles and	
Course Teaching	Lecture w	structure and bonding of mas well as thermodynamic processes and materials so the basic foundation knowle and erroneous use of data knowledge of inorganic ch synthesis and characterizativith laboratory components	sic foundation knowledge of inorgain group compounds and metal cor and kinetic aspects of metal cor ience. Show little or no evidence of edge of inorganic chemistry. Show a and experimental results to drawernistry. Demonstrate minimally effon of inorganic compounds and met it course	anic chemistry, especially those related mplexes; electronic absorption spectroscor mplexes and their reactions; and their abilities to apply and integrate knowledg little or no ability to analyze problems to w appropriate conclusions relating to the ective basic laboratory skills and techni	ciples and knowledge of yin the synthesis and concepts, principles, and to acid-base concept popy, magnetic propertie relevance to biologically and theory relating the most familiar situation the basic principles and ques, especially in the No. of Hours 24	
Course Teaching	Lecture w Activitie Lectures Laborato	structure and bonding of mas well as thermodynamic processes and materials so the basic foundation knowle and erroneous use of data knowledge of inorganic che synthesis and characterizativith laboratory components	sic foundation knowledge of inorgain group compounds and metal cor and kinetic aspects of metal cor ience. Show little or no evidence of edge of inorganic chemistry. Show a and experimental results to drawernistry. Demonstrate minimally effon of inorganic compounds and met it course	anic chemistry, especially those related mplexes; electronic absorption spectroscor mplexes and their reactions; and their abilities to apply and integrate knowledg little or no ability to analyze problems to w appropriate conclusions relating to the ective basic laboratory skills and techni	ciples and knowledge of yin the synthesis and concepts, principles, and to acid-base concept oppy, magnetic propertie relevance to biologica ge and theory relating timost familiar situation are basic principles and ques, especially in the No. of Hours 24 24	
Course Teaching	Lecture w Activitie Lectures Laborato Tutorials	structure and bonding of max well as thermodynamic processes and materials so the basic foundation knowle and erroneous use of data knowledge of inorganic che synthesis and characterizativith laboratory components	sic foundation knowledge of inorgain group compounds and metal cor and kinetic aspects of metal cor ience. Show little or no evidence of edge of inorganic chemistry. Show a and experimental results to drawernistry. Demonstrate minimally effon of inorganic compounds and met it course	anic chemistry, especially those related mplexes; electronic absorption spectroscor mplexes and their reactions; and their abilities to apply and integrate knowledg little or no ability to analyze problems to w appropriate conclusions relating to the ective basic laboratory skills and techni	ciples and knowledge of y in the synthesis and concepts, principles, and to acid-base concept oppy, magnetic propertie relevance to biologically and theory relating the most familiar situation the basic principles and ques, especially in the No. of Hours 24 24 6	
Course Teaching & Learning Activities	Lecture w Activitie Lectures Laborato Tutorials Reading	structure and bonding of mas well as thermodynamic processes and materials so the basic foundation knowle and erroneous use of data knowledge of inorganic che synthesis and characterizativith laboratory components ry / Self study	sic foundation knowledge of in orgain group compounds and metal cor and kinetic aspects of metal cor ience. Show little or no evidence of edge of inorganic chemistry. Show and experimental results to draw emistry. Demonstrate minimally effon of inorganic compounds and metal to course Details	anic chemistry, especially those related mplexes; electronic absorption spectroscomplexes and their reactions; and their abilities to apply and integrate knowledgittle or no ability to analyze problems to w appropriate conclusions relating to the ective basic laboratory skills and technical complexes.	ciples and knowledge of yin the synthesis and knowledge of yin the synthesis and concepts, principles, and to acid-base concept opportune to be concept opportune to be concept opportune to biological per and theory relating the most familiar situation are basic principles and riques, especially in the solution of the concept of the co	
Course Teaching & Learning Activities Assessment Methods	Lecture w Activitie Lectures Laborato Tutorials	structure and bonding of mas well as thermodynamic processes and materials so the basic foundation knowle and erroneous use of data knowledge of inorganic che synthesis and characterizativith laboratory components ry / Self study	sic foundation knowledge of inorgain group compounds and metal cor and kinetic aspects of metal cor ience. Show little or no evidence of edge of inorganic chemistry. Show a and experimental results to drawernistry. Demonstrate minimally effon of inorganic compounds and met it course	anic chemistry, especially those related mplexes; electronic absorption spectroscor mplexes and their reactions; and their abilities to apply and integrate knowledg little or no ability to analyze problems to w appropriate conclusions relating to the ective basic laboratory skills and techni	ciples and knowledge of y in the synthesis and concepts, principles, and to acid-base concept oppy, magnetic propertie relevance to biologically and theory relating the most familiar situation the basic principles and ques, especially in the No. of Hours 24 24 6	
Course Teaching & Learning Activities Assessment Methods	Lecture w Activitie Lectures Laborato Tutorials Reading Methods	structure and bonding of me as well as thermodynamic processes and materials so the basic foundation knowle and erroneous use of data knowledge of inorganic ch synthesis and characterizativith laboratory components	sic foundation knowledge of in orgain group compounds and metal cor and kinetic aspects of metal cor ience. Show little or no evidence of edge of inorganic chemistry. Show and experimental results to draw emistry. Demonstrate minimally effon of inorganic compounds and metal to course Details	anic chemistry, especially those related mplexes; electronic absorption spectrosoc mplexes and their reactions; and their abilities to apply and integrate knowledglittle or no ability to analyze problems to wappropriate conclusions relating to the ective basic laboratory skills and technical complexes. Weighting in final course grade (%)	ciples and knowledge of yin the synthesis and knowledge of yin the synthesis and concepts, principles, and to acid-base concept oppy, magnetic propertie relevance to biologically and theory relating the basic principles and iques, especially in the No. of Hours No. of Hours 24 24 6 100 Assessment Methods to CLO Mapping	
Course Teaching & Learning Activities Assessment Methods	Lecture w Activitie Lectures Laborato Tutorials Reading Methods	structure and bonding of mas well as thermodynamic processes and materials so the basic foundation knowle and erroneous use of data knowledge of inorganic ch synthesis and characterizati /ith laboratory components	sic foundation knowledge of in orgain group compounds and metal cor and kinetic aspects of metal cor ience. Show little or no evidence of edge of inorganic chemistry. Show and experimental results to draw emistry. Demonstrate minimally effon of inorganic compounds and metal to course Details	anic chemistry, especially those related nplexes; electronic absorption spectrosoc mplexes and their reactions; and their abilities to apply and integrate knowledglittle or no ability to analyze problems to wappropriate conclusions relating to the ective basic laboratory skills and technical complexes. Weighting in final course grade (%)	ciples and knowledge of yin the synthesis and knowledge of yin the synthesis and concepts, principles, and to acid-base concept oppy, magnetic propertie relevance to biologica and theory relating to most familiar situation the basic principles and iques, especially in the No. of Hours 24 24 6 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5	
Course Teaching & Learning Activities Assessment Methods	Lecture w Activitie Lectures Laborato Tutorials Reading Methods Assignm Examina	structure and bonding of mas well as thermodynamic processes and materials so the basic foundation knowle and erroneous use of data knowledge of inorganic ch synthesis and characterizativith laboratory components Try / Self study ents tion	sic foundation knowledge of in orgain group compounds and metal cor and kinetic aspects of metal cor ience. Show little or no evidence of edge of inorganic chemistry. Show and experimental results to draw emistry. Demonstrate minimally effon of inorganic compounds and metal to course Details	anic chemistry, especially those related mplexes; electronic absorption spectrosoc mplexes and their reactions; and their abilities to apply and integrate knowledgilitile or no ability to analyze problems to wappropriate conclusions relating to the ective basic laboratory skills and technical complexes. Weighting in final course grade (%)	ciples and knowledge of yin the synthesis and concepts, principles, and to acid-base concept by, magnetic propertie relevance to biologica ge and theory relating to most familiar situation: the basic principles and iques, especially in the No. of Hours 24 24 6 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5 CLO 1,2,3,4,5	
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	Lecture w Activitie Lectures Laborato Tutorials Reading Methods Assignm Examina	structure and bonding of mas well as thermodynamic processes and materials so the basic foundation knowle and erroneous use of data knowledge of inorganic ch synthesis and characterizati /ith laboratory components	sic foundation knowledge of in orgain group compounds and metal cor and kinetic aspects of metal cor ience. Show little or no evidence of edge of inorganic chemistry. Show and experimental results to draw emistry. Demonstrate minimally effon of inorganic compounds and metal to course Details	anic chemistry, especially those related nplexes; electronic absorption spectrosoc mplexes and their reactions; and their abilities to apply and integrate knowledglittle or no ability to analyze problems to wappropriate conclusions relating to the ective basic laboratory skills and technical complexes. Weighting in final course grade (%)	ciples and knowledge of yin the synthesis and knowledge of yin the synthesis and concepts, principles, and to acid-base concept by, magnetic propertie relevance to biologically and theory relating to most familiar situation: the basic principles and iques, especially in the No. of Hours 24 24 6 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5	

reading and online materials	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 mandatory. Students must complete ALL experiments and laboratory reports to pass this course.

CHEM2441	Organic	chemistry I (6 cre	dits)	Academic Yea	r 2019		
Offering Department	Chemistry			Quota	200		
Course Co-ordinator	Dr X Y Li	(1st sem); Prof P Chiu	(2nd sem), Chemistry (xiaoyuli@hku.	hk; pchiu@hku.hk)			
Teachers Involved	,	,Chemistry) niu,Chemistry)					
Course Objectives	examples This cours	provide students with the basic principles to understand the structure and reactivity of organic molecules, with amples illustrating the role of organic chemistry in daily life and industry. It is course serves as the first part of the complete program on fundamental organic chemistry, to be followed up CHEM3441 Organic Chemistry II.					
Course Contents & Topics	stereoche	ucture and bonding of organic compounds, three dimensional structures of organic molecules, conformational reochemistry, chirality. Chemistry of alkanes, cycloalkanes, alkenes, alkynes, haloalkanes, dienes, aromatic mpounds, alcohols, thiols, and ethers. Organometallic chemistry for organic synthesis. Principles of organic thesis. Detailed considerations of reaction mechanisms.					
Course Learning Outcomes	CLO 1 un CLO 2 vi CLO 3 re CLO 4 un CLO 5 un	n successful completion of this course, students should be able to: LO 1 understand basic concepts and employ the vocabulary of organic chemistry LO 2 visualize and draw three-dimensional, stereochemically correct representations of organic molecules recognize, discriminate and name chiral stereoisomers and diastereomers LO 4 understand the reactivity of the functional groups LO 5 understand reaction mechanisms and apply mechanistic knowledge to solve chemistry problems					
			nthesis of target molecules	,			
		•	e of organic chemistry in biological pr				
Pre-requisites (and Co-requisites and Impermissible combinations)	students a Pass in C	ss in CHEM1042; and NOT for students who have passed in CHEM2041, or already enrolled in this course (for dents admitted in 2014-15 or before); ss in CHEM1042; and Pass in CHEM1043, or already enrolled in this course; and NOT for students who have ssed CHEM2041, or already enrolled in this course (for students admitted in 2015-16 or thereafter)					
Offer in 2019 - 2020		sem 2nd sem Offe	,	Examination	Dec May		
Grade Descriptors (A+ to F)	A Demonstrate a thorough mastery at an advanced level of knowledge and understanding of facts and concepts pertaining to the chemical properties, reactions and mechanisms of organic chemistry. Show a strong ability to integrate knowledge and theory, and a strong ability to analyze and solve novel organic chemistry problems. Demonstrate highly effective organization, understanding, and execution of lab skills and techniques in organic chemistry experiments.						
	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.						
	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.						
	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 no even chemical properties, react knowledge and theory, an problems. Demonstrate rechemistry experiments.	vidence of command of knowledge and unders tions and mechanisms of organic chemistry. S d little or no ability to analyze novel problems. ninimal or no organization, understanding a	how little or no evidence of ability Show little or no evidence of abilit	to apply and integrate y to solve most familiar		
Course Type		ased course					
Course Teaching	Activities	3	Details	No. of Hours			
& Learning Activities	Lectures			36			
	Tutorials	Calf atualu			12		
Accomment Mathed		Self study	Deteile	Walastina 1 C - 1	100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme			15	CLO 1,2,3,4,5,6,7		
	Examinat	ion	2 hrs written examination	75	CLO 1,2,3,4,5,6		
	Test		(open book midterm 5% and regular midterm 5%)		CLO 1,2,3,4,5,6		
Required/recommended reading and online materials	"Organic Chapters	Chemistry", by Paula 3 - 13	Y. Bruice, 2016, 8th Edition, Pea	rson, with e-text and Mas	stering Chemistry.		
Additional Course	Nil						
Information							
IIIIOIIIIatioii							

CHEM2442	Fundamentals of organic chemistry (6 credits)	Academic Year	2019		
Offering Department	Chemistry	Quota	130		
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 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 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 be 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 un	derstanding of the structi	ure of organic molecules			
	CLO 2 demonstrate basic understanding of the reactivity of organic molecules						
	CLO 3	appreciate how organ	ic chemistry plays an imp	oortant role in everyday life			
Pre-requisites (and Co-requisites and Impermissible combinations)		in CHEM1042; and or students who have passed CHEM2441, or have already enrolled in this course.					
Offer in 2019 - 2020	Y 1s	t sem Offer in 2020 - 2	2021 : Y	Exami	nation Dec		
Grade Descriptors (A+ to F)	A	all the course learning or	utcomes. Show strong analytic	extensive organic chemistry knowledg al and critical abilities and logical the complex, familiar and unfamiliar prob	hinking, with evidence of original		
	В		g outcomes. Šhow evidence o	vith a broad range of knowledge, and of analytical and critical abilities and lo			
	С		s. Show evidence of some an	nic chemistry knowledge, and skills r alytical and critical abilities and logi			
	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.						
Course Type	Lecture v	vith laboratory compone	nt course				
Course Teaching	Activitie	s	Details		No. of Hours		
& Learning Activities	Lectures				24		
	Laborato	ory			20		
	Tutorials				5		
	Reading	/ Self study			100		
Assessment Methods and Weighting	Methods	5	Details	Weighting in course grade			
	Examina	tion		60	CLO 1,2,3		
	Test		Test/Quiz	40	CLO 1,2,3		
Required/recommended reading and online materials	Bruice, P	uice, P.Y.; Essential Organic Chemistry (Pearson, 2016, 3rd edition)					
Additional Course Information	Laborato		te CHEM3441 should tak ry. Students must comp	e CHEM2441. lete ALL experiments and take	e a written laboratory test in		

CHEM2443	Fundan (6 credi		emistry for pharmacy students	Academic Year	2019	
Offering Department	Chemistr	у		Quota	60	
Course Co-ordinator	Dr P H T	oy, Chemistry (phtoy@hk	u.hk)			
Teachers Involved	(Dr P H 1	Toy,Chemistry)				
Course Objectives	especiall functiona	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	carboxyli	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 succe	essful completion of this co	ourse, students should be able to:			
Outcomes	CLO 1	demonstrate basic unde	erstanding of structure of organic molecule	S		
	CLO 2	demonstrate basic unde	erstanding of the reactivity of organic mole	cules		
	CLO 3	appreciate how organic	chemistry plays an important role in every	day life		
(and Co-requisites and Impermissible combinations)	(This cou	ırse is for BPharm student	CHEM2442, or already enrolled in this cous only)			
Offer in 2019 - 2020		fer in 2020 - 2021 : 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.					
	B Demonstrate substantial command of organic chemistry with 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 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.					
Course Type	Lecture v	vith laboratory component	course			
Course Teaching	Activitie	s	Details		No. of Hours	
	Lectures				24	
& Learning Activities	LCCturcs					
& Learning Activities	Laborato				20	
& Learning Activities		ory				

Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Examination		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	emistry (Pearson, 2016, 3rd edition)		
Additional Course Information	Laboratory classes are mandatory course.	. Students must complete ALL exp	periments and laboratory	reports to pass this

CHEM2541	Introductory	physical chemi	stry (6 credits)	Academic Yea	ar 2019	
Offering Department	Chemistry	, ,		Quota	100	
Course Co-ordinator		hemistry (jinyao@hi	ku.hk)	4.51		
Teachers Involved	(Dr J Y Tang,C		,			
Course Objectives	The course ai Students are re chemical reach properties of n	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 understan hemical reactions and related processes. Topics include the three laws of thermodynamics, thermodynami roperties of mixtures, solutions, chemical equilibrium, electrochemistry, rates of chemical reactions and reactio ynamics. Students will gain a good foundation of knowledge and skills for further study in Physical Chemistry.				
Course Contents & Topics	Properties of G States of gases	ases s and the gas laws v	vith applications.			
	Basic concepts		ergy, expansion work, heat transac y and materials science.	ctions, enthalpy and adia	batic changes and	
		nd Third Laws of The contaneous change, o	ermodynamics entropy and the Third Law of Therm	odynamics.		
			xtures, partial molar quantities, and ions in solution.	d chemical potentials of I	iquids. Activities of	
	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 thermodynamic functions. Applications of electrochemistry in energy, material science, sensing.					
	Molecules in Motion Molecular motion in gases and liquids, kinetic model, collisions with surfaces, the rate of effusion and transport properties, conductivities of electrolyte solutions.					
	Rates of Chemical Reactions Empirical chemical kinetics including experimental methods, rates of reactions, integrated rate laws and temperature dependence of reactions and Reaction mechanism On expensely the projection of this course attribute about the other temperature.					
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 demonstrate knowledge and understanding of the properties of gases, molecules in motion and the rates of chemical reactions					
	CLO 2 understand and demonstrate knowledge of the three laws of thermodynamics					
	CLO 3 understand and apply the concepts of chemical equilibrium and the response of chemical equilibria to					
	temperature and pressure CLO 4 understand and demonstrate knowledge of electrochemistry and its relationship to thermodynamics, can build electrochemical cell and calculate thermodynamic functions from electrochemical reactions					
	CLO 5 demonstrate knowledge and understanding of basic reaction dynamics including reaction mechanism and how mechanism determines reaction rate law					
Pre-requisites (and Co-requisites and Impermissible	students admit	ted in 2014-15 or be	students who have passed CHEM fore); 43; and NOT for students who hav			
combinations)			n 2015-16 or thereafter)	. ,		
Offer in 2019 - 2020	Y 2nd sem	Offer in 2020 - 20)21 : Y	Examination	May	
Grade Descriptors (A+ to F)	lear	ning outcomes. Show the	ery at an advanced level of extensive kno- prough grasp of the subject. Demonstrate st le to a wide range of complex, familiar and un	rong analytical and critical abilit		
	lear thinl	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.				
	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.					
	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 Den evid	nonstrate little or no evide ence of little or no grasp	ence of command of knowledge and skills re of the knowledge and understanding of the very little or no ability to apply knowledge to	subject. Lack of analytical and		
	and coherent thinking. Show very little or no ability to apply knowledge to solve problems.					
Course Type	Lecture-based	course				
Course Type Course Teaching & Learning Activities	Lecture-based Activities	course	Details		No. of Hours	

	Tutorials			12
	Reading / Self study			100
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments	including tests	30	CLO 1,2,3,4
	Examination		70	CLO 1,2,3,4
Required/recommended reading and online materials	"Physical Chemistry" by P. W. Atk	ins, latest edition		

CHEM3141	Environ	mental chemistry (6	credits)	Academic Ye	ar 2019
Offering Department	Chemistry	1		Quota	100
Course Co-ordinator	Dr W T Ch	nan, Chemistry (wtchan	@hku.hk)		'
Teachers Involved		han,Chemistry) C Cheung,Chemistry)			
Course Objectives			to Environmental Chemistry a ronmental phenomena and process.		stand the chemical
Course Contents & Topics	Atmosphere chemistry: atmospheric composition and behavior, ozone in the stratosphere, chemistry of the troposphere, air pollution Water Chemistry: property of water, water resources and cycle, chemical quality of natural water, acid-base chemistry, oxidation-reduction chemistry, water purification Organic pollutants: persistent organic pollutants, pesticides, toxicology Energy: energy resources, fossil fuels, solar energy, nuclear energy, energy conversion (heat engine, fuel cells) Waste treatment: domestic and hazardous waste treatment (landfill, incineration, air stripping, adsorption, oxidation)				
Course Learning	On succes	ssful completion of this of	course, students should be able t	o:	
Outcomes	CLO 2 de en CLO 3 cri	escribe the practical pronergy production itically discuss local and	in chemical principles of the various cesses of chemistry in atmosphisms of chemistry in atmosphisms of chemical environmental issues basize chemical processes involved in the chemical principles of the various chemical principles of the chemical princ	ohere, water purification, was	ste treatment, and
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in CHEM2041 or CHEM2341 or CHEM2441 or CHEM2442 or CHEM2541				
Offer in 2019 - 2020	Y 2nd	l sem Offer in 2020 - 2	2021 : Y	Examination	May
Grade Descriptors (A+ to F)	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. 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.				
	- Demonstrate general but incomplete grasp of the subject Demonstrate some partial integration of theories, principles, and evidence Show evidence of some analytical abilities and logical thinking, little evidence of independent thinking, and ability to apply knowledge to most familiar situations Demonstrate moderately effective organization and presentation skills.				
	 Demonstrate partial but limited grasp, with retention of some relevant information, of the subject Demonstrate limited integration of theories, principles, and evidence Show evidence of limited analytical abilities, little or no evidence of independent thinking, and limited ability to apply knowledge to solve problems Demonstrate limited or barely effective organization and presentation skills. 				
	Fail - Demonstrate little or no grasp of the knowledge and understanding of the subject Demonstrate little or inapt integration of theories, principles, and evidence 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 incoherent organization and poor presentation skills.				
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	(continuous assessment)	30	CLO 1,2,3,4
	Examinat	ion	<u>, </u>	70	CLO 1,2,3,4
Required/recommended reading and online materials			ntal Chemistry, Freeman, latest emistry, Lewis Publishers, latest		

CHEM3142	Chemical process industries and analysis (6 credits)	Academic Year	2019				
Offering Department	Chemistry	Quota	60				
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 familiarize with typical chemical industries important in local and glue technology of chemicals manufacturing and chemical processes in general industries.		understand the				
Course Contents & Topics		Process flow charts, units and conversions, materials and energy balances, unit operations. Selection of chemical processes to include variation in products, scale, and types of operation, e.g. for petrochemical industries,					
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 solve basic problems of energy and mass balances in chemical and e CLO 2 be familiarized with a few common chemical industries and chemical CLO 3 understand some general principles of industrial practice through plan	orocesses	sses				

Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Cl	HEM2241 or CHEM234	1 or CHEM2441 or (CHEM2442 or C	CHEM2541		
Offer in 2019 - 2020	Y 2nd	sem Offer in 2020 - 2	2021 : Y		Examination	May	
Grade Descriptors (A+ to F)	A Demonstrate thorough knowledge of industrial chemical processes and mastery of mass and energy balance 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	for attaining at least most o	f the course learning out age to solve problems in	comes. Show evide familiar and some t	nd command of mass and energence of analytical and critical abunfamiliar situations. Correct us	lities and logical thinking,	
	С	skills required for attaining	most of the course learn o apply knowledge solve	ning outcomes. Sho problems to most fa	processes and command of mow evidence of some analytical amiliar situations. Mostly correctesentational skills.	and critical abilities and	
	D						
	Fail	Demonstrate little or no ev skills required for attaining	idence of knowledge of the course learning outo ility to apply knowledge	industrial chemical omes. Lack of anal to solve problem	processes and command of m lytical and critical abilities, logic is. Misuse of data and refere	al and coherent thinking.	
Course Type	Lecture wi	th laboratory componer	nt course				
Course Teaching	Activities	i	Details	No. of Hours			
& Learning Activities	Lectures			24			
	Laborator	У	computational labor	12			
	Field worl	ζ	1 - 2 plant visits	12			
	Reading /	Self study	·			100	
Assessment Methods and Weighting	Methods	,	Details		Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents	continuous as (assignments+test	ssessment s)	40	CLO 1,2	
	Examinat	ion	, ,	,	60	CLO 1,2,3	
Required/recommended reading and online materials	Felder and	d Rousseau: Elementar	Principles of Chem	ical Processes			
Additional Course Information	Laboratory course.	y courses are mandator	y. Students must c	omplete ALL ex	operiments and laboratory	reports to pass this	

CHEM3143	Introduc	tion to materials che	mistry (6 credits)	Academic Ye	ar 2019			
Offering Department	Chemistry			Quota	100			
Course Co-ordinator	Dr Y F Wa	Dr Y F Wang, Chemistry (wanglab@hku.hk)						
Teachers Involved	(Dr Y F W	ang,Chemistry)						
Course Objectives	various ty		their structure, synthesis, a	e goal is to present the fundar nd properties. This course is e				
Course Contents & Topics	properties	; alloys and ceramics; ir	ntroduction to soft matter;	and phase transformation; def structure, synthesis, and prop characterization techniques.				
Course Learning Outcomes	CLO 1 de ap CLO 2 ex CLO 3 ur	escribe different materials oprehend the concept of st plain different structures a derstand defects in crysta	tructure/property relationship and phases, phase transform alline solid materials and rela	composition, structures, and nation in solid materials te them with mechanical prope	·			
	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 polymerization kinetics to their properties CLO 6 identify examples of some important materials, and explain their structure-property relationship CLO 7 demonstrate knowledge in materials characterizations							
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in C	HEM2441; and Pass in Ch	HEM2541 or CHEM2341					
Offer in 2019 - 2020	Y 1st	sem Offer in 2020 - 202	1 : Y	Examination	Dec			
Grade Descriptors (A+ to F)	A	deep understanding of materia classical solid materials and common polymers. Demonstra of materials. Show strong abili	als structures at different length sca soft materials. Show extensive late strong ability to apply/integrate	nciples, and theories related to classifi les and the relationship with materials knowledge in synthesis, characteriza knowledge and theory related to the s ritical use of data/experimental results on.	properties particularly for ion and applications of nthesis and applications			
	В	B Demonstrate thorough 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 extensive 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 evidence to analyze novel problems and critical use of data/experimental results to draw appropriate and insightful conclusions related to materials synthesis/characterization.						
	Insigntful conclusions related to materials synthesis/characterization. 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.							

	classification of materials materials properties par characterization and appl and theory related to the situations and mostly corr synthesis/characterization		tructures at different length scales d soft materials. Show limited k te evidence but limited ability to a Show limited ability to analyze p I results to draw appropriate conclu	and the relationship with nowledge in synthesis, pply/integrate knowledge roblems to most familiar sions related to materials	
	classification of materials with materials properties characterization and app knowledge and theory rel	evidence of command of knowledge of ex. Show little or no understanding of materi particularly for classical solid materials ar plications of common polymers. Demons ated to the synthesis and applications of rerimental results to draw appropriat to	als structures at different length so nd soft materials. Show little or no trate limited or no evidence of a naterials. Show little or no ability to	ales and the relationship knowledge in synthesis, ability to apply/integrate analyze novel problems	
Course Type	Lecture-based course				
Course Teaching	Activities	Details	Details		
& 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		70	CLO 1,2,3,4,5,6,7	
	Test	(continuous assessment)	30	CLO 1,2,3,4,5,6,7	
Required/recommended reading and online materials	F. W. Billmeyer: Textbook of Pol G. Odian: Principles of Polymeri	te and Engineering: An Introduction lymer Science (John Wiley and So zations (John Wiley and Sons, 200 try: An Introduction (Oxford Univer	ns, 1984))4)		

CHEM3146	techniqu	ies (6 credits)	tions of spectroscopic and analyti	ical	Academic Year	2019	
Offering Department	Chemistry	-			Quota	200	
Course Co-ordinator	Dr X Li, Cl	nemistry <i>(xiangli</i> @	Dhku.hk)				
Teachers Involved							
Course Objectives			applications of modern practical spectrostanced chemistry courses.	scopic and a	analytical techni	ques. This course	
Course Contents & Topics		V-Visible Absorption Spectroscopy, Nuclear Magnetic Resonance Spectroscopy, Mass Spectrometry, Infra- pectroscopy, Elemental Analysis, Molecular Formulas and analysis of data.					
Course Learning Outcomes	CLO 1 ur	In successful completion of this course, students should be able to: CLO 1 understand the basic principles and applications of IR, UV/Vis, MS and NMR spectroscopic techniques CLO 2 describe and explain the terminology of IR, UV/Vis, MS and NMR spectroscopies 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)		ıy CHEM2XXX lev	,				
Offer in 2019 - 2020	N Offe	er in 2020 - 2021 :	: N		Examination		
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, 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 analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations.						
	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.						
	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.						
	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						
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		ing in final grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents			15	CLO 1,2,3	
	Examinati				70	CLO 1,2,3	
	Test		(2 quizzes)		15	CLO 1,2,3	
Required/recommended reading and online materials	4th edition)	ampman, George S. Kriz: Introduction to S scopy (Macmillan, 1991, 3rd ed.)	Spectroscopy	y (Thomson Lea	rning, 2001, 3rd 8	
Additional Course Information	Suggested	d follow-up course	: CHEM3241				

CHEM3241	Analytical chemistry II: chemical instrumentation (6 credits)	Academic Year	2019
Offering Department	Chemistry	Quota	80
Course Co-ordinator	Dr W T Chan, Chemistry (wtchan@hku.hk)		
Teachers Involved	(Dr I K Chu, Chemistry)		
	(Dr W T Chan, Chemistry)		

Course Objectives			and applications of chemical ins principles, of instruments that are					
Course Contents & Topics	Optical methods: Beer's Law; UV-visible, infrared, and atomic spectrometry; fluorescence; atomic mass 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								
Outcomes	On successful completion of this course, students should be able to: CLO 1 explain the principles of the optical methods, separation methods, and mass spectrometry							
	CLO 2 de		perimental set up and the propertion	•	•			
		. , .	ills in chemical analysis including and matrix effects correction (sta		solution preparatior			
Pre-requisites (and Co-requisites and Impermissible combinations)		Pass in CHEM2241						
Offer in 2019 - 2020	Y 1st	sem Offer in 2020	- 2021 : Y	Examination	Dec			
Grade Descriptors (A+ to F)	A - Demonstrate thorough grasp of the subject 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 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							
	 Demonstrate substantial grasp of the subject 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 proficient lab skills and techniques and correct use of data and results to draw appropriate conclusions Demonstrate effective organization and presentation skills. 							
	С	C - 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.						
	D	- Demonstrate partial but limited grasp, with retention of some relevant information, of the subject Show evidence of limited analytical abilities, little or no evidence of independent thinking, and limited ability to apply knowledge to solve problems Demonstrate partially effective lab skills and techniques and limited ability to use data and results to draw appropriate conclusions Demonstrate limited or barely effective organization and presentation skills.						
	 - 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 appropriat conclusions Demonstrate incoherent organization and poor presentation skills. 							
Course Type	Lecture w	rith laboratory compo	nent course					
Course Teaching	Activities	S	Details		No. of Hours			
Learning Activities	Lectures				24			
	Laborato	ry			28			
	Tutorials				6			
		/ Self study			100			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Examinat	tion		65	CLO 1,2,3			
		ry reports	including an oral examinatio		CLO 1,2,3			
	Test			10	CLO 1,2,3			
Required/recommended reading and	D.A. Sko		Crouch: Principles of Instrumental Holler, and S.R. Crouch: Funda					
online materials	edition)							
Additional Course		y classes are mand	atory. Students must complete A	LL experiments and laboratory	reports to pass th			
Information	course.							

CHEM3242	Food ar	nd water analysis (6 credits) Academic Year	2019					
Offering Department	Chemistr	ry Quota	50					
Course Co-ordinator	Dr W T C	Chan, Chemistry (wtchan @hku.hk)						
Teachers Involved	(Dr W T (Chan, Chemistry)						
Course Objectives		To cover areas in the application and new methodology development in analytical chemistry with focus on food a water analysis.						
Course Contents & Topics	Water and sodium of undeclared Water A technology recreation	al Analysis in Practicing Laboratories: Use of standard methods, guidelines and standardlysis; good laboratory practice; reliability and quality issues in chemical analysis. Italysis: Requirement of nutritional labeling; determination of food nutritional value (e.g. tot content); detection of food adulteration and contamination (e.g. presence of banned red components); recent issues and case studies in food analysis. Analysis: Water quality standards; sampling, pretreatment, storage of water samplings for field, laboratory and automated analysis of selected types of water (e.g. analysis) water, waste water).	al protein conter additives, toxins les; theory and drinking water					
	Analytical Method Development: Selection, application and combination of analytical (e.g. sample digestion, solid phase extraction) and instrumental (e.g. GC, LC, MS) techniques for food and water analysis; method validation (e.g. recovery analysis, analysis of certified reference materials)							
Course Learning	On succe	essful completion of this course, students should be able to:						
Outcomes	CLO 1	identify and determine errors and uncertainty of analytical results						
	CLO 2	apply measures taken to control quality and ensure reliability of analytical results						
	CLO 3	demonstrate a general knowledge in food and water analysis						
	CLO 3 CLO 4	demonstrate a general knowledge in food and water analysis understand issues in public health protection related to chemical analysis						

Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Ch	HEM2041 or CHEM224	11 or CHEM2341 or CHEM2441	or CHEM2541.			
Offer in 2019 - 2020	Y 2nd	sem Offer in 2020 -	2021 : Y	Examination	May		
Grade Descriptors (A+ to F)	A	Demonstrate through a thorough grasp of the knowledge and skills required in theory and laboratory work in food and water 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.					
	В	·					
	С	evidence of analytical and	mmand of knowledge and skills requir critical abilities, logical thinking, and abi ed to the analysis of food and water. A	ility to apply knowledge learnt to solve	a wide range of complex		
	D	D 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	Lack of analytical and criti	idence for the command of knowledge ical abilities, logical and coherent think alysis of food and water. Organization	ing. Show very little or no ability to a	pply knowledge to solve		
Course Type	Lecture wi	th laboratory compone	nt course				
Course Teaching	Activities		Details	No. of Hours			
& Learning Activities	Lectures				24		
	Laborator	у			16		
	Tutorials				8		
	Reading /	Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	nts		15	CLO 1,2,3,4		
	Examinati			70	CLO 1,2,3,4		
	Laborator	y reports	Experiment & Lab report	15	CLO 2,5		
Required/recommended reading and online materials	D. A. Sko latest editi		Holler, S.R. Crouch: Fundame	ntals of Analytical Chemistry	(Cengage Learning,		
Additional Course	Reference	s to specialist texts and	d other published material will b	e made throughout the course			
Information			ry. Students must complete AL				

	Introdu	uctory	instrumen	tal chemic	al analysis	(6 credits)		Academic Year	2019
Offering Department	Chemistr	Chemistry Quota 65						65	
Course Co-ordinator	Dr X Li, (Dr X Li, Chemistry (xiangli @hku.hk)							
Teachers Involved	(Dr K C J Wong,Pharmacology and Pharmacy) (Dr X Li,Chemistry)								
Course Objectives	for chem	This course is designed for non-chemistry major students covering basic principles of separation and spectroscop for chemical analysis. This course provides a general foundation for further studies in pharmacology, life an environmental sciences.							
Course Contents & Topics	spectrom Separation chromator Mass special laser des NMR: ba	metry; gr tion meth tography pectrome esorption pasic prin	ating spectro lods: partition (GC); instruetry: fundame ionization (No ciple of nucle	ometer; photon; chromatog mental set u ental concep (ALDI); time ear magnetic	on detectors graphy theori p of HPLC ar t of mass sp -of-flight (TOI resonance.	and thermal de es; high perfor nd GC.	etectors. mance liquic ectrospray io pole (Q) mas	•	(HPLC) and ga
Course Learning Outcomes	CLO 1 e	On successful completion of this course, students should be able to: CLO 1 explain the principles of the optical methods, separation methods, mass spectrometry, and NMR CLO 2 describe the basic experimental set up and the properties of the basic components of the instruments used in the laboratory classes							
Pre-requisites (and Co-requisites and Impermissible	Pass in 0	Pass in CHEM2041 or CHEM2241; and Not for students who have passed CHEM3241, or have already enrolled in this course.							
combinations)									
	Y 2n	2nd sem	Offer in 202	20 - 2021 : Y				Examination	May
combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	Y 2n	- Dem ablility and te	onstrate thorou to apply knowle	gh grasp of the edge to a wide ritical use of da	subject Show range of comple	x, familiar and unf	g analytical abil amiliar situation	Examination ities, logical and inder s Demonstrate high conclusions Demon	pendent thinking, ar aly proficient lab ski
Offer in 2019 - 2020 Grade Descriptors		- Dem ablility and to organ - Den indep and to prese	onstrate thorour to apply knowle chniques and constrate substant thinking, echniques and contation skills.	gh grasp of the edge to a wide ritical use of da entation skills. antial grasp of and ability to a correct use of c	subject Show range of comple ta and results to the subject Si pply knowledge lata and results	x, familiar and unfolder draw appropriate now evidence of a to familiar and sore to draw appropriate.	g analytical abil familiar situation and insightful of analytical abilition me unfamiliar si ate conclusions.	ties, logical and inder s Demonstrate high conclusions Demon es and logical thinkin tuations Demonstra - Demonstrate effect	pendent thinking, and proficient lab ski strate highly effecting, some evidence the proficient lab ski tive organization ar
Offer in 2019 - 2020 Grade Descriptors	Α	- Dem ablility and to organ - Den indep and to prese - Dem evider and to	onstrate thorouse to apply knowle children and president thinking, achniques and constrate substandent thinking, achniques and constrate generance of independichniques and rechildren and	gh grasp of the edge to a wide ritical use of da entation skills. antial grasp of and ability to a correct use of coll but incomplet lent thinking, an nostly correct b	subject Show range of comple ta and results to the subject Si pply knowledge lata and results e grasp of the si d ability to app	x, familiar and unfordraw appropriate now evidence of a to familiar and sor to draw appropria ubject Show evic y knowledge to r usus use of data ar	g analytical abil familiar situation and insightful of analytical abilitie me unfamiliar si ate conclusions. dence of some a nost familiar situ	ties, logical and inder s Demonstrate high conclusions Demon es and logical thinkin tuations Demonstra	pendent thinking, and proficient lab ski strate highly effecting, some evidence the proficient lab ski live organization and logical thinking, little adequate lab skile eadequate lab skile.
Offer in 2019 - 2020 Grade Descriptors	В	- Dem ability and to organ - Den indep and to prese - Den evider and to mode - Den analyty Demo	onstrate thorou to apply knowle chiques and c zation and pres constrate substandent thinking, chniques and c tation skills. onstrate genera cochiniques and r ately effective c constrate partial ical abilities, littinstrate partially instrate partially entrate partially entrate partially constrate partially entrate entrat	gh grasp of the edge to a wide ritical use of da entation skills. antial grasp of and ability to a correct use of coll but incomplet tent thinking, an obsty correct borganization and but limited gratle or no evide or effective lab	subject Show range of completa and results to the subject Slipply knowledge lata and results e grasp of the sid ability to app ut some erroned presentation slipply with the specific property of independent skills and tech	x, familiar and unfi draw appropriate now evidence of a to familiar and soi to draw appropria ibject Show evid by knowledge to m sus use of data ar tills. In of some releva	g analytical abili amiliar situation and insightful of analytical abilitieme unfamiliar si ate conclusions. dence of some nost familiar situ do results to dra nt information, I limited ability to dability to us	ties, logical and inder s Demonstrate high conclusions Demonstrate s and logical thinkin tuations Demonstrate - Demonstrate effect analytical abilities and cations Demonstrate was appropriate conclusions of the subject Show to apply knowledge e data and results.	nendent thinking, ar ly proficient lab ski strate highly effective, g, some evidence te proficient lab ski tive organization ar logical thinking, litte e adequate lab skil sions Demonstra v evidence of limite to solve problems.

	minimally effective or ine		e or no ability to apply knowledge to solve p es and misuse of data and results and/or una poor presentation skills.			
Course Type	Lecture with laboratory component course					
Course Teaching & Learning Activities	Activities	Details		No. of Hours		
	Lectures			24		
	Laboratory			28		
	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		
	Laboratory reports		15	CLO 1,2		
	Test		15	CLO 1,2		
Required/recommended reading and online materials	,	•	mental Analysis (Thomson, latest editi Fundamentals of Analytical Chemist	,		
Additional Course Information	Laboratory classes are mandat course.	ory. Students must comp	olete ALL experiments and laboratory	reports to pass this		

CHEM3244	Analyti	ear 2019						
Offering Department	Chemistr	•						
Course Co-ordinator	Dr X Li, C	Or X Li, Chemistry (xiangli@hku.hk)						
Teachers Involved	,	Dr K C J Wong,Pharmacology and Pharmacy) Dr X Li,Chemistry)						
Course Objectives	Sampling fluoresce	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 luorescence, 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	Analysis Optical s Separation	Principles and applications of different analytical and measurement techniques in pharmaceutical sciences. Analysis and quality assurance: method validation, sampling, statistics, hypothesis tests Optical spectroscopy: Beer's law, UV/Vis, infrared, fluorescence, and atomic spectroscopy Separation and purification: gas chromatography and liquid chromatography Modern mass spectrometry: ionization techniques (ESI, MALDI), mass analysis techniques (TOF, quadrupole protein sequencing.						
Course Learning		On successful completion of this course, students should be able to:						
Outcomes		•	ge and understanding of principles of d	ata analysis, optical spe	ctroscopic methods			
			s, and modern mass spectrometry	, , - --				
	CLO 2 d ir CLO 3 a	escribe the basic exp the laboratory class pply experimental s	perimental setup and the properties of thes ses skills in experiments including sample	•				
	ir	strument 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 2019 - 2020	Y 2n	d sem Offer in 202	0 - 2021 : Y	Examination	May			
Grade Descriptors	Α		h grasp of the subject Show evidence of strong		-			
(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.							
	 Demonstrate substantial grasp of the subject 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 proficient lab skills and techniques and correct use of data and results to draw appropriate conclusions Demonstrate effective organization and presentation skills. 							
	 C - 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. 							
	 D - Demonstrate partial but limited grasp, with retention of some relevant information, of the subject Show evidence of limited analytical abilities, little or no evidence of independent thinking, and limited ability to apply knowledge to solve problems Demonstrate partially effective lab skills and techniques and limited ability to use data and results to draw appropriate conclusions Demonstrate limited or barely effective organization and presentation skills. 							
	Fail - Demonstrate little or no grasp of the knowledge and understanding of the subject Show little or no evidence of analytica 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.							
Course Type	Lecture v	vith laboratory compo	onent course					
Course Teaching	Activitie		Details		No. of Hours			
& Learning Activities	Lectures				24			
=	Laborato	pry			28			
		•			100			
	Reading / Self study Methods		Details	Weighting in final course grade (%)	Assessment Methods			
	Methods			course grade (70)	to CLO Mapping			
	Methods Examina	ition		70				
	Examina	ition bry reports			to CLO Mapping CLO 1,2,3			
	Examina Laborato			70 15	to CLO Mapping CLO 1,2,3 CLO 1,2,3			
Assessment Methods and Weighting Reguired/recommende	Examina Laborato Test	ory reports	Crouch: Principles of Instrumental Analy	70 15 15	to CLO Mapping CLO 1,2,3 CLO 1,2,3 CLO 1,2,3			

CHEM3341		nic chemistry II (6 cre	edits)	Academic Ye			
Offering Department	Chemistry			Quota	90		
Course Co-ordinator		Prof V W W Yam, Chemistry (wwyam@hku.hk)					
eachers Involved	,	(Dr A M Y Yuen,Chemistry) (Prof V W W Yam Chemistry)					
	(Prof V W W Yam, Chemistry) This source is a continuation from CHEM2241 Inorganic Chemistry I with a more detailed treatment of general						
ourse Objectives		This course is a continuation from CHEM2341 Inorganic Chemistry I, with a more detailed treatment of general inorganic chemistry, with examples relevance to biological processes and material science, suited to the needs of					
	inorganic chemistry, with examples relevance to biological processes and material science, suited to the needs of						
Contonto	those intending to extend their studies in chemistry.						
Course Contents		Chemistry of selected classes of inorganic, coordination and organometallic compounds including mechanisms of heir reaction where appropriate.					
Topics	uleii lead	stion where appropriate.					
	Structure	honding magnetism ar	nd spectral properties of inorganic	e eveteme including evem	nles in higinorgan		
		tructure, bonding, magnetism and spectral properties of inorganic systems including examples in bioinorga ystems.					
ourse Learning		On successful completion of this course, students should be able to:					
Outcomes			of chemistry of selected classes of	f inorganic coordination	and organometalli		
		compounds	in charmany or colocica classes of	. morganio, ocoramation	and organomotam		
		· ·	ding, magnetism and spectral prope	erties of inorganic systems	3		
			of selected chemical reactions	• •			
		organometallic compounds					
	CLO 4 g	gain appropriate knowledg	e of coordination compounds in bid	ological systems			
re-requisites	Pass in (CHEM2341					
and Co-requisites							
nd Impermissible							
ombinations)							
Offer in 2019 - 2020		st sem Offer in 2020 - 20		Examination	Dec		
Grade Descriptors	Α		vledge and understanding of essential facts				
(A+ to F)			ledge of inorganic chemistry, especially etallic compounds; mechanisms of reactio				
		systems including examples in bioinorganic systems. Show strong ability to apply and integrate knowledge and the more advanced foundation knowledge of inorganic chemistry. Show strong ability to analyze novel problems of data and experimental results to draw appropriate and insightful conclusions relating to the essential and foundation principles and knowledge of inorganic chemistry. Demonstrate highly effective laboratory skills especially in the synthesis and reactivity study of inorganic compounds and metal complexes, and their characteristics.					
		especially in the synthesis and reactivity study of inorganic compounds and metal complexes, and their character various spectroscopic methods.					
	В	Demonstrate substantial con	nmand of knowledge and understanding of				
			ndation knowledge of inorganic chemistry				
		inorganic, coordination and organometallic compounds; mechanisms of reactions; and magnetic and spectral properties or inorganic systems including examples in bioinorganic systems. Show evidence to apply and integrate knowledge and theore relating to the more advanced foundation knowledge of inorganic chemistry. Show evidence to analyze novel problems are correct use of data and experimental results to draw appropriate conclusions relating to the essential and more advance foundation principles and knowledge of inorganic chemistry. Demonstrate effective laboratory skills and techniques, especially the synthesis and reactivity study of inorganic compounds and metal complexes, and their characterization by variou spectroscopic methods.					
	С	Demonstrate general but incomplete command of knowledge and understanding of essential facts, concepts, principles,					
	-		e advanced foundation knowledge of inorg				
		bonding of inorganic, coordination and organometallic compounds; mechanisms of reactions; and magnetic and s properties of inorganic systems including examples in bioinorganic systems. Show evidence of some abilities to app integrate knowledge and theory relating to the more advanced foundation knowledge of inorganic chemistry. Show all analyze problems to most familiar situations and mostly correct but erroneous use of data and experimental results t appropriate conclusions relating to the essential and more advanced foundation principles and knowledge of inorganic chemistry and the synthesis and reactivity study of in Demonstrate moderately effective laboratory skills and techniques, especially in the synthesis and reactivity study of in					
			lexes, and their characterization by various		ictivity study of morgan		
	D	Demonstrate partial but limited command of knowledge and understanding of essential facts, concepts, principles, and the					
		relating to the more advanced foundation knowledge of inorganic chemistry, especially those related to structure and bonding					
		inorganic, coordination and organometallic compounds; mechanisms of reactions; and magnetic and spectral properties o 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					
			lexes, and their characterization by various		, , ,		
	Fail		dence of command of knowledge and und				
		honding of inorganic coord	e advanced foundation knowledge of inorgidination and organometallic compounds;	anic chemistry, especially those mechanisms of reactions: and	magnetic and spectra		
			ems including examples in bioinorganic sys				
			eory relating to the more advanced founda				
			to most familiar situations and erroneous u e essential and more advanced foundati				
		Demonstrate minimally effect	ctive laboratory skills and techniques, espe	ecially in the synthesis and rea			
_			lexes, and their characterization by various	spectroscopic methods.			
Course Type		with laboratory component					
Course Teaching	Activitie		Details		No. of Hours		
Learning Activities	Lectures				24		
	Laborato	-			24		
	Tutorials				6		
	Reading	g / Self study			100		
ssessment Methods nd Weighting	Methods	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin		
5 5	Assignm	nents	including lab report & test	30	CLO 1,2,3,4		
	, working		morading lab report & test				
	Fyamina	ation		711	CIU 1 2 3 4		
oguirod/rocommond-d	Examina		etry (4th Ed.) Oxford University De-	70	CLO 1,2,3,4		
eading and	Shriver 8	& Atkins, Inorganic Chemis	stry (4th Ed.), Oxford University Prenorganic Chemistry (3nd Ed.), Pren	ess, 2005	CLO 1,2,3,4		
equired/recommended eading and nline materials dditional Course	Shriver & Catherine	& Atkins, Inorganic Chemis e, Housecroft & Sharpe, Ir		ess, 2005 htice Hall, 2008			

CHEM3342	Bioinor	ganic chemistry (6 c	redits)	Academic Yea	ar 2019	
Offering Department	Chemistry Quota				50	
Course Co-ordinator		Prof H Z Sun, Chemistry (hsun @hku.hk)				
Teachers Involved	(Dr H Y Au Yeung,Chemistry) (Prof H Z Sun,Chemistry)					
Course Objectives	details of	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			d topics of interest. Examples include			
Topics	mechanis		cal cells for metals such as zinc, iror obtain required metal ions from the uch as cancer.	• • •		
ourse Learning		-	course, students should be able to:			
Outcomes	CLO 2 u	nderstand structure, bon	and concepts of inorganic/organic or iding, and spectral properties of selectanisms of selected metal homeost tal complexes medicine	cted metals in proteins an	d nucleic acids	
re-requisites	Pass in C	HEM2341				
and Co-requisites and Impermissible combinations)						
Offer in 2019 - 2020	Y 2nd	d sem Offer in 2020 - 2	2021 : Y	Examination	May	
Grade Descriptors (A+ to F)	A	foundation knowledge of bid bonding of metals in biolog relevance to metal homeost the basic foundation knowle and experimental results to	wledge and understanding of essential facts pinorganic chemistry, especially those relate gical systems; thermodynamic and kinetic a lasis; metal-based drugs. Show strong ability adge of bioinorganic chemistry. Show strong o draw appropriate and insightful conclusic nonstrate highly effective basic techniques, cules.	d to hard-soft acid-base theory; spects of metal ions in biologic to apply and integrate knowledç ability to analyze novel problems ons relating to the basic princip	chelation; structure an cal processes and theige ge and theory relating to and critical use of dat oles and knowledge of	
	В	Demonstrate substantial cor to the basic foundation kno structure and bonding of me and their relevance to meta relating to the basic foundat of data and experimental re	mmand of knowledge and understanding of e wledge of bioinorganic chemistry, especially etals in biological systems; thermodynamic a al homeostasis; metal-based drugs. Show et tion knowledge of bioinorganic chemistry. Sh ssults to draw appropriate conclusions relatirective basic techniques, especially in the cha	those related to hard-soft acid and kinetic aspects of metal ions evidence to apply and integrate ow evidence to analyze novel pr g to the basic principles and kn	-base theory; chelation in biological processe knowledge and theor oblems and correct us owledge of bioinorgan	
	С	Demonstrate general but in theories relating to the bas theory, chelation; structure biological processes and the integrate knowledge and th problems to most familiar si conclusions relating to the	ncomplete command of knowledge and und ic foundation knowledge of bioinorganic chand bonding of metals in biological system eir relevance to metal homeostasis; metal-bate trustions and mostly correct but erroneous u basic principles and knowledge of bioinorgate characterization of inorganic active site and	emistry, especially those related s; thermodynamic and kinetic a sed drugs. Show evidence of sol edge of bioinorganic chemistry. se of data and experimental resi anic chemistry. Demonstrate mo	I to hard-soft acid-bas spects of metal ions i me abilities to apply ar Show ability to analyz ults to draw appropriat	
	D	Demonstrate partial but limir relating to the basic found chelation; structure and bor processes and their relevant knowledge and theory relation problems to most familiar si conclusions relating to the	ited command of knowledge and understand attion knowledge of bioinoriganic chemistry, nding of metals in biological systems; therm ce to metal homeostasis; metal-based drugs ting to the basic foundation knowledge of ituations and mostly correct but erroneous u basic principles and knowledge of bioinor	ing of essential facts, concepts, especially those related to hard odynamic and kinetic aspects of Show evidence of limited abilitie pioinorganic chemistry. Show lir se of data and experimental resignanc chemistry. Demonstrate y	d-soft acid-base theory metal ions in biologic es to apply and integra mited ability to analyz ults to draw appropria	
	Fail	Demonstrate little or no evi theories relating to the bas theory, chelation; structure biological processes and the and integrate knowledge an to analyze problems to mo conclusions relating to the	e characterization of inorganic active site and idence of command of knowledge and und ic foundation knowledge of bioinorganic che and bonding of metals in biological system eir relevance to metal homeostasis; metal-ba d theory relating to the basic foundation know ost familiar situations and erroneous use basic principles and knowledge of bioinorge e characterization of inorganic active site and	erstanding of essential facts, co emistry, especially those related s; thermodynamic and kinetic a sed drugs. Show little or no evid wledge of bioinorganic chemistry of data and experimental resultanic chemistry. Demonstrate m	I to hard-soft acid-bas spects of metal ions i ence of abilities to app . Show little or no abili ts to draw appropriat	
ourse Type	Lecture-b	ased course				
ourse Teaching	Activities	3	Details		No. of Hours	
Learning Activities	Lectures				36	
	Tutorials		including literature survey & presentation		12	
ccoccmont Mathada		/ Self study	Deteile	Walashiin a to Cont	100	
ssessment Methods nd Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin	
	Assignments		(continuous assessment of	25	CLO 1,2,3,4	
	Examinat		assignments and presentation)	75		
Doguirod/rocommonded			ciples of Bioinorganic Chemistry (U		CLO 1,2,3,4	
eading and	Bertini, I.	; Gray, H. B.; Stiefel, I	E. I.; Valentine, J. S., editors. Bio			
online materials Additional Course		, University Science Boo d Life, Moore C., RSC P				
nformation			c Elements in the Chemistry of Life	Kaim W & Schwederek	ri B. John Wiley	
	Sons, 201		2sonto in the onemotry of Life	,	J., Joini Wiley	

CHEM3441	Organic chemistry II (6 credits)	Academic Year	2019
Offering Department	Chemistry	Quota	300
Course Co-ordinator	Dr X Y Li (1st sem); Prof D Yang (2nd sem), Chemistry (xiaoyuli@hku.hk; yanga	lan @hku.hk)	
Teachers Involved	(Dr X Li,Chemistry) (Dr X Y Li,Chemistry) (Prof D Yang,Chemistry)		

Course Objectives	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	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	sful completion of this o	course, students should be able to:			
Outcomes	CLO 1 dra	aw correct structural rep	presentations of organic molecules			
	CLO 2 un	derstand the basic princ	ciples of structure and reactivity of o	rganic molecules		
	CLO 3 de	termine structures of or	ganic compounds based on spectro	scopic data		
	со		isms for transformations of common tetones, carboxylic acids, acyl halic			
	CLO 5 ap	preciate the importance	of organic chemistry in daily life			
	CLO 6 de	vise synthetic pathways	to organic compounds using functi	onal group chemistry		
Pre-requisites (and Co-requisites and Impermissible combinations)	students v	CHEM3441 has been who admitted in 2014-1	n changed to lecture-based course 15 or before, they must enroll also meet the Chemistry Major requiren	CHEM3443 for enrollin		
Offer in 2019 - 2020	Y 1st	sem 2nd sem Offer	in 2020 - 2021 : Y	Examination	Dec 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	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.				
	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. Lac of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems					
Carriera Trena	Lastuma ha		ities, logical and coherent thinking. Show ver	y little or no ability to apply know	riedge to solve problems.	
Course Type		sed course	Datailla		No of Harris	
Course Teaching & Learning Activities	Activities		Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials	0-16-4			12	
		Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	nts		10	CLO 1,2,3,4,5,6	
	Examinati	on	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		Chemistry", by Paula . Chapters 14-20.	a Y. Bruice, 2016, 8th Edition	n, Pearson, with e-tex	t and Mastering	

CHEM3442	Organic	Organic chemistry of biomolecules (6 credits) Academic Year 2019					
Offering Department	Chemistr	Chemistry Quota 50					
Course Co-ordinator	Dr P H To	Dr P H Toy, Chemistry (phtoy@hku.hk)					
Teachers Involved	(Dr P H T	oy,Chemistry)	·				
Course Objectives	,	or objective of this course in biology and biochemi	e is to give the students an understand istry.	ing and appreciation of the	he role of organic		
Course Contents & Topics		, 0	e groups such as carbohydrates, amine catalysis, cofactors and inhibitors will a	71 1 7	mes, nucleotides		
Course Learning	On succe	essful completion of this of	course, students should be able to:				
Outcomes	CLO 1	have a basic understand	ling of biologically important organic mo	olecules			
	CLO 2	have a basic understand	ling of enzyme catalysis				
	CLO 3	appreciate how organic	chemistry plays an important role in bio	logy and biochemistry			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in C	Pass in CHEM2442 or CHEM3441					
Offer in 2019 - 2020	Y 1st	t sem Offer in 2020 - 20	021 : Y	Examination	Dec		
Grade Descriptors (A+ to F)	Α		tery at an advanced level of extensive biomolecu	ule organic chemistry knowledg	e and skills required		
(A+ to F)			earning outcomes. Show strong analytical and or to apply knowledge to a wide range of comp	ritical abilities and logical think	king, with evidence of		
(A+ to F)	В	original thought, and ability effective organizational and Demonstrate substantial co attaining at least most of the	earning outcomes. Show strong analytical and or to apply knowledge to a wide range of comp	critical abilities and logical think lex, familiar and unfamiliar pro a broad range of knowledge, a nalytical and critical abilities and	king, with evidence of oblems. Apply highly and skills required for d logical thinking, and		
(A+ to F)		original thought, and ability effective organizational and Demonstrate substantial co attaining at least most of the ability to apply knowledge to Demonstrate general but in most of the course learning	earning outcomes. Show strong analytical and or to apply knowledge to a wide range of comp presentational skills. Immand of biomolecule organic chemistry with a course learning outcomes. Show evidence of a	critical abilities and logical think lex, familiar and unfamiliar pro- a broad range of knowledge, a nalytical and critical abilities and fective organizational and press emistry knowledge, and skills and or critical abilities and logical t	king, with evidence of oblems. Apply highly and skills required for d logical thinking, and entational skills. required for attaining hinking, and ability to		
(A+ to F)	В	original thought, and ability effective organizational and Demonstrate substantial co attaining at least most of the ability to apply knowledge to Demonstrate general but in most of the course learning apply knowledge to most far Demonstrate partial but limit the course learning outcom	earning outcomes. Show strong analytical and of to apply knowledge to a wide range of comp presentational skills. Immand of biomolecule organic chemistry with a course learning outcomes. Show evidence of a of familiar and some unfamiliar problems. Apply effocmplete command of biomolecule organic cheoutcomes. Show evidence of some analytical a	critical abilities and logical think lex, familiar and unfamiliar programmer a broad range of knowledge, a nalytical and critical abilities and fective organizational and presemistry knowledge, and skills ind critical abilities and logical trizational and presentational skiknowledge, and skills required ical thinking, but with limited a	king, with evidence of oblems. Apply highly and skills required for d logical thinking, and entational skills. required for attaining hinking, and ability to ills. for attaining some of analytical and critical		
(A+ to F)	В	original thought, and ability effective organizational and Demonstrate substantial co attaining at least most of the ability to apply knowledge to Demonstrate general but immost of the course learning apply knowledge to most far Demonstrate partial but limit the course learning outcom abilities. Show limited abili presentational skills. Demonstrate little or no evic course learning outcomes.	earning outcomes. Show strong analytical and of to apply knowledge to a wide range of comp presentational skills. Immand of biomolecule organic chemistry with a course learning outcomes. Show evidence of a p familiar and some unfamiliar problems. Apply electromplete command of biomolecule organic choutcomes. Show evidence of some analytical a miliar problems. Apply moderately effective organic chord of biomolecule organic chemistry tes. Show evidence of some coherent and log	critical abilities and logical think lex, familiar and unfamiliar programment of the prog	king, with evidence of oblems. Apply highly and skills required for d logical thinking, and entitional skills. required for attaining hinking, and ability to ills. for attaining some of analytical and critical organizational and uired for attaining the y little or no ability to		
(A+ to F)	B C D	original thought, and ability effective organizational and Demonstrate substantial co attaining at least most of the ability to apply knowledge to Demonstrate general but immost of the course learning apply knowledge to most far Demonstrate partial but limit the course learning outcom abilities. Show limited abili presentational skills. Demonstrate little or no evic course learning outcomes.	earning outcomes. Show strong analytical and of to apply knowledge to a wide range of comp presentational skills. Immand of biomolecule organic chemistry with a course learning outcomes. Show evidence of a familiar and some unfamiliar problems. Apply et complete command of biomolecule organic che outcomes. Show evidence of some analytical a miliar problems. Apply moderately effective organited command of biomolecule organic chemistry ess. Show evidence of some coherent and log ity to apply knowledge to solve problems. Apdence of command of biomolecule organic chemistry applications of the problems. Apply companies of the problems	critical abilities and logical think lex, familiar and unfamiliar programment of the prog	king, with evidence of oblems. Apply highly and skills required for d logical thinking, and entitional skills. required for attaining hinking, and ability to ills. for attaining some of analytical and critical organizational and uired for attaining the y little or no ability to		

& 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		60	CLO 1,2,3
	Presentation		10	CLO 1,2,3
	Test	2-mid term tests	30	CLO 1,2,3
Required/recommended reading and online materials	Bruice, P.Y.; Organic Chemistry (F	Pearson, 2017, 8th edition), Char	oters 20-26.	

Off D		c cnemistry labora	atory (6 credits)	Academic Year	2019		
Offering Department	Chemistr	Quota	80				
Course Co-ordinator	Dr A M Y	r A M Y Yuen, Chemistry (maiyan @hku.hk)					
Teachers Involved		r A M Y Yuen,Chemistry)					
Course Objectives	and the chemistry multistep	To provide students with intensive hands-on training of experimental chemistry techniques on organic reactions and the opportunity to develop analytical and critical thinking skills through scientific investigations in organic chemistry experiments. The course focuses on the practical aspects of a variety of organic reactions, including and multistep syntheses. Chromatographic, instrumental, and spectroscopic techniques are also discussed to give a nolistic training of experimental organic chemistry.					
Course Contents & Topics	The cour	rse will include the fon, and characteriza	following laboratory skills and practices tion of organic compounds; gas and ectroscopy; NMR spectroscopy and melti	liquid chromatography;			
Course Learning Outcomes	CLO 1 d u CLO 2 c CLO 3 a	On successful completion of this course, students should be able to: CLO 1 demonstrate a good practice of laboratory safety and exercise proper procedures for safe handling usage of chemicals CLO 2 carry out, record and analyze the results of chemical experiments CLO 3 apply modern instrumentation techniques to characterize organic compounds and draw conclusions					
		he results communicate the resul	ts of their work to others				
	CLO 5 d	lemonstrate problem-s	solving skills, critical thinking and analytica	al reasoning			
Pre-requisites and Co-requisites	Pass in C	CHEM2441; and pass	in CHEM3441, or already enrolled in this assed CHEM3441A in semester 1, 2015-	course;	before 2014-201		
and Impermissible combinations)	(for stude Pass in C	ents admitted in 2014- CHEM2441 or CHEM2	•	3441 or CHEM3442, or a			
Offer in 2019 - 2020		t sem 2nd sem Off		Examination	Dec May		
Grade Descriptors (A+ to F)	A Demonstrate extensive knowledge and thorough command of concepts and principles which are required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Competently conduct experiment with efficient lab skills and techniques. Critically appraise data to draw appropriate and insightful conclusions. 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 substantial grasp and mastery of the subject knowledge. Demonstrate evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Show effective lab skills and techniques and critical analysis of experimental data. 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 general but incomplete grasp of the subject knowledge. Demonstrate evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Show moderately effective lab skills and techniques. Demonstrated some ability to analyze experimental data critically. Apply moderately effective organizational and presentational skills.						
		outcomes. Show genera abilities and logical thinl techniques. Demonstrat	al but incomplete grasp of the subject knowledge. I king, and ability to apply knowledge to most familia	required for attaining most of Demonstrate evidence of some r situations. Show moderately	f the course learning analytical and critic effective lab skills ar		
	D	outcomes. Show genera abilities and logical thind techniques. Demonstrat presentational skills. Demonstrate partial but some of factual informa apply them. Demonstra	al but incomplete grasp of the subject knowledge. I king, and ability to apply knowledge to most familia	required for attaining most on Demonstrate evidence of some r situations. Show moderately cally. Apply moderately effection or attaining course learning out of basic concepts and principlents, but with limited analytical	f the course learning analytical and critice effective lab skills are ve organizational are comes. Ability to recess and weak ability and critical abilities.		
		outcomes. Show genera abilities and logical thinl techniques. Demonstrat presentational skills. Demonstrate partial but some of factual informa apply them. Demonstrate Demonstrate partially ef Demonstrate little or no evidence of little or no gand coherent thinking.	al but incomplete grasp of the subject knowledge. I king, and ability to apply knowledge to most familia ited some ability to analyze experimental data criti limited command of knowledge and skills required for tion of the subject. Show a partial comprehension at evidence of some coherent and logical thinki	required for attaining most on the commonstrate evidence of some residuations. Show moderately cally. Apply moderately effective or attaining course learning out of basic concepts and principling, but with limited analytical rely effective organizational and irred for attaining the course leas ubject. Lack of analytical and solve problems. Demonstrate	f the course learnine analytical and critice effective lab skills are ve organizational and comes. Ability to recees and weak ability and critical abilities d presentational skills rrning outcomes. Sho critical abilities, logic minimally effective of		
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course Type Course						No Exam	
skills and techniques and critical analysis of experimental data. Apply effective organizational and presentation C Demonstrate general but incomplete command of knowledge and skills required for attaining most of the outcomes. Show general but incomplete grasp of the subject knowledge. Demonstrate evidence of some an abilities and logical thinking, and ability to apply knowledge to most familiar situations. Show moderately effective presentational skills. D Demonstrate partial but limited command of knowledge and skills required for attaining course learning outcom some of factual information of the subject. Show a partial comprehension of basic concepts and principles a apply them. Demonstrate evidence of some coherent and logical thinking, but with limited analytical and permited in the presentation of the subject. Show a partial comprehension of basic concepts and principles a apply them. Demonstrate evidence of some coherent and logical thinking but with limited analytical and presentation of the subject. Lack of analytical and critic and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Demonstrate mire evidence of little or no grasp of the knowledge and skills required for attaining course learning evidence of itild or no grasp of the knowledge and skills required for attaining course learning evidence of some coherent and logical thinking, but with limited analytical and critic and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Demonstrate mire ineffective lab skills and techniques. Organization and presentational skills are minimally effective or ineffective course Teaching & Learning Activities Details N Activities Details N Leboratory Tutorials Reading / Self study Activities Details Weighting in final course grade (%) Ito trial course grade (%) Total course grade (%) Total course grade (%) Presentation Test Test/ Quiz John W. Lehman: Operational Organic Chemistry - A Problem-Solving Approach to the Labor	F)	course learning outcomes. Show strong analytical and critical abilities and logical thinking, with ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Competently conduct experiment with efficient lab skills and techniques. Critically appraise data 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 substantial grasp and mastery of the subject knowledge. Demonstrate evidence of analytical and					
D Demonstrate partial but limited command of knowledge and skills required for attaining ourse learning outcom some of factual information of the subject. Show a partial comprehension of basic concepts and principles a apply them. Demonstrate evidence of some coherent and logical thinking, but with limited analytical and Demonstrate partially effective lab skills and techniques. Apply limited or barely effective organizational and pre Demonstrate ititle or no evidence of command of knowledge and skills required for attaining the course learning bemonstrate little or no evidence of command of knowledge and skills required for attaining the course learning bemonstrate little or no evidence of command of knowledge and skills required for attaining the course learning bemonstrate minimized or parely effective organizational and prevention of the subject. Lack of analytical and critic and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Demonstrate minimized critical skills and techniques. Organization and presentational skills are minimally effective or ineffective lab skills and techniques. Organization and presentational skills are minimally effective or ineffective lab skills and techniques. Organization and presentational skills are minimally effective or ineffective lab skills and techniques. Organization and presentational skills are minimally effective or ineffective lab skills and techniques. Organization and presentational skills are minimally effective or ineffective lab skills and techniques. Organization and presentational skills are minimally effective or ineffective lab skills and techniques. Organization and presentational skills are minimally effective or ineffective lab skills and techniques. Organization and presentational skills are minimally effective or ineffective lab skills and techniques. Organization and presentational skills are minimally effective or ineffective lab skills and techniques. Organizational and presentational skills are minimally effecti	С	;	skills and techniques and critical analysis of experimental data. 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 general but incomplete grasp of the subject knowledge. Demonstrate evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Show moderately effective lab skills and techniques. Demonstrated some ability to analyze experimental data critically. Apply moderately effective organizational and				
Demonstrate partially effective lab skills and techniques. Apply limited or barely effective organizational and presentational skills required for attaining the course learning evidence of little or no grasp of the knowledge and skills required for attaining the course learning evidence of little or no prasp of the knowledge and understanding of the subject. Lack of analytical and critic and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Demonstrate minineffective lab skills and techniques. Organization and presentational skills are minimally effective or ineffective. Course Type	D	presentational skills. Demonstrate partial but limited command of knowledge and skills required for attaining course learning outcomes. Ability to recall some of factual information of the subject. Show a partial comprehension of basic concepts and principles and weak ability to					
evidence of little or no grasp of the knowledge and understanding of the subject. Lack of analytical and critic and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Demonstrate min ineffective lab skills and techniques. Organization and presentational skills are minimally effective or ineffective Course Teaching & Lecture with laboratory component course Course Teaching			apply them. Demonstrate evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Demonstrate partially effective lab skills and techniques. Apply limited or barely effective organizational and presentational skills.				
Course Teaching & Learning Activities Activities Laboratory Tutorials Reading / Self study Methods Assessment Methods and Weighting Methods Course grade (%) Laboratory reports Course grade (%) Laboratory reports Course grade (%) Laboratory reports Course grade (%) (Practical Examination 25%; Lab report 10%; Lab performance 10%) Presentation Test Test/ Quiz Required/recommended reading and online materials Activities N N N N N N N N N N N N N			evidence of little or no grasp and coherent thinking. Show ineffective lab skills and tech	p of the knowledge and understanding of the w very little or no ability to apply knowledge t uniques. Organization and presentational skills	subject. Lack of analytical and o solve problems. Demonstrat	l critical abilities, logica e minimally effective o	
Laboratory Tutorials Reading / Self study Methods Assessment Methods and Weighting Methods Course grade (%) Laboratory reports (Practical Examination 25%; Lab report 10%; Lab performance 10%) Presentation Test Test/ Quiz Required/recommended reading and conline materials Laboratory Teports (Practical Examination 25%; Lab report 10%; Lab performance 45 (Presentation 20 Test Test/ Quiz 35 (Pearson, latest edition)			h laboratory componen	t and the second			
Tutorials Reading / Self study Methods Assessment Methods and Weighting Methods M				Details		No. of Hours	
Reading / Self study Methods Assessment Methods and Weighting Methods Details Weighting in final course grade (%) Laboratory reports (Practical Examination 25%; Lab report 10%; Lab performance 10%) Presentation Test Test Test/ Quiz Required/recommended reading and conline materials Reading / Self study Methods Weighting in final course grade (%) to (Practical Examination 25%; Lab report 10%; Lab performance 45 Test/ Quiz 35 (Presentation 7 Test/ Quiz Approach to the Laboratory reports 7 Problem-Solving Approach to the Laboratory reports 10%; Lab performance 45 (Presentation 7 Test/ Quiz Required/recommended (Pearson, latest edition)			1			48	
Assessment Methods and Weighting Methods Details Weighting in final course grade (%) Laboratory reports (Practical Examination 25%; Lab report 10%; Lab performance 10%) Presentation Test Test/Quiz Required/recommended reading and conline materials Methods Weighting in final course grade (%) to (Practical Examination 25%; Lab performance 10%; Lab perfor			Salf study			12 100	
and Weighting (Practical Examination 25%; Lab report 10%; Lab performance 10%) Presentation Test Test/ Quiz Required/recommended reading and conline materials (Practical Examination 25%; Lab report 10%; Lab performance 45 (Presentation 10%) Test Test/ Quiz Te			Sell study	Dotaile	Waighting in final	Assessment	
Laboratory reports report 10%; Lab performance 45 (10%) Presentation 20 Test Test/ Quiz 35 (Pearson, latest edition) Required/recommended reading and contine materials		netilous				Methods to CLO Mappin	
Test Test/ Quiz 35 (Required/recommended John W. Lehman: Operational Organic Chemistry - A Problem-Solving Approach to the Laborating and polline materials	La	.aboratory	/ reports	report 10%; Lab performance	45	CLO 1,2,3,4,5	
Required/recommended John W. Lehman: Operational Organic Chemistry - A Problem-Solving Approach to the Laborating and (Pearson, latest edition)			on			CLO 3,4,5	
reading and (Pearson, latest edition) online materials						CLO 1,2,3,4,5	
Additional Course	and (Pe			Organic Chemistry - A Problem-Sol	ving Approach to the I	Laboratory Course	
Information course.		,	classes are mandatory	y. Students must complete ALL expe	eriments and laboratory	reports to pass thi	

CHEM3541	Physical chemis credits)	stry: Introduction to quantum chemistry (6	Academic Year	2019		
Offering Department	Chemistry	Quota	100			
Course Co-ordinator	Prof G H Chen, Che	emistry (ghc@yangtze.hku.hk)				
Teachers Involved	(Prof G H Chen, Che	emistry)				
Course Objectives		nts fundamental principles and topics on quantum ents intending to further their studies in chemistry.	chemistry in order to	orovide a soiled		
Course Contents & Topics	mechanics, Theory particle in a box, har	m mechanics: Historical development, Postulates of q of angular momentum, Heisenberg uncertainty pr armonic oscillator, rigid rotator; Atomic structure: Hydro nical bonds. Approximation methods: variational methation theory.	rinciple. Applications to ogen and many electron	simple systems: atoms. Molecular		
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 understand and use the terminology and nomenclature in quantum chemistry and topics discussed in the course					

	CLO 2 demonstrate knowledge and understanding of basic concepts in quantum mechanics, atomic and molecular structure CLO 3 understand elementary numerical procedures and the basic relationships of quantum mechanics and molecular systems					
	CLO 4 h	nands-on experience of th	ne application of Hartree-Fock me	ethod to molecules		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in 0	ass in CHEM2541				
Offer in 2019 - 2020	Y 1s	st sem Offer in 2020 - 20	021 : Y	Examination	Dec	
Grade Descriptors (A+ to F)	A	learning outcomes. Show sto apply knowledge to a wid	stery at an advanced level of extensive trong analytical and critical abilities and le le range of complex, familiar and unfamil ults to draw appropriate and insightful cor	ogical thinking, with thorough grasp iar situations. Apply highly effective	of the subject, and ability	
	В	learning outcomes. Show e	emmand of a broad range of knowledge evidence of analytical and critical abilitie of amiliar and some unfamiliar situations. te conclusions.	s and logical thinking, and substan	itial grasp of the subject,	
	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 little or no grasp of the knowledge and understanding of the subject, 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.					
Course Type	Lecture	with laboratory componer	nt course			
Course Teaching	Activitie	es	Details		No. of Hours	
& Learning Activities	Lectures	6			24	
	Laborate	ory			24	
	Tutorials	8			6	
	Reading	g / 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	
		ory reports	Experiment & Lab report	20	CLO 1,2,3,4	
	Test		Test/Quiz	10	CLO 1,2,3	
Required/recommended reading and online materials		Quarrie: Quantum Chemi in: Quantum Chemistry (5	, ,			
Additional Course Information	Laborato course.	ory classes are mandator	y. Students must complete ALL	experiments and laboratory	reports to pass this	

CHEM3542	Physical theory (6	chemistry: statistical thermodynamics and kinetics credits)	Academic Year	2019			
Offering Department	Chemistry		Quota	50			
Course Co-ordinator	Dr. J Yang,	Chemistry (juny@hku.hk)					
Teachers Involved	(Dr J Yang,	Chemistry)					
Course Objectives		presents fundamental principles and topics on statistical thermolid foundation for students intending to further their studies in pl					
Course Contents & Topics	- Thermody - Ensemble - Systems of - Molecular - Ideal gas - Quantum	Principles of Statistical Thermodynamics - Thermodynamic laws - Ensembles and partition functions: microcanonical, canonical and grand-canonical - Systems of independent molecules: ideal gas - Molecular degrees of freedom: translation, rotation, vibration, and electronic - Ideal gas mixture: chemical equilibrium, binding, and titration - Quantum statistics Chemical equilibrium and kinetics theory - Rate theory: collision theory, transition state theory, electron transfer					
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 microscopic statistical model systems						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in CH	Pass in CHEM2541					
Offer in 2019 - 2020	Y 2nd	sem Offer in 2020 - 2021 : 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.						
		General but incomplete command of knowledge of statistical thermodynamics analytical thinking. Can apply the knowledge to familiar situations.	<u> </u>				
	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 command of knowledge of statistical thermodynamics and reaction dynamics.					
Course Type	Lecture with laboratory component course					
Course Teaching	Activities	S	Details		No. of Hours	
& Learning Activities	Lectures				24	
	Laborato	ry			24	
	Tutorials				4	
	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	tion		60	CLO 1,2,3	
Required/recommended reading and online materials		Physical Chemistry (10	Oth edition)			
Course Website	Nil					
Additional Course Information	Laboratory classes are mandatory. Students must complete ALL experiments and laboratory reports to pass thi course. Students are strongly recommended to take CHEM3541 Physical Chemistry: Introduction to Quantum Chemistr before taking this course. References: KA Dill, Molecular driving forces: statistical thermodynamics in biology, chemistry, physics and nanoscicence; T. L. Hill, An introduction to Statistical Thermodynamics					

CHEM3999	Directed	l studies in chemisti	ry (6 credits)	Academic Yea	r 2019			
Offering Department	Chemistry			Quota				
Course Co-ordinator	Prof D L F	hillips, Chemistry (phillip	os @hku.hk)					
Teachers Involved	(Various teachers in the Department, Chemistry)							
Course Objectives			year students who would like to tak ut small scale chemical projects by t		research. It offer			
Course Contents & Topics	Students interested in taking this course should contact their prospective supervisors in May to determine the contents and the nature of their project in the coming academic year. Prior approval from both the prospective supervisor and the course coordinator is required.							
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 understand the terminology and nomenclature associated with the small scale chemical project to worked on in the course							
	CLO 2 de	emonstrate knowledge ar	nd understanding of basic concepts	involved in their chemical	project			
			ps of the their particular chemical pr	•	•			
Pre-requisites (and Co-requisites and Impermissible combinations)	or CHEM3 This caps This cours	XX) in the Chemistry Ma 3146. tone course is for Chemi se is designed for third ye	advanced level disciplinary core/e ijor including a pass in CHEM2341 stry Major/ Chemistry Major (Intens ear students who would like to take ed to take this capstone course is the	or CHEM2441 or CHEM2 ive) students only. an early experience on res	442 or CHEM254			
Offer in 2019 - 2020		sem 2nd sem Offer i	•	Examination	No Exam			
Grade Descriptors	A		nension of the subject. Demonstrate very ab					
	B C D	of a wide range of appropria skills. [Work of A+ should de Show a substantial compre information from sources. De Correct utilization of data an and methods. Perform effect Show a general but incomprelevant information from sou but some incorrect utilization theories, principles, data and Show a partial but limited coherent and logical thinking but mostly via summary inst conclusions. Demonstrate lingranizational and presentat Show little or no comprehenthinking. Limited employmen	nsion of the subject. Evidence of little or lac at of secondary sources and no critical comp	Employ very effective organization of that is required in wider areas reamalytical and critical thinking omparisons between different secompose general integration of the conference of some analytical and critical arisons between different interpresentations of the conclusions. Demonstrate some anizational and presentational skielevant information, of the subjectives. Show utilization and reference dability to employ data and resultand methods. Perform limited k of analytical and critical abilities arison of them. Incorrectly utilize	anal and presentational levant to the topic.] with use of relevant condary interpretations eories, principles, dat all thinking with use cetations. Mainly correct a partial integration cells. It is presented to some of several sources with the total cordinator marginally effectives, logical and coherer data and results and/c			
	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.							
Course Type	Project-ba	sed course	·					
Course Teaching	Activities	3	Details		No. of Hours			
& Learning Activities	Reading /	Self study	discussion & meetings to be arranthe supervisor	nged by the student and	120			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Dissertati	on	including a written report and an oral presentation	100	CLO 1,2,3			
Required/recommended reading and conline materials	Recomme	ended reading material w	ill be assigned depending on the pr	oject.				
Additional Course	Exception		the students is required for taking the component as Course Teaching &					

CHEM4142			d applications (6 credits)	Academic Ye			
Offering Department	Chemistry		am @hlu hl	Quota	60		
Course Co-ordinator Teachers Involved	Prof V W W Yam, Chemistry (wwyam@hku.hk) (Dr S M Tong,Chemistry)						
reachers involved	,	/ W Yam,Chemistry)					
Course Objectives			metry and group theory and to	apply them in solving chen	nical problems. Thi		
		•	uctory treatment of bonding the				
			ntial for students who wish to tak	ce advanced courses in ino	rganic chemistry an		
Course Contents	all types of spectroscopy. Symmetry elements and symmetry operations; symmetry point groups; reducible and irreducible representations;						
& Topics	character tables; direct products; symmetry-adapted linear combinations; projection operators; hybrid orbitals						
		molecular orbital theory for organic, inorganic and organometallic systems; selected applications in electronic ar vibrational spectroscopy. On successful completion of this course, students should be able to:					
Source Learning							
Course Learning Outcomes	CLO 1 understand the basic principles and concepts of symmetry and group theory and to apply the						
Jatoomoo		hemical problems	ipies and concepts of symmetry	and group theory and to a	ppry them in serving		
	CLO 2 de	emonstrate knowledge a	and understanding in the use	of character tables and	projection operator		
		echniques					
		•	nd understanding of bonding th nic and organometallic systems	eories involving hybrid orb	ntais and molecula		
			nd understanding in the applicati	on of symmetry and group	theory in electronic		
	a	nd vibrational spectroscop	ру				
Pre-requisites	Pass in C	HEM3341					
and Co-requisites and Impermissible							
combinations)							
Offer in 2019 - 2020	Y 1st	sem Offer in 2020 - 20	21 : Y	Examination	Dec		
Grade Descriptors	Α		ledge and understanding of essential fac applications in solving chemical proble				
(A+ to F)		symmetry operations; symm	netry point groups; reducible and irred	ucible representations; character	tables; direct products		
			ombinations; projection operators; treat c, inorganic and orgametallic systems; a				
		Show strong ability to apply	and integrate knowledge and theory rela	ating to the basic principles and co	oncepts of symmetry an		
			ations in bonding, and electronic and vib data and experimental results to draw app				
	_	and applications of symmetry and group theory. Demonstrate substantial command of knowledge and understanding of essential facts, concepts, principles, and theories relating					
	В	to symmetry and group the	eory and their applications in solving c	hemical problems, especially the	se related to symmetry		
			erations; symmetry point groups; reducib l linear combinations; projection operato				
		and molecular orbitals for	organic, inorganic and orgametallic s	systems; and applications in ele	ectronic and vibrationa		
		spectroscopy. Show evidence 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 evidence to analyze novel problems and correct use of data and experimental results to draw appropriate conclusions relating to the principles and applications of symmetry and group theory.					
	С						
	_		y and group theory and their application mmetry operations; symmetry point gro				
		tables; direct products; sym	metry-adapted linear combinations; proj	ection operators; treatment of bo	nding theories including		
			ar orbitals for organic, inorganic and of ow evidence of some abilities to apply				
		principles and concepts of	symmetry and group theory and their o analyze problems to most familiar situ	applications in bonding, and el	lectronic and vibrationa		
			appropriate conclusions relating to the pr				
	D	Demonstrate partial but limited command of knowledge and understanding of essential facts, concepts, principles, and theorelating to symmetry and group theory and their applications in solving chemical problems, especially those related to symmetry.					
		elements and symmetry ope	erations; symmetry point groups; reducib	le and irreducible representations	; character tables; direc		
			l linear combinations; projection operato organic, inorganic and orgametallic s				
		spectroscopy. Show evidenc	e of limited abilities to apply and integrat	e knowledge and theory relating to	the basic principles an		
			group theory and their applications in bo blems to most familiar situations and m				
			onclusions relating to the principles and a				
	Fail	theories relating to symmetry	dence of command of knowledge and u y and group theory and their application:	s in solving chemical problems, e	specially those related t		
			mmetry operations; symmetry point gro metry-adapted linear combinations; proj				
		hybrid orbitals and molecul	ar orbitals for organic, inorganic and o	orgametallic systems; and applic	ations in electronic and		
			ow little or no evidence of abilities to app symmetry and group theory and their				
		spectroscopy. Show little o	r no ability to analyze problems to m	nost familiar situations and error	neous use of data and		
Course Type	Lecture-h	ased course	appropriate conclusions relating to the pr	morpios and applications of symm	ony and group triedry.		
Course Teaching	Activitie		Details		No. of Hours		
& Learning Activities	Lectures				36		
	Tutorials		or discussion		12		
Accoccment Methods		/ Self study	Dotaile	Wajahtina in final	100		
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods		
				352100 grado (70)	to CLO Mapping		
	Assignm		(continuous assessment)	25	CLO 1,2,3,4		
	Examina			75	CLO 1,2,3,4		
	F.A. Cotto	on: Chemical Applications	of Group Theory (Wiley, 3rd ed.	, 1990)			
eading and online materials							
Additional Course	This cour	se is also offered to RPn	students, and the course code fo	r RPa students is CHEM61	16.		

CHEM4143	Interfacial science and technology (6 credits)	Academic Year 2019
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	Chemistry Quota				50		
Course Co-ordinator	Prof G K	Y Chan, Chemistry (hrsd	ccky@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 processes often appeared in high value added products and modern technologies.						
Course Contents	Physics and Chemistry of Interfaces: coatings and surfactants, colloids and interfaces, wetting, microemulsion, thin						
& Topics	films, nanomaterials, porous materials.						
Course Learning			course, students should be able t				
Outcomes		•	enomena and their origin from mo				
	th	nermodynamics, and kind					
			nologies that require application ncy, composite polymers, and por		ding nanomaterials		
Pre-requisites and Co-requisites and Impermissible combinations)	Pass in CHEM3143 or CHEM3541 or CHEM3542						
Offer in 2019 - 2020	N Off	fer in 2020 - 2021 : Y		Examination			
Grade Descriptors (A+ to F)	A	course learning outcomes. ability to apply knowledge	owledge of interfacial science and techno Show strong analytical and critical abilitie to solve problems in a wide range of cor Apply highly effective organizational and	es and logical thinking, with evidenc inplex, familiar and unfamiliar situat	e of original thought, and		
	B Demonstrate substantial knowledge of interfacial science and technology and command of 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 solve problems in familiar and some unfamiliar situations. Correct use of data and sourcing of references. Apply effective organizational and presentational skills.						
	Demonstrate general but incomplete knowledge of interfacial science and technology and command of 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 solve problems to most familiar situations. Mostly correct but some erroneous use of data and references. Apply moderately effective organizational and presentational skills.						
		attaining most of the cours ability to apply knowledge	e learning outcomes. Show evidence of se solve problems to most familiar situation	some analytical and critical abilities ons. Mostly correct but some erro	and logical thinking, an		
	D	attaining most of the cours ability to apply knowledge references. Apply moderate Demonstrate partial but lin some of the course learnin critical abilities. Show limit	e learning outcomes. Show evidence of se solve problems to most familiar situation ely effective organizational and presentation nited knowledge of interfacial science are no outcomes. Show evidence of some come de ability to apply knowledge to solve preserved.	some analytical and critical abilities ons. Mostly correct but some erro onal skills. Id technology and command of sk oherent and logical thinking, but we oblems. Limited ability to use data	and logical thinking, an oneous use of data and ills required for attaining ith limited analytical and		
		attaining most of the cours ability to apply knowledge references. Apply moderate Demonstrate partial but lin some of the course learnin critical abilities. Show limit Apply limited or barely effect portions trace it to or no e attaining the course learning the course learning.	e learning outcomes. Show evidence of s solve problems to most familiar situatis- lely effective organizational and presentation inted knowledge of interfacial science and goutcomes. Show evidence of some or ed ability to apply knowledge to solve pro- ctive organizational and presentational ski evidence of knowledge of interfacial scie ing outcomes. Lack of analytical and critic dge to solve problems. Misuse of data	some analytical and critical abilities ons. Mostly correct but some erronal skills. It is technology and command of skills of technology and command of skills of the skills. It is the skills of the	and logical thinking, an oneous use of data and ills required for attaining ith limited analytical and and source references and of skills required for nking. Show very little of the state of the state of the and source references and of skills required for the state of the state of the and source references and of skills required for the state of the state of the state of the and state of the state of the state of the and of skills required for the state of the state of the state of the and state of the state of the and state of the state of the and state of the state of the and and and and and and and and		
Course Type	D Fail	attaining most of the cours ability to apply knowledge references. Apply moderate Demonstrate partial but lin some of the course learnic critical abilities. Show limit Apply limited or barely effect Demonstrate little or no eattaining the course learnir no ability to apply knowled.	e learning outcomes. Show evidence of s solve problems to most familiar situatis- lely effective organizational and presentation inted knowledge of interfacial science and goutcomes. Show evidence of some or ed ability to apply knowledge to solve pro- ctive organizational and presentational ski evidence of knowledge of interfacial scie ing outcomes. Lack of analytical and critic dge to solve problems. Misuse of data	some analytical and critical abilities ons. Mostly correct but some erronal skills. It is technology and command of skills of technology and command of skills of the skills. It is the skills of the	and logical thinking, and one ous use of data and ills required for attaining ith limited analytical and and source references and of skills required for nking. Show very little of		
·	D Fail	attaining most of the cours ability to apply knowledge references. Apply moderate Demonstrate partial but lin some of the course learnir critical abilities. Show limit Apply limited or barely effec Demonstrate little or no e attaining the course learnir no ability to apply knowled minimally effective or ineffectased course	e learning outcomes. Show evidence of s solve problems to most familiar situatis- lely effective organizational and presentation inted knowledge of interfacial science and goutcomes. Show evidence of some or ed ability to apply knowledge to solve pro- ctive organizational and presentational ski evidence of knowledge of interfacial scie ing outcomes. Lack of analytical and critic dge to solve problems. Misuse of data	some analytical and critical abilities ons. Mostly correct but some erronal skills. It is technology and command of skills of technology and command of skills of the skills. It is the skills of the	and logical thinking, and one ous use of data and ills required for attaining ith limited analytical and and source references and of skills required for nking. Show very little of		
Course Teaching	D Fail	attaining most of the cours ability to apply knowledge references. Apply moderate Demonstrate partial but lin some of the course learnin critical abilities. Show limit Apply limited or barely effect Demonstrate little or no e attaining the course learnin no ability to apply knowled minimally effective or ineffectives.	e learning outcomes. Show evidence of a solve problems to most familiar situative ellevitive organizational and presentationited knowledge of interfacial science and outcomes. Show evidence of some of a billity to apply knowledge to solve protive organizational and presentational skievidence of knowledge of interfacial science of some conductomes. Lack of analytical and critic dge to solve problems. Misuse of data active.	some analytical and critical abilities ons. Mostly correct but some erronal skills. It is technology and command of skills of technology and command of skills of the skills. It is the skills of the	and logical thinking, an oneous use of data and ills required for attaining ith limited analytical and and source references and of skills required for nking. Show very little of presentational skills are		
Course Teaching	D Fail Lecture-b	attaining most of the cours ability to apply knowledge references. Apply moderate Demonstrate partial but lin some of the course learnin critical abilities. Show limit Apply limited or barely effect Demonstrate little or no e attaining the course learnin no ability to apply knowled minimally effective or ineffect assed course	e learning outcomes. Show evidence of a solve problems to most familiar situative ellevitive organizational and presentationited knowledge of interfacial science and outcomes. Show evidence of some of a billity to apply knowledge to solve protive organizational and presentational skievidence of knowledge of interfacial science of some conductomes. Lack of analytical and critic dge to solve problems. Misuse of data active.	some analytical and critical abilities ons. Mostly correct but some erronal skills. It is technology and command of skills of technology and command of skills of the skills. It is the skills of the	and logical thinking, and neous use of data and lills required for attaining ith limited analytical and and source references and of skills required for nking. Show very little oppresentational skills are No. of Hours		
Course Teaching	D Fail Lecture-b Activitie Lectures Tutorials	attaining most of the cours ability to apply knowledge references. Apply moderate Demonstrate partial but lin some of the course learnin critical abilities. Show limit Apply limited or barely effect Demonstrate little or no e attaining the course learnin no ability to apply knowled minimally effective or ineffect assed course	e learning outcomes. Show evidence of se solve problems to most familiar situation let be solve problems to most familiar situation interfacial science and outcomes. Show evidence of some of a bility to apply knowledge to solve protive organizational and presentational skievidence of knowledge of interfacial science of knowledge of interfacial science of some of the solve problems. Lack of analytical and critic dge to solve problems. Misuse of data active. Details	some analytical and critical abilities ons. Mostly correct but some erronal skills. It is technology and command of skills of technology and command of skills of the skills. It is the skills of the	and logical thinking, an oneous use of data and ills required for attaining the limited analytical and and source references and of skills required fonking. Show very little operational skills are No. of Hours 36		
Course Teaching & Learning Activities Assessment Methods	D Fail Lecture-b Activitie Lectures Tutorials	attaining most of the cours ability to apply knowledge references. Apply moderate Demonstrate partial but lin some of the course learnin critical abilities. Show limit Apply limited or barely effect Demonstrate little or no e attaining the course learnin no ability to apply knowled minimally effective or ineffects.	e learning outcomes. Show evidence of se solve problems to most familiar situation let be solve problems to most familiar situation interfacial science and outcomes. Show evidence of some of a bility to apply knowledge to solve protive organizational and presentational skievidence of knowledge of interfacial science of knowledge of interfacial science of some of the solve problems. Lack of analytical and critic dge to solve problems. Misuse of data active. Details	some analytical and critical abilities ons. Mostly correct but some erronal skills. It is technology and command of skills of technology and command of skills of the skills. It is the skills of the	and logical thinking, an oneous use of data and ills required for attaining ith limited analytical and and source references and of skills required fonking. Show very little opresentational skills are No. of Hours 36 12		
Course Teaching & Learning Activities Assessment Methods	Fail Lecture-b Activitie Lectures Tutorials Reading Methods	attaining most of the cours ability to apply knowledge references. Apply moderate Demonstrate partial but lin some of the course learnic critical abilities. Show limit Apply limited or barely effect Demonstrate little or no e attaining the course learnir no ability to apply knowled minimally effective or ineffectives.	e learning outcomes. Show evidence of se solve problems to most familiar situation let be solve problems to most familiar situation interfacial science are no outcomes. Show evidence of some ced ability to apply knowledge to solve protive organizational and presentational skievidence of knowledge of interfacial science are solved problems. Lack of analytical and critic dge to solve problems. Misuse of data scrive. Details Or discussion	some analytical and critical abilities ons. Mostly correct but some erronal skills. In technology and command of sk oberent and logical thinking, but wroblems. Limited ability to use data lis. In the control of the c	and logical thinking, an aneous use of data and logical thinking, an aneous use of data and lills required for attaining the limited analytical and and source references on the state of t		
Course Teaching & Learning Activities Assessment Methods	D Fail Lecture-b Activitie Lectures Tutorials Reading	attaining most of the cours ability to apply knowledge references. Apply moderate Demonstrate partial but lin some of the course learnin critical abilities. Show limit Apply limited or barely effect Demonstrate little or no e attaining the course learnin no ability to apply knowled minimally effective or ineffectives.	e learning outcomes. Show evidence of s solve problems to most familiar situatiely effective organizational and presentationited knowledge of interfacial science and outcomes. Show evidence of some of ed ability to apply knowledge to solve protive organizational and presentational ski evidence of knowledge of interfacial science of knowledge of interfacial science of solve problems. Misuse of data incidence of the solve problems. Misuse of data incidence of the solve problems. Misuse of data incidence of the solve problems. Details Details Details	were analytical and critical abilities ons. Mostly correct but some erronal skills. Indicate the content of the content and logical thinking, but woblems. Limited ability to use data lls. Indicate the content and technology, and comma al abilities, logical and coherent thi and references. Organization and Weighting in final course grade (%)	and logical thinking, an aneous use of data and logical thinking, an aneous use of data and lills required for attaining the limited analytical and and source references and of skills required for king. Show very little or presentational skills and lills a		
Course Teaching & Learning Activities Assessment Methods	D Fail Lecture-b Activitie Lectures Tutorials Reading Methods Assignment	attaining most of the cours ability to apply knowledge references. Apply moderate Demonstrate partial but lin some of the course learnin critical abilities. Show limit Apply limited or barely effect Demonstrate little or no e attaining the course learnin no ability to apply knowled minimally effective or ineffectives.	e learning outcomes. Show evidence of s solve problems to most familiar situatiely effective organizational and presentationited knowledge of interfacial science and outcomes. Show evidence of some of ed ability to apply knowledge to solve protive organizational and presentational ski evidence of knowledge of interfacial science of knowledge of interfacial science of solve problems. Misuse of data incidence of the solve problems. Misuse of data incidence of the solve problems. Misuse of data incidence of the solve problems. Details Details Details	some analytical and critical abilities ons. Mostly correct but some erronal skills. Indicate the correct but some error and comma and references. Organization and references. Organization and Indicate the correct but some error and	and logical thinking, an aneous use of data an ills required for attaining the limited analytical and and source references and of skills required for presentational skills are some source references and of skills required for presentational skills are source and of skills required for presentational skills are source and of skills are source and of skills are source and skills are successful and skills are source and skills are successful and skills are successful at the skills are successful and skills ar		
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended reading and	D Fail Lecture-b Activitie Lectures Tutorials Reading Methods Assignme Examina Test	attaining most of the cours ability to apply knowledge references. Apply moderate Demonstrate partial but lin some of the course learnic critical abilities. Show limit Apply limited or barely effect Demonstrate little or no e attaining the course learnir no ability to apply knowled minimally effective or ineffectives. / Self study sents ents tion	e learning outcomes. Show evidence of s solve problems to most familiar situatiely effective organizational and presentationited knowledge of interfacial science and outcomes. Show evidence of some of adulity to apply knowledge to solve protive organizational and presentational skievidence of knowledge of interfacial science of the solve problems. Misuse of data incident of the solve problems of data incident of the solve problems. Details Or discussion Details (continuous assessment)	were analytical and critical abilities ons. Mostly correct but some erronal skills. In technology and command of sk oberent and logical thinking, but woblems. Limited ability to use data lis. In technology, and command a bilities, logical and coherent thi and references. Organization and Weighting in final course grade (%) 5 70	and logical thinking, an aneous use of data an ills required for attainin ith limited analytical and and source references and of skills required for his presentational skills ar No. of Hours 36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2,3		
Course Teaching Learning Activities Assessment Methods and Weighting Required/recommended	D Fail Lecture-b Activitie Lectures Tutorials Reading Methods Assignm Examina Test Barnes and	attaining most of the cours ability to apply knowledge references. Apply moderate Demonstrate partial but lin some of the course learnic critical abilities. Show limit Apply limited or barely effect Demonstrate little or no e attaining the course learnir no ability to apply knowled minimally effective or ineffectives. / Self study sents ents tion	e learning outcomes. Show evidence of se solve problems to most familiar situative organizational and presentationited knowledge of interfacial science and outcomes. Show evidence of some of ed ability to apply knowledge to solve protive organizational and presentational skievidence of knowledge of interfacial science of knowledge of interfacial science of solve problems. Misuse of data incidence of control of the control	were analytical and critical abilities ons. Mostly correct but some erronal skills. In technology and command of sk oberent and logical thinking, but woblems. Limited ability to use data lis. In technology, and command a bilities, logical and coherent thi and references. Organization and Weighting in final course grade (%) 5 70	and logical thinking, ar neous use of data an ills required for attaining the limited analytical are and source reference and of skills required for kills required for kills. Show very little presentational skills and the logical area of the logical and the logical and the logical and logical		

CHEM4144	Advance	ced mat	terials (6	credits)						Academic Yea	20	19
Offering Department	Chemistry	try	•	· ·						Quota	50	
Course Co-ordinator	Dr J Y Tai	ang, Che	mistry (jiny	/ao@hku.l	hk)							
Teachers Involved	(Dr E C M (Dr J Y Ta	,	,									
Course Objectives	on materi	erials che		d application	on of m					les a more comp . The most recei		
Course Contents & Topics	control of high strer	of stereod ength ma	chemistry ir aterials; hiç	n polymers gh temper	s; ionic rature p	and rac	dical livi s, polye	ng polym electrolyte	nerization. es, condu	ymers, coordinati Materials for spe cting polymers, c characterization to	cialty ptica	applications:
Course Learning Outcomes	CLO 1 de po CLO 2 id	describe polymeriz identify e	ations xamples of	anisms ar f some enç	nd kinet gineerin	tics of	copolyn	nerizatior high tem		nation polymeriza		
	are their properties affected by the molecular structures											
	CLO 3 demonstrate knowledge in advanced materials characterization techniques											
Pre-requisites (and Co-requisites and Impermissible combinations)		CLO 4 understand the working principles of materials for information storage and opto-electronic applications Pass in CHEM3143						ilication is				
Offer in 2019 - 2020	Y 2nd	nd sem	Offer in 20	20 - 2021	: Y					Examination	Ма	y
Grade Descriptors (A+ to F)	A	approa	ch in polymer o apply and ir	synthesis, potentegrate know	properties wledge an	s, applicated and theory	tion, and o	characterize the synthe	ation of mate esis and app	principles, and theoretials for advanced tellications of advanced order appropriate and	hnolog nateria	gy. Show strong als. Show strong

		relating to advanced materi	als synthesis and their properties.				
	В	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	Demonstrate general but in theories relating to frontier technology. Show evidence applications of advanced m	ncomplete command of knowledge and approach in polymer synthesis, propertie e of some abilities to apply and integraterials. Show ability to analyze problem intal results to draw appropriate conclusion.	es, application, and characterization grate knowledge and theory relating to most familiar situations and mo	of materials for advanced ng to the synthesis and stly correct but erroneous		
	D	relating to frontier approact technology. Show evidence applications of advanced management of the state of t	ited command of knowledge and under, th in polymer synthesis, properties, a e of limited abilities to apply and inter naterials. Show limited ability to analyze experimental results to draw appropria	pplication, and characterization of grate knowledge and theory relating problems to most familiar situation	materials for advanced ng to the synthesis and as and mostly correct but		
	Fail	theories relating to frontier a technology. Show little or a applications of advanced m data and experimental resu	ridence of command of knowledge and approach in polymer synthesis, propertie no evidence of abilities to apply and in aterials. Show little or no ability to analy lts to draw appropriate conclusions relat	es, application, and characterization tegrate knowledge and theory relative expression in the relation in the	of materials for advanced ting to the synthesis and ons and erroneous use of		
Course Type	Lecture-ba	sed course					
Course Teaching	Activities	i	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		
	Assignme	nts	(continuous assessment)	20	CLO 1,2,3,4		
	Examinati	on	i i	80	CLO 1,2,3,4		
Required/recommended reading and online materials	Specialist	references will be giver	throughout the course.				

CHEM4145	Medici	inal che	mistry (6 credit	s)		Academic Yea	2019	
Offering Department	Chemist	stry	- ,	•		Quota	70	
Course Co-ordinator	Prof H Z	Prof H Z Sun, Chemistry (hsun@hku.hk)						
Teachers Involved	(Prof H 2	i,Chemistr Z Sun,Ch C Li,Cher	emistry)					
Course Objectives				ncinles of drug de	sian and drug action	and uses as an introd	luction to resear	
odurse Objectives	in areas	This course covers the chemical principles of drug design and drug action and uses as an introduction to research in areas of bioorganic chemistry, bioinorganic chemistry, medicinal chemistry, pharmaceutical chemistry, and biotechnology.						
Course Contents & Topics	compute - Drug-re - Protein - Metals - DNA-D	Drug discovery, design, and development: lead discovery, pharmacophore, structure-activity relationships (SAR) computer-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				urse, students sho	uld be able to:			
Outcomes	CLO 1		•		, design and develop	ment		
	CLO 2				where appropriate			
	CLO 3				olism and drug deliver	erv		
and Impermissible combinations) Offer in 2019 - 2020	Y 2r	2nd sem	Offer in 2020 - 20	21 : Y		Examination	May	
Grade Descriptors (A+ to F)	A	Demon founda drug le ability strong conclus	strate thorough knowle tion knowledge of med ad optimization; structu o apply and integrate ability to analyze nove sions relating to the base	edge and understandin icinal chemistry, espec ure activity relationship knowledge and theory of problems and critica	ially those related to drug; pharmacokinetics; drug; relating to the basic fou il use of data and experiledge of medicinal chemis	epts, principles, and theorie discovery, design and deve delivery and its relevance to ndation knowledge of medi mental results to draw app stry. Demonstrate highly effe	s relating to the bas elopment; drug target to toxicity. Show stror cinal chemistry. Sho ropriate and insightf	
	В	Demon to the I drug ta Show e Show e relating	strate substantial comp pasic foundation knowl rgets; drug lead optimi evidence to apply and i evidence to analyze no to the basic principle	nand of knowledge and edge of medicinal cher zation; structure activit ntegrate knowledge ar ovel problems and con	d understanding of essenti mistry; especially those re y relationship; pharmacok dd theory relating to the ba rect use of data and expendicinal chemistry. Dem	al facts, concepts, principle lated to drug discovery; de- inetics; drug delivery and it asic foundation knowledge erimental results to draw al onstrate effective basic tec	sign and developmer s relevance to toxicit of medicinal chemistr opropriate conclusion	
	С	theorie develop relevar founda erroned medicii	s relating to the basic forment; drug targets; doce to toxicity. Show the toxicity in the bus use of data and expenses the bus use of data and expenses.	oundation knowledge of drug lead optimization evidence of some abi cinal chemistry. Show perimental results to dr trate moderately effecti	f medicinal chemistry; esp ; structure activity relation lities to apply and integrability to analyze problem aw appropriate conclusion	ding of essential facts, con ecially those related to drug onship; pharmacokinetics; ate knowledge and theory is to most familiar situations is relating to the basic princ c techniques for medicinal of	discovery; design ar drug delivery and it relating to the basi and mostly correct b ples and knowledge	
	D	relating develop relevar founda	to the basic foundatement; drug targets; once to toxicity. Show the tion knowledge of medium.	ion knowledge of med drug lead optimization evidence of limited ab licinal chemistry. Show	dicinal chemistry; especial; structure activity relation illities to apply and integrated in the distribution and integrated ability to analyze	essential facts, concepts, p illy those related to drug on onship; pharmacokinetics; rate knowledge and theory e problems to most familiar te conclusions relating to the	liscovery; design and it drug delivery and it relating to the bas situations and most	

		e of medicinal che and metabolism.	emistry. Demonstrate partially effective	e basic techniques for medicinal che	mistry, especially in drug		
	theories r developm relevance foundatio erroneous	elating to the basic ent; drug targets to toxicity. Show h knowledge of r s use of data and chemistry. Demo	evidence of command of knowledge and understanding of essential facts, concepts, principles, asic foundation knowledge of medicinal chemistry; especially those related to drug discovery; design ets; drug lead optimization; structure activity relationship; pharmacokinetics; drug delivery and ow little or no evidence of abilities to apply and integrate knowledge and theory relating to the befunding the first factor of the control of the co				
Course Type	Lecture-based cour	se					
Course Teaching	Activities		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		
	Assignments		(continuous assessment)	25	CLO 1,2,3		
	Examination			75	CLO 1,2,3		
Required/recommended reading and online materials	Medicinal Chemistr	n Introduction to Medicinal Chemistry (3/e), G.L. Patrick, Oxford University Press, 2005 edicinal Chemistry- An Introduction, G. Thomas, John Wiley, 2000 Wang, S.J. Lippard (2004) Nat. Rev. Drug Dis., Cellular processing of platinum anticancer drugs, 4, 307-320					
Additional Course Information	This course is also	offered to RPg	students, and the course code	e for RPg students is CHEM61	13.		

CHEM4147	Supram	olecular chemistry	(6 credits)	Academic Yea	ar 2019			
Offering Department	Chemistr	y		Quota	40			
Course Co-ordinator	Dr H Y Au	u-Yeung, Chemistry (ho	yuay @hku.hk)					
Teachers Involved		(Dr H Y Au-Yeung,Chemistry) (Dr Y F Wang,Chemistry)						
Course Objectives	Supramo students	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 and supramolecular structures leads to functions and properties, and their relevance to material and biological science.						
Course Contents & Topics	building bas macro	Basic concepts in molecular recognition and self-assembly; non-covalent interactions and common supramolecular 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 structures supramolecular polymers and supramolecular chemistry of biomolecules and biomaterials, will also be discussed.						
Course Learning			course, students should be a					
Outcomes			nciples and concepts in supra	•				
	Co			ture of non-covalent interactions structures, properties and fund				
			hysical characterization data explain the properties of the su	a of supramolecular systems ar upramolecular systems	d extract relevant			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in C	CHEM3341 and CHEM34	441					
Offer in 2019 - 2020	Y 2nd	d sem Offer in 2020 - :	2021 : Y	Examination	May			
Grade Descriptors (A+ to F)	Α	A Demonstrate thorough 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 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 general but incomplete amount 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 some ability to apply and integrate knowledge in supramolecular chemistry in explaining the formation and properties of, and in designing different supramolecular systems. Show some ability to analyse and interpret experimental data to draw appropriate conclusions relating to the advanced principles and properties of supramolecular systems.						
	D							
	Fail Demonstrate little or no evidence of command of knowledge and understanding of essential facts, concepts and principles supramolecular chemistry, especially those relating to non-covalent interactions, molecular recognition and self-assembly. Sho little or no ability to apply and integrate knowledge in supramolecular chemistry in explaining the formation and properties of, at in designing different supramolecular systems. Show little or no ability to analyse and interpret experimental data to dra appropriate conclusions relating to the advanced principles and properties of supramolecular systems.							
Course Type	Lecture-b							
Course Teaching	Lecture-b	appropriate conclusions rel pased course						
Course Teaching		appropriate conclusions rel pased course s	lating to the advanced principles and		erimental data to draw			
Course Teaching	Activitie	appropriate conclusions rel pased course s	lating to the advanced principles and		No. of Hours			
Course Teaching	Activitie Lectures Tutorials	appropriate conclusions rel pased course s	lating to the advanced principles and		No. of Hours			
Course Teaching & Learning Activities Assessment Methods	Activitie Lectures Tutorials	appropriate conclusions rel passed course s	lating to the advanced principles and		No. of Hours 36 12 100 Assessment Methods			
Course Teaching & Learning Activities Assessment Methods	Activitie Lectures Tutorials Reading	appropriate conclusions released course s / Self study	lating to the advanced principles and	d properties of supramolecular systems. Weighting in final	No. of Hours 36 12 100 Assessment Methods			
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	Activitie Lectures Tutorials Reading Methods	appropriate conclusions rel assed course s / Self study tion	lating to the advanced principles and	Weighting in final course grade (%)	No. of Hours 36 12 100 Assessment Methods to CLO Mapping			

•	Supramolecular Chemistry by Jonathan W. Steed and Jerry L. Atwood, John Wiley & Sons, Ltd., 2nd Edition, 2009 Modern Physical Organic Chemistry by Eric V. Anslyn and Dennis A. Dougherty, University Science Books, 2006
Additional Course Information	References to specialist texts and other published materials will be made throughout the course.

CHEM4148	Frontie	rs in Modern Chem	nical Science (6 credits)	Academic Ye	ear 2019		
Offering Department	Chemistr	У		Quota	60		
Course Co-ordinator	Dr X Li, C	Chemistry <i>(xiangli</i> @hku	ı.hk)				
Teachers Involved	(Dr E C N	M Tse,Chemistry)					
	,	ang,Chemistry) Chemistry)					
Course Objectives		• '	be the "central science" as it plays	a critical role in related	biological, physica		
·	medical, and engineering disciplines. This course aims to introduce students to the newest concepts an technological breakthroughs in chemical sciences. Throughout the course, students will be introduced to how the interplay among molecules, materials, and interfaces leads to unprecedented functionalities that contribute the innovations in biology and medicine, smart materials, and sustainable energy schemes.						
Course Contents	Current t	opics focus on the inte	rdisciplinary area of chemistry with bio	ology, and material scien	ces. Covered topi		
k Topics	stimuli-re conversion materials	include chemical genetics, epigenetics and proteomics; chemical biology for drug discovery and development stimuli-responsive nanomaterials; autonomous macromolecular motion; future power landscape; renewable energ conversion and utilization. Examples in protein posttranslational modifications, active colloidal, thermoelectric materials, molecular machines, advanced rechargeable batteries, and next-generation fuel cells and electrolyser will be discussed.					
Course Learning	On succe	essful completion of this	s course, students should be able to:				
Outcomes	CLO 1 u	inderstand important pr	inciples and topical trends in chemical	sciences			
	CLO 3 ir	ciences and applying the nterpret and analyse re	ding of future directions in biomedion his knowledge in comparing and contra- cent published research data in the fie	asting various emergent ld of chemistry and extra	technologies act relevant chemica		
		•	e observed properties and phenomena	a associated to the chem	ical systems		
Pre-requisites and Co-requisites and Impermissible combinations)	Pass in (CHEM3341 and CHEM	3441.				
Offer in 2019 - 2020	N Of	ffer in 2020 - 2021 : Y		Examination			
Grade Descriptors (A+ to F)	Α	Demonstrate thorough knowledge and understanding of essential facts, concepts and principles in chemical sciences, especially those relating to biomedical chemistry, nanomaterials, and energy sciences. Show strong ability to apply and integrate knowledge in chemical sciences in explaining the formation and properties of chemical species and in designing different chemical systems. Show strong ability to analyse and interpret experimental data to draw appropriate conclusions relating to the advanced principles and properties of chemical systems.					
	В	Demonstrate substantial knowledge and understanding of essential facts, concepts and principles in chemical sciences, especially those relating to biomedical chemistry, nanomaterials, and energy sciences. Show evidence to apply and integrate knowledge in chemical sciences in explaining the formation and properties of chemical species and in designing different chemical systems. Show evidence to analyse and interpret experimental data to draw appropriate conclusions relating to the advanced principles and properties of chemical systems.					
	С	Demonstrate general but incomplete amount of knowledge and understanding of essential facts, concepts and principles in chemical sciences, especially those relating to biomedical chemistry, nanomaterials, and energy sciences. Show some ability to apply and integrate knowledge in chemical sciences in explaining the formation and properties of chemical species and in designing different chemical systems. Show some ability to analyse and interpret experimental data to draw appropriate conclusions relating to the advanced principles and properties of chemical systems.					
	D						
	Fail						
Course Type	Lecture-b	pased course					
Course Teaching	Activitie	es	Details		No. of Hours		
Learning Activities	Lectures	3			36		
	Tutorials	3			12		
		/ Self study			100		
assessment Methods nd Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin		
	Assignm	nents	(20% Tests/Assignments; 5% participation)	25	CLO 1,2,3		
	Examina	ation		40	CLO 1,2,3		
	Examina Presenta			40 35	CLO 1,2,3 CLO 1,2,3		

CHEM4241	Modern chemical instrumentation and applications (6 credits)	Academic Year	2019
Offering Department	Chemistry	Quota	50
Course Co-ordinator	Dr I K Chu, Chemistry (ivankchu@hku.hk)		
Teachers Involved	(Dr I K Chu,Chemistry) (Dr W T Chan,Chemistry)		
Course Objectives	The aim of the course is to provide an understanding of modern instrume principles and practical aspects of instrument design. The course will be of phigher research degree or a career in technical sales/service.		
Course Contents	Biological Mass spectrometry: Liquid Chromatography-Tandem Mass	Spectrometry for	Proteomics &

& Topics	Laser Spe frequency noise enha Atomic Pl spectrome detectors; Atomic X-	Metabolomics. Laser Spectroscopy: Principle of laser; three-level and four-level lasers; laser instrumentation (Q-switching an requency conversion); laser-induced fluorescence; laser atomic spectrometry; laser remote sensing; signal-noise enhancement by boxcar integration and photon counting. Atomic Plasma Spectrometry: Inductively couple plasma-atomic emission spectrometry (ICP-AES) and mass spectrometry (ICP-MS); signal-production processes in ICP spectrometry; Echelle grating spectrometer; arradetectors; interferences in ICP-AES and ICP-MS. Atomic X-ray Spectrometry: x-ray fluorescence; wavelength-dispersive (WDXRF) and energy-dispersive (EDXRI K-ray fluorescence spectrometers								
Course Learning	On succes	n successful completion of this course, students should be able to:								
Outcomes	ide	entification and quantific		•						
	pr	oteomics experiments	e identified and sequenced exp	•						
			g techniques and software tools to		proteomics data					
	CLO 5 ex		or target quantitative analysis of s the laser spectroscopy, atom		and atomic x-ray					
	CLO 6 de	•	nental set up and the properties of	the basic components of	the instruments used					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Cl	•								
Offer in 2019 - 2020	Y 1st	sem Offer in 2020 - 20	021 : Y	Examination	n Dec					
Grade Descriptors (A+ to F)	Demonstrate thorough knowledge and understanding of essential facts, concepts, principles and theories relating to the modern chemical instrumentations and applications. Show strong ability to apply and integrate knowledge and theory, and strong ability to analyze problems related to fundamental principles and practical aspects of instrument design.									
	В	B 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	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.								
	D	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 fundamental principles and practical aspects of instrument design.									
Course Type	10	ith laboratory componen								
Course Teaching	Activities	3	Details		No. of Hours					
& Learning Activities	Lectures	7.7		24						
	Laborator Tutorials	у		16 12						
		Self study			100					
Assessment Methods and Weighting	Methods	oon otacy	Details	Weighting in final course grade (%)	Assessment Methods					
	Examinat	ion		65	to CLO Mapping CLO 1,2,3,4,5,6					
	Laborator		(lab performance, reports, test, oral test)	35	CLO 1,2,3,4,5,6					
Required/recommended reading and online materials	Chhabil D. D.A. Skoo	ass: Fundamentals of co g, F.K. Holler, S.R. Crou	ontemporary mass spectrometry (Vich: Principles of Instrumental Ana	Viley-Interscience) llysis (Thomson, latest ed	ition)					
Additional Course Information	Laboratory course.	y classes are mandatory	ill be made throughout the course . Students must complete ALL e students, and the course code for	xperiments and laborator						

CHEM4242	Analytical chemistry (6 credits)	Academic Year	2019
Offering Department	Chemistry	Quota	50
Course Co-ordinator	Dr W T Chan, Chemistry (wtchan@hku.hk)		
Teachers Involved	(Dr W T Chan, Chemistry)		
Course Objectives	This course focuses on the basic principle, practice and methodology in chem course emphasizes on the integration of analytical concepts and technologie bioanalytical problems. This course will be particularly useful for students who p analytical and bioanalytical chemistry.	s to solve practic	al analytical and
Course Contents & Topics	cal measurement ce in chemical and		
	Theoretical background and practical techniques of sample preparation, s preparation and enrichment techniques for biomedical, pharmaceutical and for separation technologies for complex mixture analysis (e.g. multidimensional chromatographic analysis and spectroscopic detection; Analytes characterization mass spectrometry	ensic chemical an I LC); Derivatizat	alysis; Advanced ion methods for
	Problem-based design of analytical strategy for chemical & biochemical anaknowledge and experience related to selected fields of research; Case study		

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								
		emonstrate understandir dvantages and limitations	ng on the working principle of di	fferent analytical techniques	and recognize their				
	CLO 3 inf	tegrate different analytic	al 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 2019 - 2020	Y 2nd	d sem Offer in 2020 - 2	021 : Y	Examination	May				
Grade Descriptors (A+ to F)	A	learning outcomes. Show st	tery at an advanced level of extensive rong analytical and critical abilities, logi sues and problems related to chemical a c.	cal thinking and capability to apply l	knowledge learnt to solve				
	В	learning outcomes. Show e	command of a broad range of knowledg vidence of analytical and critical abilities lex issues and problems related to che c.	s, logical thinking, and capability to a	apply knowledge learnt to				
	С	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 chemical analysis. Apply effective organization and presentation skills as shown in class work.							
	D								
	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.								
Course Type	Lecture w	ith laboratory componen	t course						
Course Teaching	Activities	3	Details		No. of Hours				
& Learning Activities	Lectures			24					
	Laborator	гу	6 x 4-hour of laboratory practic						
	Tutorials			24					
	Tutoriais				24 6				
		/ Self study							
		•	Details	Weighting in final course grade (%)	6				
	Reading /	,	Details (small project)	0 0	6 100 Assessment Methods				
	Reading / Methods	ents		course grade (%)	6 100 Assessment Methods to CLO Mapping				
	Reading / Methods Assignment	ents ion		course grade (%)	6 100 Assessment Methods to CLO Mapping CLO 1,2,3				
and Weighting Required/recommended reading and	Reading / Methods Assignment Examinat Laborator D.A. Skooledition)	ents ion ry reports og, D.M. West, F.J. Holle	(small project) Experiment & Lab report er, S.R. Crouch: Fundamentals of	course grade (%) 15 70 15 of Analytical Chemistry (Cenc	6 100 Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2,3 CLO 1,2,3 gage Learning, lates				
Assessment Methods and Weighting Required/recommended reading and online materials Additional Course	Reading / Methods Assignme Examinat Laborator D.A. Skoo edition) A. Manz, I	ents ion ry reports og, D.M. West, F.J. Holle P. S. Dittrich, N. Pamme	(small project) Experiment & Lab report	course grade (%) 15 70 15 of Analytical Chemistry (Cengmistry (Imperial College Pres	6 100 Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2,3 CLO 1,2,3 gage Learning, lates s, latest edition)				

CHEM4341	Advan	Advanced inorganic chemistry (6 credits) Academic Year 2019													
Offering Department	Chemis	Chemistry Quota 80													
Course Co-ordinator	Prof C M Che, Chemistry (cmche@hku.hk)														
Teachers Involved	(Prof H	l Z Su	e,Chemistr n,Chemistr Yam,Chen	y)											
Course Objectives	topics in	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, i	, inorga		upramole	ecular p	hotoch	emistr	y, İanth				I bonds and inorganic ar		-	
Course Learning	On succ	ccessfu	ul completio	on of this	s cours	e, stude	ents sh	ould b	e 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	4 unde	rstand the	role of m	netal co	mplexe	s in bi	o-inorg	ganic a	nd me	dicinal d	chemistry			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in	n CHE	M3341									·			
Offer in 2019 - 2020	Y 1	1st sei	n Offer ir	n 2020 -	2021:	Υ						Examination	n	Dec	
Grade Descriptors (A+ to F)	Demonstrate thorough knowledge and understanding of essential facts, concepts, principles and theories relating to the frontiers in inorganic chemistry. Show strong ability to apply and integrate knowledge and theory, and strong ability to analyze novel problems in inorganic chemistry. Apply highly effective organizational and presentational skills.														
	В	to	the more adv	vanced kno	owledge i	n inorgar	nic chem	nistry. Sł	how evid	dence to	apply and	ts, concepts, pri d integrate know presentational s	edge:		
	to analyze novel problems of inorganic chemistry. Apply effective organizational and presentational skills. C Demonstrate general but incomplete command of knowledge and understanding of essential facts, concepts, principles and theories relating to the more advanced knowledge in inorganic chemistry. Show evidence of some abilities to apply and integrate knowledge and theory, and to analyze problems to most familiar situations in inorganic chemistry. Apply moderately effective organizational and presentational skills.														

	D Fail	relating to the more adv knowledge and theory, ar partially effective organiza Demonstrate little or no theories relating to the m integrate knowledge and	monstrate partial but limited command of knowledge and understanding of essential facts, concepts, principles and theorie titing to the more advanced knowledge in inorganic chemistry. Show evidence of limited abilities to apply and integrat wheldge and theory, and limited ability to analyze problems to most familiar situations in inorganic chemistry. Demonstrat titilly effective organizational and presentational skills. In monstrate little or no evidence of command of knowledge and understanding of essential facts, concepts, principles an ories relating to the more advanced knowledge in inorganic chemistry. Show little or no evidence of abilities to apply an agrate knowledge and theory, and little or no ability to analyze problems to most familiar situations in inorganic chemistry monstrate minimally effective organizational and presentational skills.						
Course Type	Lecture-ba	ased course							
Course Teaching	Activities	3	Details		No. of Hours				
& Learning Activities	Lectures				36				
	Tutorials		including literature survey & pre	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)	30	CLO 1,2,3,4				
	Examinat	ion		70	CLO 1,2,3,4				
	LAGITITIAL								
Required/recommended reading and online materials			o and Bochmann: Advance Inorgar	nic Chemistry (Wiley, 1999,	6th ed.)				

CHEM4342	Organoi	netallic chemistry (6 credits) Aca	ademic Year	2019					
Offering Department	Chemistry	Chemistry Quota 40							
Course Co-ordinator	Prof V W	Prof V W W Yam, Chemistry (wwyam@hku.hk)							
Teachers Involved	,	(Dr H Y Au-Yeung,Chemistry) (Prof V W W Yam,Chemistry)							
Course Objectives	II. The co	To give further, more detailed, treatment to organometallic chemistry mentioned in CHEM3341 Inorganic Chemistry II. The course also aims to introduce and familiarize students with advanced laboratory techniques, and to prepare students for graduate work in inorganic and organometallic chemistry.							
Course Contents & Topics	and reacti	Main group and transition metal organometallics. Transition metal cluster vities of organometallics. Application of organometallics in organic synthes y: To introduce and familiarize students with advanced laboratory techniqu	sis and catalys	sis.					
	and manipmethods.	bulation of air- and moisture- sensitive compounds, and their characterize	ation by vario	us spectroscop					
Course Learning	On succes	ssful completion of this course, students should be able to:							
Outcomes	CLO 1 ur	nderstand the advanced principles and concepts in organometallic chemistr	у						
	tra	emonstrate knowledge and understanding in the bonding, structure and ransition metal organometallics, especially in transition metal clusters, metaletal alkylidynes							
		emonstrate knowledge and understanding in the application of organom olymerization and catalysis	netallics in org	ganic synthesis					
	CLO 4 demonstrate ability in advanced laboratory techniques including the synthesis and manipulation of air- and moisture- sensitive compounds, and their characterization by various spectroscopic methods								
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in C	HEM3341							
Offer in 2019 - 2020	Y 1st	sem Offer in 2020 - 2021 : Y	amination	Dec					
Grade Descriptors (A+ to F)	A	Demonstrate thorough knowledge and understanding of essential facts, concepts, principl detailed and advanced treatment of organometallic chemistry, especially those related to main group and transition metal organometallics; transition metal cluster chemistry; and apply synthesis and catalysis. Show strong ability to apply and integrate knowledge and theory reconcepts of organometallic chemistry. Show strong ability to analyze novel problems and results to draw appropriate and insightful conclusions relating to the advanced principle chemistry. Demonstrate highly effective advanced laboratory skills and techniques, especia dir- and moisture- sensitive compounds and their characterization by various spectroscop	structure, bonding plication of organ leating to the adverse of days and application in the synthesially i	ng and reactivities of nometallics in organ ranced principles ar ata and experiment ns of organometalli					
	В	Demonstrate substantial command of knowledge and understanding of essential facts, conto the more detailed and advanced treatment of organometallic chemistry, especially the reactivities of main group and transition metal organometallics; transition metal clu organometallics in organic synthesis and catalysis. Show evidence to apply and integrate advanced principles and concepts of organometallic chemistry. Show evidence to analyz data and experimental results to draw appropriate conclusions relating to the advar organometallic chemistry. Demonstrate effective advanced laboratory skills and technique manipulation of air- and moisture- sensitive compounds and their characterization by various	cepts, principles, ose related to struster chemistry; knowledge and to receive problems need principles aues, especially in	ructure, bonding and application of theory relating to the s and correct used and applications of the synthesis and					
	С	Demonstrate general but incomplete command of knowledge and understanding of esse theories relating to the more detailed and advanced treatment of organometallic chemistry, bonding and reactivities of main group and transition metal organometallics; transition metal organometallics in organic synthesis and catalysis. Show evidence of some abilities to applie relating to the advanced principles and concepts of organometallic chemistry. Show ability situations and mostly correct but erroneous use of data and experimental results to draw a advanced principles and applications of organometallic chemistry. Demonstrate moderatel and techniques, especially in the synthesis and manipulation of air- and moisture characterization by various spectroscopic methods.	 especially those cluster chemistre and integrate known to analyze proble appropriate conclude effective advantage 	e related to structur ry; and application nowledge and theo lems to most famili usions relating to the need laboratory ski					
	D	Demonstrate partial but limited command of knowledge and understanding of essential fac relating to the more detailed and advanced treatment of organometallic chemistry, especia and reactivities of main group and transition metal organometallics; transition metal organometallics in organic synthesis and catalysis. Show evidence of limited abilities to theory relating to the advanced principles and concepts of organometallic chemistry. Show most familiar situations and mostly correct but erroneous use of data and experimental rerelating to the advanced principles and applications of organometallic chemistry. Demonstratory skills and techniques, especially in the synthesis and manipulation of air- and mocharacterization by various spectroscopic methods.	ally those related cluster chemistry; apply and integ wilmited ability to esults to draw appropertate partially	to structure, bondii ; and application ; rate knowledge ar analyze problems propriate conclusion effective advance					

	the book or the too according to the control of the	eories relating to the more origing and reactivities of n ganometallics in organic se eory relating to the advanor most familiar situations a dvanced principles and ap- did techniques, especially aracterization by various s		organometallic chemistry, especially to metallics; transition metal cluster che novidence of abilities to apply and metallic chemistry. Show little or no al mental results to draw appropriate co /. Demonstrate minimally effective av	hose related to structure, mistry; and application of integrate knowledge and bility to analyze problems onclusions relating to the dvanced laboratory skills		
Course Type		aboratory componen			N. 611		
Course Teaching	Activities		Details		No. of Hours		
& 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	3	(continuous assessment)	30	CLO 1,2,3,4		
	Examination		,	70	CLO 1,2,3,4		
Required/recommended reading and online materials		R. H. Crabtree: The Organometallic Chemistry of the Transition Metals (Wiley, 2005, 4th ed.) C. Elschenbroich and A. Salzer: Organometallics - A Concise Introduction (VCH, 1992, 2nd revis					
Additional Course Information		eference to specialist texts and other published materials will be made throughout the course. boratory classes are mandatory. Students must complete ALL experiments and laboratory reports to pass urse.					

CHEM4441	Advance	ed organic chemi	istry (6 credits)	Academic Ye	ear 2019			
Offering Department	Chemistry		<u> </u>	Quota	80			
Course Co-ordinator	Prof D Ya	ng, Chemistry <i>(yang</i>	dan @hku.hk)					
Teachers Involved		ing,Chemistry) Li,Chemistry)						
Course Objectives	To provide students with knowledge in organic chemistry reaction mechanisms and organic compound structure determination.							
Course Contents				nemistry, conformational analy				
& Topics				rrangement reactions, and perio	yclic reactions.			
Course Learning			is course, students should be a					
Outcomes	CLO 1 describe, analyze and interpret the structure and reactivity relationship of organic molecules CLO 2 identify and predict the selectivities (chemoselectivity, regioselectivity and stereoselectivity reactions CLO 3 describe the general approaches to study organic mechanisms							
	CLO 4 ha	ve a general under		dge of pericyclic reactions, rea	active intermediates			
	CLO 5 su	ggest reasonable me	echanistic pathways for some ty	pes of organic reactions				
			f reaction mechanisms in desigr	n of synthetic routes for organic o	compounds			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Cl							
Offer in 2019 - 2020	Y 1st	sem Offer in 2020	- 2021 : 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.							
	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.							
	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.							
	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	of analytical and critical		nd skills required for attaining the course Show very little or no ability to apply know				
Course Type Course Teaching		ased course	Detaile		No of Harries			
& Learning Activities	Activities Lectures		Details		No. of Hours 36			
a Learning Activities	Tutorials				12			
		Self study			100			
Assessment Methods	Methods	Och Study	Details	Weighting in final	Assessment			
and Weighting	Wethous		Details	course grade (%)	Methods to CLO Mapping			
	Examinat	ion		70	CLO 1,2,3,4,5,6			
	Test			30	CLO 1,2,3,4,5,6			
Required/recommended reading and online materials	2007.	•	•	Part-A: Structure and Mechanisr earson, with e-text and Mastering				
Omine materials			ns", Oxford University Press, 19		, Oriennistry.			

CHEM4443	Integrated organic synthesis (6 credits)	Academic Year	2019
Offering Department	Chemistry	Quota	50
Course Co-ordinator	Prof P Chiu, Chemistry (pchiu@hku.hk)		

Teachers Involved	(Prof P Ch	iu,Chemistry)						
Course Objectives	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							
Causa Cautanta			r research in organic chemistry.	as CUEM4002 and CUE	MOADO this serves wil			
Course Contents & Topics	present moments molecules. these mole their mechanic retrosynthese	odern synthetic methods In each unit, the che ecules are introduced, a nanisms, selectivity, ste etic analysis, stereosele	covered in the foundational cours is and synthetic planning. The col mical biology of these compoun accompanied by in-depth discuss ereochemistry, scope and limita activity and enantioselective cont actical skills of synthesis.	urse is organized into unit ds are briefly presented lons of the reactions involutions. Concept of synth	s based on target drug and the syntheses of lved with emphasis or letic design including			
Course Learning	On successful completion of this course, students should be able to:							
Outcomes	CLO 1 understand the rationale, selectivities, and mechanisms of various reactions and reagents in organic chemistry CLO 2 able to solve mechanistic and synthetic chemistry problems							
			experiments at an increased level execution, spectroscopic analysis		sing additional skills in			
	CLO 4 inte	egrate lecture material a	and literature search, to learn che	mistry independently				
Pre-requisites (and Co-requisites and Impermissible combinations)		HEM3441; or HEM3441 (without lab co	omponent) and CHEM3443					
Offer in 2019 - 2020	Y 2nd	sem Offer in 2020 - 2	021 : Y	Examinatio	n May			
Grade Descriptors (A+ to F)	A	mechanisms related to synthetic on analyze novel synthetic o	astery at an advanced level of knowledgenetic organic chemistry. Show a strong at rganic chemistry situations and problems lex synthetic problems. Demonstrate hig rriments.	oility to integrate knowledge and Show a critical use of knowled	theory, and a strong ability lge and data to apply to the			
	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.						
	С	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.						
	D							
	Fail	principles, reactions and e knowledge and theory in Show mostly erroneous use ation and application of lab						
Course Type	Lecture wit	th laboratory componen	t course					
Course Teaching	Activities		Details		No. of Hours			
& Learning Activities	Lectures			24				
	Laboratory				25			
Accomment Matheda	Reading /	Sell' Study	Deteile	Majabia - ! fi!	100			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Examinati	on		65	CLO 1,2			
	Laboratory	y reports	(lab practical 15% and lab test 10%)	25	CLO 1,2			
	Test		(open book midterm)	10	CLO 3,4			
Required/recommended reading and online materials			sis, C. Willis, M. Wills, Oxford Sci Saunders, Oxford Science Public					
Additional Course Information	course.	ĺ	/. Students must complete ALL	•				
	This cours	a is also ottered to RPa	students, and the course code for	r RPa students is CHEMA	1111			

CHEM4444	Chemical biology (6 credits)	Academic Year	2019				
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 generate new functional molecules. Useful as an introduction to research in an chemistry and biotechnology.						
Course Contents & Topics	Chemical biology of nucleic acids, protein chemistry, protein posttranslati chemistry, chemical glycobiology and tools and techniques in chemical biology.	onal modification	s, carbohydrate				
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 understand chemical biology approaches in studying biology						
	CLO 2 give examples of how to use chemical methods to produce natural bid wiht altered functions	omolecules and no	ew biomolecules				
	CLO 3 compare chemical biology and traditional biology approaches in drug dis	covery					
Pre-requisites (and Co-requisites	Pass in BIOC3601 or CHEM3441	·					

and Impermissible combinations)								
Offer in 2019 - 2020	Y 2n	d sem Offer in 20	020 - 2021 : Y	Examination	n 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 ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply 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	learning outcomes.	Show evidence of analytical and critical r situations. Apply effective organizatior	owledge and skills required for attaining a abilities and logical thinking, and ability to a nal and presentational skills. Critical use o between different secondary interpretatio	apply knowledge to familiar f relevant information from			
	С	outcomes. Show ev familiar situations. A	idence of some analytical and critical a apply moderately effective organizationa	edge and skills required for attaining mo abilities and logical thinking, and ability to all and presentational skills. Use of relevan pretations and to quote/reference aptly.	apply knowledge to 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. Use and reference of several sources, but mainly through summary rather than analysis and comparison.						
	Fail	of analytical and ci	ritical abilities, logical and coherent th tion and presentational skills are minima	e and skills required for attaining the cours inking. Show very little or no ability to ally effective or ineffective. Limited use of	apply knowledge to solve			
Course Type	Lecture-b	pased course						
Course Teaching	Activitie	s	Details	No. of Hours				
& Learning Activities	Lectures							
	Tutorials		tutorials/discussion	tutorials/discussion				
	Reading	/ Self study			100			
Assessment Methods and Weighting	Methods	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Examina	ition		40	CLO 1,2,3			
	Test			60	CLO 1,2,3			
Required/recommended reading and online materials	Foundati	ons of Chemical Bi	ology by C.M. Dobson, J.A. Ger	rard and A.J. Pratt.				
Course Website	Nil							
Additional Course Information	Nil							

CHEM4541		cal chemistry III: statistica cs theory (6 credits)	l thermodynamics and	Academic Year	2019	
Offering Department			Quota	40		
Course Co-ordinator	, Cher	mistry ()				
Teachers Involved						
Course Objectives	The course presents fundamental principles and topics on statistical thermodynamics and kinetic theory in order t provide a solid foundation for students intending to further their studies in physical chemistry and related fields.					
Course Contents & Topics	Principles of Statistical Thermodynamics - Thermodynamic laws - Ensembles and partition functions: microcanonical, canonical and grand-canonical - 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					
Course Learning Outcomes	On successful completion of this course, students should be able to: 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 microscopic statistical model systems					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in CHEM3541					
Offer in 2019 - 2020	N O	N Offer in 2020 - 2021 : N		Examination		
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	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.				
	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.					
O	Fail Little or no evidence of command of knowledge of statistical thermodynamics and reaction dynamics.					
Course Type	Lecture with laboratory component course					
Course Teaching & Learning Activities	Activities		ails		No. of Hours	
	Lectures				24	
	Laborat	tory			24	

	Tutorials			6
	Reading / Self study			100
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments	continuous assessment of on class quizzes & assignments	40	CLO 1,2,3
	Examination		60	CLO 1,2,3
Required/recommended reading and online materials	T. L. Hill, An introduction to Statisti P. Atkins, Physical Chemistry	cal Thermodynamics		
Additional Course Information	Laboratory classes are mandatory course.	. Students must complete ALL expe	eriments and laboratory	reports to pass this

CHEM4542	Compu	tational chemistry	(6 credits)	Academic Ye	ear 2019		
Offering Department	Chemistr		· ·	Quota	60		
Course Co-ordinator	Prof G H	Chen, Chemistry (ghc	@yangtze.hku.hk)				
Teachers Involved		ng,Chemistry)					
		l Chen,Chemistry)					
Course Objectives	methods.		omputational chemistry including first lergraduate and postgraduate stude putational biology.				
Course Contents & Topics			method, density-functional theory, a ergy calculation, and computer-aided		, Basis sets, Force		
Course Learning	On succe	essful completion of this	s course, students should be able to:				
Outcomes			oncepts of density-functional theory				
		inderstand the basionechanics/molecular m	c numerical techniques of molectic echanics method	cular mechanics metho	od and quantum		
			omputational software to calculate thude organic molecules, inorganic mate		operties of various		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in C	iss in CHEM3541 or PHYS3351					
Offer in 2019 - 2020	N Of	fer in 2020 - 2021 : Y		Examination			
Grade Descriptors (A+ to F)	A	functional theory, open s	owledge on following topics: density-functional ystem, molecular dynamics, force field, and qua ogical thinking, with strong ability to apply know	antum mechanics/molecular me	chanics. Strong analytica		
	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.						
	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.						
	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.						
	Fail Little or no evidence of 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. Lack of analytical and critical abilities and logical thinking, with very little or no ability to apply knowledge to practical problems in physical chemistry.						
Course Type	Lecture v	vith laboratory compon	•				
Course Teaching	Activitie	s	Details		No. of Hours		
& Learning Activities	Lectures				24		
	Laborato	ory	lab sessions 6x4 hours of computa	lab sessions 6x4 hours of computational laboratory			
	Tutorials			6			
	Reading / Self study				100		
Assessment Methods and Weighting	Methods	5	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignm	ents	(continuous assessment)	40	CLO 1,2,3		
	Examina	ition		60	CLO 1,2,3		
Required/recommended reading and online materials	Robert G J.M. Hail	i. Parr & Weitao Yang: e: Molecular Dynamics		and Molecules			
Additional Carres			odelling - Principles and Applications				
Additional Course Information	CHEM45	42 is offered every oth	EM6109 Computational Chemistry. er year. ory. Students must complete ALL ex	periments and laboratory	reports to pass thi		

CHEM4543	Advanced physical chemistry (6 credits)	Academic Year	2019
Offering Department	Chemistry	Quota	40
Course Co-ordinator	Prof G H Chen, Chemistry (ghc@yangtze.hku.hk)		
Teachers Involved	(Prof D L Phillips,Chemistry) (Prof G H Chen,Chemistry)		
Course Objectives	This course covers advanced topics in physical chemistry. It is offered for student and for students who are interested in postgraduate studies.	nts majoring in p	hysical chemisti
Course Contents	Time-resolved spectroscopy methods, excited states and reactive intermediates,	photophysics ar	nd photochemica

& Topics	processes, chemical read surface crossings.	rocesses, chemical reaction mechanisms, advanced quantum mechanical methods, reaction pathways and urface crossings.					
Course Learning	On successful completion	of this course, students should be able to	o:				
Outcomes		sic concepts of quantum chemistry, stati					
	dynamics	e-Fock method, statistical ensembles,	·	,			
	CLO 3 understand the ele	mentary numerical procedures in Hartre	e-Fock and molecular mech	anics methods			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in CHEM3541						
Offer in 2019 - 2020	Y 2nd sem Offer in 2	2020 - 2021 : Y	Examination	May			
Grade Descriptors (A+ to F)	theory, advanced s	ed knowledge on following topics: variation methor statistical thermodynamics, reaction dynamics. Str ply knowledge to practical problems in physical ch	rong analytical and critical abilities				
	method, perturbation	and of a broad range of knowledge on following to on theory, advanced statistical thermodynamics, ro g, with ability to apply knowledge to practical proble	eaction dynamics. Evidence of ana	mechanics, Hartree-Fock lytical and critical abilities			
	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.						
	method, perturbation	nce of command of knowledge on following topio on theory, advanced statistical thermodynamics, ru th very little or no ability to apply knowledge to practice.	eaction dynamics. Lack of analytica	al and critical abilities and			
Course Type	Lecture-based course						
Course Teaching	Activities	Details		No. of Hours			
& Learning Activities	Lectures						
	Tutorials	tutorials/discussion	tutorials/discussion				
	Reading / Self study						
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignments	(continuous assessment)	20	CLO 1,2,3			
	Examination	,	80	CLO 1,2,3			
Required/recommended	P. W. Atkins: Physical Che	mistry					
reading and	Ira N. Levine: Quantum Ch	nemistry (Prentice Hall, 4th ed.)					
online materials		es of Statistical Mechanics ein: Molecular Reaction Dynam					
Course Website	Nil	•					
Additional Course Information	This course is also offered	to RPg students, and the course code for	or RPg students is CHEM61	12.			

CHEM4544	Electrochemical science and technology (6 credits) Academic Year 2019							
Offering Department	Chemistr	Chemistry Quota 36						
Course Co-ordinator	Prof G K	Prof G K Y Chan, Chemistry (hrsccky@hku.hk)						
Teachers Involved	١,	K Y Chan, Chemistry)						
		Professor, Chemistry)						
Course Objectives		rstand the science of electrochemistry, methods to characterise elect nemical applications and technologies.	trochemical cells, an	d factors affecting				
Course Contents & Topics	controlled sources,	dynamics, kinetics, and transport of electrochemical processes. d potential, current, and hydrodynamics. Voltammetry for analytic sensors, synthesis and separation processes. Electrolytes, separatonemical processes.	al chemistry. Electro	ochemical power				
Course Learning	On succe	essful completion of this course, students should be able to:						
Outcomes		Understand the thermodynamic and kinetics of a charge transfer nterface and transport of relevant species in molecular and macrosco		trode-electrolyte				
	CLO 2 A	Apply voltammetry methods to characterize an electrochemical proce	SS.					
	CLO 3 C	Correlate performance of electrochemical cells to materials, design, a	and operation parame	eters.				
Pre-requisites (and Co-requisites and Impermissible combinations)								
Offer in 2019 - 2020	Y 2n	nd sem Offer in 2020 - 2021 : N	Examination	May				
Grade Descriptors (A+ to F)	A	Demonstrate thorough knowledge of electrochemical science and technology, ar the course learning outcomes. Show strong analytical and critical abilities and log and ability to apply knowledge to solve problems in a wide range of complex, fa data and sourcing of references. Apply highly effective organizational and present	gical thinking, with eviden amiliar and unfamiliar situ	ce of original thought,				
	В							
	C Demonstrate general but incomplete knowledge of electrochemical science and technology and command of 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 solve problems to most familiar situations. Mostly correct but some erroneous use of data and							
		ability to apply knowledge solve problems to most familiar situations. Mostly or references. Apply moderately effective organizational and presentational skills.	correct but some erroned	l logical thinking, and ous use of data and				
	D	ability to apply knowledge solve problems to most familiar situations. Mostly of	correct but some erroned chnology and command at and logical thinking, but	I logical thinking, and ous use of data and of skills required for with limited analytical				

Course Type	Lecture with laboratory componen	t course		
Course Teaching	Activities Details			No. of Hours
& Learning Activities	Lectures			24
	Laboratory	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
	Assignments	(assignments, test and term paper)	40	CLO 1,2,3
	Examination		60	CLO 1,2,3
Required/recommended reading and online materials	K. B. Oldham, J. C. Myland, and J ISBN 978047071045. Bard, Allen J., Larry R. Faulkner. ISBN: 9780471043720.	•	07 ,	
Additional Course Information	This course is offered every other	year.		

Offering Department Course Co-ordinator Teachers Involved Course Objectives Course Contents & Topics Course Learning Outcomes Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	(Various This coutechnique The couliterature the study On succession CLO 1 of CLO 2 of CLO 3 of the coulitry Pass in CHEM4: This cap The early 2 of A	Chemistry (xiangli@hku.h. teachers in the Departmeurse is designed for final es by working on small provides training on claresearch and a short later ents' supervisorswho are a sessful completion of this contents of the completion of	ent, Chemistry) I year students who would li rojects on literature research a chemistry literature research a chemistry literature research to aboratory-based research projects on literature research to a chemistry literature research projects, students should be ablef academic databases and search and understanding of the chemister of the che	echniques. Students will work on ect. Thelaboratory-based project in the control of the control	n a small project on the sare provided by the sare provided by the sare provided by the same that th	
Teachers Involved Course Objectives Course Contents & Topics Course Learning Outcomes Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	(Various This coutechnique The couliterature the study On succession CLO 1 of CLO 2 of CLO 3 of the coulitry Pass in CHEM4: This cap The early 2 of A	teachers in the Departmeurse is designed for final es by working on small provides training on claresearch and a short later ents' supervisorswho are a sessful completion of this contents of the completion of the co	ent, Chemistry) I year students who would li rojects on literature research a chemistry literature research a chemistry literature research to aboratory-based research projects on literature research to a chemistry literature research projects, students should be ablef academic databases and search and understanding of the chemister of the che	and chemistry research. echniques. Students will work on ect. Thelaboratory-based project let to: earch engines of chemistry literatured with their own research project mical techniques they used to comical techniques they used to come/elective chemistry courses CHEM3341, and CHEM3441, and CHEM3441, and CHEM3441, and chemistrate very able analytical and critical thruston of information acquired from a wice propriate and illuminating conclusions. Extends. Employ very effective organization to be used to the comparisons between different secsions. Compose general integration of the skills.	n a small project or its are provided by the state of the research in and its context in the state of the sta	
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Course Learning Outcomes Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	the stude On succ CLO 1 c CLO 2 c CLO 3 c t CLO 4 c Pass in CHEM4) This cap The earl Y 2r A B	ents' supervisorswho are a essful completion of this c demonstrate knowledge of understand the terminolog demonstrate knowledge a demonstrate knowledge a their own research project demonstrate knowledge a the broader research area at least 24 credits of a XXX) in the Chemistry Maj stone course is for Chemi liest that a student is allow nd sem Offer in 2020 - 20 Show an extensive compreh some originality. Illuminating sources. Critical employmen of a wide range of appropris skills. [Work of A+ should de Show a substantial compreh information from sources. Dicorrect utilization of data an and methods. Perform effect Show a general but incomple of relevant information from	assigned by the department. course, students should be able of academic databases and sea gy and nomenclature associate and understanding of the cheat and understanding of the result and understanding of the research project. Demonstrate substantial additional work the properties of the research project. Demonstrate ability to compose mean and results to form appropriate conclustive organizational and presentational lete comprehension of the research project.	le to: arch engines of chemistry literatured with their own research project mical techniques they used to coll lts of their own research project core/elective chemistry courses CHEM3341, and CHEM3441, arcs is their year 3 study. Examination Instrate very able analytical and critical trustion of information acquired from a wicopropriate and illuminating conclusions. Extendes, Employ very effective organization to be constrate able analytical and critical thinkingful comparisons between different secsions. Compose general integration of the I skills. Toject. Presence of some analytical and critical thinkingrous constrate able analytical and critical thinking ingful comparisons between different secsions. Compose general integration of the I skills.	Ire It do the research in a rand its context in the context in th	
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Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	CLO 1 of CLO 2 of CLO 3 of the CLO 4 of the	demonstrate knowledge of understand the terminolog demonstrate knowledge a heir own research project demonstrate knowledge a he broader research area at least 24 credits of a XXX) in the Chemistry Maj stone course is for Chemi lest that a student is allowed sem Offer in 2020 - 2 Show an extensive compreh some originality. Illuminating sources. Critical employmen of a wide range of appropris skills. [Work of A+ should de Show a substantial compreh information from sources. D. Correct utilization of data an and methods. Perform effect Show a general but incomple of relevant information from	of academic databases and sea gy and nomenclature associated and understanding of the che that and understanding of the result and understanding of the result and understanding of the result and understanding of the result and understanding of the result pior including CHEM3241, and instry Major students only. wed to take this capstone course 2021: Y thension of the research project. Demo gutilization and critical analysis / eval and of data and results to synthesize ap- iate theories, principles, data and me emonstrate substantial additional work bemonstrate substantial additional work bemonstrate ability to compose mean and results to form appropriate conclus- tivitive organizational and presentational lete comprehension of the research p	arch engines of chemistry literatured with their own research project mical techniques they used to coll the order of their own research project core/elective chemistry courses CHEM3341, and CHEM3441, arcs is their year 3 study. Examination Examination	to the research in the tand its context or and CHEM3XXX or and CHEM3541. No Exam the tange of high quality commonstrate integration or all and presentational elevant to the topic.] ing with use of relevant condary interpretations, neories, principles, data critical thinking with use	
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(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	CLO 3 of the CLO 4	demonstrate knowledge a heir own research project demonstrate knowledge a he broader research area at least 24 credits of a XXX) in the Chemistry Maj stone course is for Chemi lest that a student is allow and sem Offer in 2020 - 2 Show an extensive compreh some originality. Illuminating sources. Critical employmen of a wide range of appropris skills. [Work of A+ should de Show a substantial compreh information from sources. D. Correct utilization of data an and methods. Perform effect Show a general but incomple of relevant information from	and understanding of the che to and understanding of the results and understanding of the results and understanding of the results and understanding CHEM3241, and istry Major students only. Wed to take this capstone course. 2021: Yhension of the research project. Demog utilization and critical analysis / evalt not of data and results to synthesize apiate theories, principles, data and me emonstrate substantial additional work hension of the research project. Demograms and results to compose mean and results to form appropriate conclustive organizational and presentational lete comprehension of the research p	mical techniques they used to collists of their own research project core/elective chemistry courses CHEM3341, and CHEM3441, are see is their year 3 study. Examination	do the research in and its context in and its context in a (CHEM3XXX or and CHEM3541. No Exam anought with presence of derange of high quality Demonstrate integration and and presentational elevant to the topic.] ing with use of relevant condary interpretations. neories, principles, data critical thinking with use	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	Pass in CHEM42 This cap The earl Y 2r A B	their own research project demonstrate knowledge a the broader research area at least 24 credits of a XXX) in the Chemistry Maj stone course is for Chemi itest that a student is allowed as moffer in 2020 - 2 Show an extensive compressome originality. Illuminating sources. Critical employmen of a wide range of appropriskills. [Work of A+ should de Show a substantial compressinformation from sources. D. Correct utilization of data an and methods. Perform effect Show a general but incomple of relevant information from	and understanding of the results and understanding of the results and understanding of the results and understanding CHEM3241, and istry Major students only. Wed to take this capstone course 2021: Yhension of the research project. Demog utilization and critical analysis / evalt not of data and results to synthesize agiate theories, principles, data and memonstrate substantial additional work hension of the research project. Demolemonstrate ability to compose mean and results to form appropriate conclustive organizational and presentational lete comprehension of the research p	Its of their own research project core/elective chemistry courses CHEM3341, and CHEM3441, are see is their year 3 study. Examination Instrate very able analytical and critical thuation of information acquired from a wice propriate and illuminating conclusions. Enthods. Employ very effective organization to be soon that is required in wider areas renstrate able analytical and critical thinkingful comparisons between different secsions. Compose general integration of the Iskills. Toject. Presence of some analytical and of the second control of	No Exam nought with presence of de range of high quality Demonstrate integration and and presentational elevant to the topic.] ing with use of relevant condary interpretations, neories, principles, data critical thinking with use	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	Pass in CHEM43 This cap The earl Y 2r A B	demonstrate knowledge a the broader research area at least 24 credits of a XXX) in the Chemistry Maj stone course is for Chemi iest that a student is allow it in the composition of a wide range of appropris skills. [Work of A+ should de Show a substantial compreh information from sources. D. Correct utilization of data an and methods. Perform effect Show a general but incomple of relevant information from	and understanding of the results and understanding of the results advanced level disciplinary agor including CHEM3241, and istry Major students only. Wed to take this capstone course 2021: Yhension of the research project. Demog utilization and critical analysis / evaluated theories, principles, data and memonstrate substantial additional work hension of the research project. Demographical conclusive organizational and presentational lete comprehension of the research presentational lete comprehension of the research presentational lete comprehension of the research p	core/elective chemistry courses CHEM3341, and CHEM3441, are see is their year 3 study. Examination Instrate very able analytical and critical the propriate and illuminating conclusions. Enthods. Employ very effective organizatic to beyond that is required in wider areas reconstrate able analytical and critical thinkingful comparisons between different seesions. Compose general integration of the I skills. Toject. Presence of some analytical and critical thinkingful comparisons between different seesions.	No Exam No Exam No Exam No Exam Nought with presence of the presence of the presentational and presentational elevant to the topic.] ing with use of relevant condary interpretations, neories, principles, data critical thinking with use	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	Pass in CHEM42 This cap The earl Y 2r A B	the broader research area at least 24 credits of a XXX) in the Chemistry Maj stone course is for Chemi lest that a student is allow and sem Offer in 2020 - 20 Show an extensive compreh some originality. Illuminating sources. Critical employmen of a wide range of appropris skills. [Work of A+ should de Show a substantial compreh information from sources. D. Correct utilization of data an and methods. Perform effect Show a general but incomple of relevant information from	advanced level disciplinary advanced level disciplinary agor including CHEM3241, and istry Major students only. Wed to take this capstone course 2021: Y then to fata and critical analysis / evalunt of data and results to synthesize ago iate theories, principles, data and memonstrate substantial additional work hension of the research project. Demomentare ability to compose mean and results to form appropriate conclustive organizational and presentational lete comprehension of the research p	core/elective chemistry courses CHEM3341, and CHEM3441, are see is their year 3 study. Examination Instrate very able analytical and critical the propriate and illuminating conclusions. Enthods. Employ very effective organizatic to beyond that is required in wider areas reconstrate able analytical and critical thinkingful comparisons between different seesions. Compose general integration of the I skills. Toject. Presence of some analytical and critical thinkingful comparisons between different seesions.	No Exam No Exam nought with presence of de range of high quality Demonstrate integration onal and presentational elevant to the topic.] ing with use of relevant condary interpretations. neories, principles, data critical thinking with use	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	Pass in CHEM42 This cap The earl Y 2r A B	at least 24 credits of a XXX) in the Chemistry Maj stone course is for Chemi iest that a student is allow nd sem Offer in 2020 - 2 Show an extensive compreh some originality. Illuminating sources. Critical employmen of a wide range of appropria skills. [Work of A+ should de Show a substantial compreh information from sources. Du Correct utilization of data an and methods. Perform effect Show a general but incomple of relevant information from	advanced level disciplinary ajor including CHEM3241, and istry Major students only. Wed to take this capstone course 2021: Y hension of the research project. Demog utilization and critical analysis / eval nt of data and results to synthesize agiate theories, principles, data and me emonstrate substantial additional work hension of the research project. Demomenstrate ability to compose mean and results to form appropriate conclustive organizational and presentational lete comprehension of the research p	CHEM3341, and CHEM3441, are see is their year 3 study. Examination Instrate very able analytical and critical the luation of information acquired from a wice opropriate and illuminating conclusions. Enthods. Employ very effective organizatic to beyond that is required in wider areas reconstrate able analytical and critical thinkingful comparisons between different sections. Compose general integration of the I skills. roject. Presence of some analytical and contents are seen as the section of the I skills.	No Exam hought with presence of de range of high quality Demonstrate integration onal and presentational elevant to the topic.] ing with use of relevant condary interpretations. neories, principles, data critical thinking with use	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	CHEM42 This cap The earl Y 2r A B	XXX) in the Chemistry Maj stone course is for Chemi iest that a student is allow and sem Offer in 2020 - 2 Show an extensive compreh some originality. Illuminating sources. Critical employmen of a wide range of appropris skills. [Work of A+ should de Show a substantial compreh information from sources. Dr. Correct utilization of data an and methods. Perform effect Show a general but incomple of relevant information from	ajor including CHEM3241, and istry Major students only. Wed to take this capstone course 2021: Y hension of the research project. Demog gutilization and critical analysis / eval nt of data and results to synthesize ariate theories, principles, data and me emonstrate substantial additional work hension of the research project. Demomentate ability to compose mean and results to form appropriate conclustive organizational and presentational lete comprehension of the research p	CHEM3341, and CHEM3441, are see is their year 3 study. Examination Instrate very able analytical and critical the luation of information acquired from a wice opropriate and illuminating conclusions. Enthods. Employ very effective organizatic to beyond that is required in wider areas reconstrate able analytical and critical thinkingful comparisons between different sections. Compose general integration of the I skills. roject. Presence of some analytical and contents are seen as the section of the I skills.	No Exam hought with presence of de range of high quality Demonstrate integration onal and presentational elevant to the topic.] ing with use of relevant condary interpretations. neories, principles, data critical thinking with use	
and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	This cap The earl Y 2r A B	stone course is for Chemi iest that a student is allow nd sem Offer in 2020 - 2 Show an extensive compreh some originality. Illuminating sources. Critical employmen of a wide range of appropria skills. [Work of A+ should de Show a substantial compreh information from sources. Du Correct utilization of data an and methods. Perform effect Show a general but incomple of relevant information from	istry Major students only. ved to take this capstone course. 2021: Y hension of the research project. Demo g utilization and critical analysis / eval nt of data and results to synthesize a iate theories, principles, data and me emonstrate substantial additional work hension of the research project. Dem Demonstrate ability to compose mean nd results to form appropriate conclu- tive organizational and presentational lete comprehension of the research p	Examination Examination Examination Instrate very able analytical and critical translation of information acquired from a wicopropriate and illuminating conclusions. Enthods. Employ very effective organization between the second that is required in wider areas nonstrate able analytical and critical thinkingful comparisons between different second compose general integration of the skills. Toject. Presence of some analytical and of the second control of t	No Exam nought with presence of de range of high quality Demonstrate integration and and presentational elevant to the topic.] ing with use of relevant condary interpretations. neories, principles, data critical thinking with use	
combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	The earl Y 2r A B	iest that a student is allow nd sem Offer in 2020 - 20 Show an extensive compreh some originality. Illuminating sources. Critical employmen of a wide range of appropria skills. [Work of A+ should de Show a substantial compreh information from sources. Du Correct utilization of data an and methods. Perform effect Show a general but incomple of relevant information from	ved to take this capstone course 2021: Y hension of the research project. Demo g utilization and critical analysis / eval nt of data and results to synthesize ar- jate theories, principles, data and me emonstrate substantial additional worh hension of the research project. Demo demonstrate ability to compose mean and results to form appropriate conclu- tive organizational and presentational lete comprehension of the research p	examination onstrate very able analytical and critical thuation of information acquired from a wic propriate and illuminating conclusions. I sthods. Employ very effective organization to beyond that is required in wider areas r onstrate able analytical and critical thinki ingful comparisons between different sec sions. Compose general integration of the I skills. roject. Presence of some analytical and of	nought with presence of de range of high quality Demonstrate integration onal and presentational elevant to the topic.] ing with use of relevant condary interpretations. neories, principles, data critical thinking with use	
Offer in 2019 - 2020 Grade Descriptors (A+ to F)	Y 2r A B	nd sem Offer in 2020 - 2 Show an extensive compreh some originality. Illuminating sources. Critical employmen of a wide range of appropris skills. [Work of A+ should de Show a substantial compreh information from sources. D. Correct utilization of data an and methods. Perform effect Show a general but incomple of relevant information from	2021: Y hension of the research project. Demo g utilization and critical analysis / eval nt of data and results to synthesize ar iate theories, principles, data and me emonstrate substantial additional work hension of the research project. Dem bemonstrate ability to compose mean nd results to form appropriate conclus- tive organizational and presentational lete comprehension of the research p	examination onstrate very able analytical and critical thuation of information acquired from a wic propriate and illuminating conclusions. I sthods. Employ very effective organization to beyond that is required in wider areas r onstrate able analytical and critical thinki ingful comparisons between different sec sions. Compose general integration of the I skills. roject. Presence of some analytical and of	nought with presence of de range of high quality Demonstrate integration onal and presentational elevant to the topic.] ing with use of relevant condary interpretations. neories, principles, data critical thinking with use	
Grade Descriptors (A+ to F)	B C	Show an extensive compreh some originality. Illuminating sources. Critical employmen of a wide range of appropris skills. [Work of A+ should de Show a substantial compreh information from sources. D. Correct utilization of data an and methods. Perform effect Show a general but incomple of relevant information from	nension of the research project. Demog g utilization and critical analysis / eval nt of data and results to synthesize ap iate theories, principles, data and me emonstrate substantial additional work hension of the research project. Dem Demonstrate ability to compose mean and results to form appropriate conclu- tive organizational and presentational lete comprehension of the research p	onstrate very able analytical and critical the luation of information acquired from a wide opropriate and illuminating conclusions. It sthods. Employ very effective organization to beyond that is required in wider areas re- onstrate able analytical and critical thinkingful comparisons between different sections. Compose general integration of the skills. roject. Presence of some analytical and of the control of the co	nought with presence of de range of high quality Demonstrate integration onal and presentational elevant to the topic.] ing with use of relevant condary interpretations. neories, principles, data critical thinking with use	
(A+ to F)	В	some originality. Illuminating sources. Critical employmen of a wide range of appropris skills. [Work of A+ should de Show a substantial compreh information from sources. D. Correct utilization of data an and methods. Perform effect Show a general but incomple of relevant information from	g utilization and critical analysis / eval nt of data and results to synthesize ap iate theories, principles, data and me memonstrate substantial additional work hension of the research project. Dem pemonstrate ability to compose mean nd results to form appropriate conclu- tive organizational and presentational lete comprehension of the research p	luation of information acquired from a wide propriate and illuminating conclusions. It sthods. Employ very effective organizations to beyond that is required in wider areas re- onstrate able analytical and critical thinkingful comparisons between different sec- sions. Compose general integration of the skills. Toject. Presence of some analytical and of	de range of high quality Demonstrate integration onal and presentational elevant to the topic.] ing with use of relevant condary interpretations. neories, principles, data critical thinking with use	
		of relevant information from				
_		Show a general but incomplete comprehension of the research project. Presence of some analytical and critical thinking with use of relevant information from sources. Demonstrate ability to compose comparisons between different interpretations. Mainly correct but some incorrect utilization of data and results to form appropriate conclusions. Demonstrate some partial integration of theories, principles, data and methods. Perform moderately effective organizational and presentational skills.				
-	D	Show a partial but limited comprehension, with knowledge of some relevant information, of the research project. Presence of some coherent and logical thinking, but with limited analytical and critical abilities. Show utilization and reference of several sources, but mostly via summary instead of by analysis and comparison. Limited ability to employ data and results to form appropriate conclusions. Demonstrate limited integration of theories, principles, data and methods. Perform limited or marginally effective organizational and presentational skills.				
	Fail	coherent thinking. Limited e results and/or unable to for methods. Organization and p	employment of secondary sources a	nce of little or lack of analytical and critic nd no critical comparison of them. Inco strate little or no integration of theories d use or ineffective.	rrectly utilize data and	
Course Type	Project-b	pased course				
Course Teaching	Activitie	es	Details		No. of Hours	
& Learning Activities	Reading	g / Self study	12 hrs tutorials; 46 hrs or reading/self study	of workshops and 100 hrs	158	
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Oral pre	sentation		50	CLO 1,2,3,4	
	Researc	ch report		50	CLO 1,2,3,4	
Required/recommende reading and online materials	d Reading	materials will be assigned	d depending on the project.			
Additional Course	0-4:-44	tory completion of this cou	iree will be counted towards th			
Information	Satistaci	iory completion of this cou	arse will be counted towards th	ne Capstone requirement.		

CHEM4911	Capstone experience for chemistry undergraduates: HKUtopia (6 credits)	Academic Year	2019
Offering Department	Chemistry	Quota	
Course Co-ordinator	Dr A P L Tong, Chemistry (apltong@hku.hk)		
Teachers Involved	(Various teachers in the Department, 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 learnt 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. No formal teaching. It is expected that students are actively engaged and should devote 120-140 hours to working						
Course Contents & Topics	on this pro	oject. will work in groups of to	d that students are actively engaged a wo or three, under the supervision of s. The time of running this project-bas	the course coordinator.	The duration of the		
Course Learning Outcomes	CLO 1 ob	serve and evaluate the	course, students should be able to: e various issues we are facing with and	d determine ways in which	ch chemistry can be		
	CLO 2 int		ns tice, and to understand limitations of tl llaborate with people with different bac	-			
			ffectively in both written and oral forms	•			
	CLO 5 de	evelop further logical, cr	ritical thinking and creativity				
	CLO 6 ac	lvocate to others the ap	preciation for chemistry as to its relev	ance to our daily life			
Pre-requisites (and Co-requisites and Impermissible combinations)	least 24 construction Students May. Late	tudents are expected to have satisfactorily completed all introductory chemistry disciplinary core courses and at ast 24 credits of advanced level disciplinary core/elective chemistry courses in the Chemistry Major. tudents who are interested in taking the course should contact the course coordinator for application in April - lay. Late application may not be considered. his capstone course is for Chemistry Major students only. he earliest that a student is allowed to take this capstone course is their year 3 study.					
Offer in 2019 - 2020		nmer Offer in 2020 - 2	•	Examination	No Exam		
Grade Descriptors (A+ to F)	В	original thought. Insightful to quote/reference aptly. Cfull range of appropriate the skills. [Work of A+ should start and to quote/reference aptheories, principles, eviden Demonstrate general but in Use of relevant information quote/reference aptly. Mos partial integration of theories skills.	sp of the subject. Show strong analytical and use and critical analysis / evaluation of informat irritical use of data and results to draw approprieories, principles, evidence and techniques. A show considerable additional work beyond that is grasp of the subject. Evidence of analytical an sources, showing ability to make meaningful coolty. Correct use of data of results to draw a ce and techniques. Apply effective organization incomplete grasp of the subject. Evidence of so on from sources, showing ability to make costly correct but some erroneous use of data and sets, principles, evidence and techniques. Apply	ion drawn from a full range of and insightful conclusions. pply highly effective organizat is required in wider areas releved critical abilities and logical mparisons between different spropriate conclusions. Show all and presentational skills. The me analytical and critical ability organizations between different desults to draw appropriate of moderately effective organizations.	high quality sources and Show integration of the ional and presentational ant to the topic.] thinking. Critical use of econdary interpretations or general integration of ties and logical thinking. interpretations and to conclusions. Show some ional and presentational		
	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. 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						
	raii	analytical and critical abilit them. Misuse of data and r	ties, logical and coherent thinking. Limited use results and/or unable to draw appropriate conclu- chniques. Organization and presentational skills	e of secondary sources and nusions. Show little or no or ina	o critical comparison of ot integration of theories,		
Course Type		ised course					
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities		vith supervisor	Tutorials		10		
		Self study			60		
Accommont Mathad	Assessm	eni	Group work or project	\A/-:	70		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Oral pres		40% Presentation; 10% Participation; 10% Peer evaluation	60	CLO 1,2,3,4,5,6		
,	Research	•		40	CLO 1,2,4,5,6		
Required/recommended reading and online materials			references. Students are encouraged and discussions with classmates and		ia various channels		
Additional Course	Enrolment	t of this course is not co	onducted via the online course selecti	on avetem and abould b	1 0 1 0		

CHEM4966	Chemistry internship (6 credits)	Academic Year	2019					
Offering Department	Chemistry	Chemistry Quota						
Course Co-ordinator	Dr H Y Au-Yeung, Chemistry (hoyuay@hku.hk)							
Teachers Involved	(Dr H Y Au-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	 - 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 							
Course Learning Outcomes	be instructed by the External Supervisor, with prior agreement of the Internal Supervisor. On successful completion of this course, students should be able to: CLO 1 apply knowledge in their major study in solving practical problems in the work place CLO 2 gain first hand work experience in the industry related to their major study							
Pre-requisites (and Co-requisites and Impermissible	Pass in at least 24 credits of advanced level disciplinary core/elective chemestal CHEM4XXX) in the Chemistry Major. This capstone course is for Chemistry Major/ Chemistry Major (Intensive) students.	,	(CHEM3XXX or					

combinations)	The earliest that a student is allowed to take this capstone course is their year 3 study.					
Offer in 2019 - 2020	Y 1st	sem 2nd sem	Summer	Offer in 2020 - 2021 : Y	Examination	No Exam
Grade Descriptors (Pass /Pass with distinction /Fail)	Pass	assigned by super the job. Successfu	visor(s). Esta lly fulfills the	e problems in the workplace. Successfull blishes effective collaboration and comr requirements set out in the Course Desc), etc. Students demonstrating excellent	nunication with supervisor(s), corription regarding working hours	olleagues, and clients in , written and oral report,
	Fail	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.				
Course Type	Internship					
Course Teaching	Activities	3	D	etails	No. of Hours	
& Learning Activities	Internship work			is expected that students are to r the equivalent of 4 weeks full-ti	160	
Assessment Methods and Weighting	Methods		D	etails	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Written report			ritten report, employer's edback and oral presentation	100	CLO 1,2
Additional Course Information	be record interested Enrolment	feedback and oral presentation Satisfactory completion of this course can be counted towards the Capstone requirement. Details of internship per recorded on the student's transcript. This course will be assessed on "Pass/Fail" basis. Students who anterested 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 relevant Department/School office after approval has been obtained from the course coordinator.				

CHEM4999	Chemist	ry project (12 credit	s)	Academic Yea	r 2019	
Offering Department	Chemistry	, ` `	•	Quota		
Course Co-ordinator	Dr J Y Tar	ng, Chemistry <i>(jinyao</i> @h	ku.hk)	'		
Teachers Involved	(Various te	eachers in the Departme	nt,Chemistry)			
Course Objectives			ch techniques by working on a sho ld prepare students for graduate sch		t supervision of a	
Course Contents & Topics	A short re	search project provided I	by a member of staff (e.g. the stude	nts supervisor).		
Course Learning	On succes	ssful completion of this c	ourse, students should be able to:			
Outcomes	CLO 2 de	emonstrate knowledge a eir own chemical project		techniques they used to d	to the research in	
	of	the research	ng skill in their own research project			
	the	e broader research area	nd understanding of the results of t			
		emonstrate ability to inte nowledge of designing re	grate the knowledge acquired from search plan	previous courses and de	velop fundamenta	
Pre-requisites (and Co-requisites and Impermissible	CHEM4XX	is in at least 24 credits of advanced level disciplinary core/elective chemistry courses (CHEM3XXX or EM4XXX) in the Chemistry Major including CHEM3241, and CHEM3341, and CHEM3441, and CHEM3541. In capstone course is for Chemistry Major/ Chemistry Major (Intensive) students only.				
combinations)			ed to take this capstone course is the			
Offer in 2019 - 2020		ar long Offer in 2020 - 2	•	Examination	No Exam	
Grade Descriptors (A+ to F)	В	some originality. Illuminating sources. Critical employmen of a wide range of appropria skills. [Work of A+ should de	ension of the research project. Demonstrate utilization and critical analysis / evaluation of t of data and results to synthesize appropria ate theories, principles, data and methods. I umonstrate substantial additional work beyon tension of the research project. Demonstrate	of information acquired from a wicte and illuminating conclusions. In Employ very effective organization that is required in wider areas re	de range of high quality Demonstrate integration onal and presentationa elevant to the topic.]	
	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.					
	Show a general but incomplete comprehension of the research project. Presence of some analytical and critical thinking with use of relevant information from sources. Demonstrate ability to compose comparisons between different interpretations. Mainly correct but some incorrect utilization of data and results to form appropriate conclusions. Demonstrate some partial integration of theories, principles, data and methods. Perform moderately effective organizational and presentational skills.					
	Show a partial but limited comprehension, with knowledge of some relevant information, of the research project. Presence of some coherent and logical thinking, but with limited analytical and critical abilities. Show utilization and reference of several sources, but mostly via summary instead of by analysis and comparison. Limited ability to employ data and results to form appropriate conclusions. Demonstrate limited integration of theories, principles, data and methods. Perform limited or marginally effective organizational and presentational skills.					
		effective organizational and i		nciples, data and methods. Perfor	ta and results to form	
	Fail	Show little or no comprehen coherent thinking. Limited e results and/or unable to for methods. Organization and p		ttle or lack of analytical and critic critical comparison of them. Inco ttle or no integration of theories	ta and results to form m limited or marginally cal abilities, logical and rrectly utilize data and	
	Project-ba	Show little or no comprehen coherent thinking. Limited e results and/or unable to for methods. Organization and pased course	presentational skills. sion of the research project. Evidence of life employment of secondary sources and no crm appropriate conclusions. Demonstrate lipresentational skills are of very limited use or	ttle or lack of analytical and critic critical comparison of them. Inco ttle or no integration of theories	ta and results to form rm limited or marginally cal abilities, logical and rrectly utilize data and s, principles, data and	
Course Teaching		Show little or no comprehen coherent thinking. Limited e results and/or unable to for methods. Organization and pased course	presentational skills. sion of the research project. Evidence of life imployment of secondary sources and no crrn appropriate conclusions. Demonstrate life presentational skills are of very limited use or Details	ttle or lack of analytical and critic pritical comparison of them. Inco ttle or no integration of theories ineffective.	ta and results to form m limited or marginally cal abilities, logical and rrectly utilize data and	
Course Teaching	Project-ba	Show little or no comprehen coherent thinking. Limited e results and/or unable to for methods. Organization and pased course	presentational skills. sion of the research project. Evidence of life employment of secondary sources and no crm appropriate conclusions. Demonstrate lipresentational skills are of very limited use or	ttle or lack of analytical and critic pritical comparison of them. Inco ttle or no integration of theories ineffective.	ta and results to form rm limited or marginally cal abilities, logical and rrectly utilize data and s, principles, data and	
Course Teaching & Learning Activities Assessment Methods	Project-ba	Show little or no comprehen coherent thinking. Limited e results and/or unable to for methods. Organization and p sed course	presentational skills. presentational skills. presentational skills. presentational skills are of tevidence of life amployment of secondary sources and no correct appropriate conclusions. Demonstrate life presentational skills are of very limited use or presentational skills.	ttle or lack of analytical and critic pritical comparison of them. Inco ttle or no integration of theories ineffective.	ta and results to form m limited or marginally cal abilities, logical and rrectly utilize data and s, principles, data and No. of Hours 192 Assessment Methods	
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	Project-ba Activities Reading /	Show little or no comprehen coherent thinking. Limited e results and/or unable to for methods. Organization and pased course Self study	presentational skills. presentational skills. presentational skills. presentational skills are of the transpropriate conclusions. Demonstrate libroresentational skills are of very limited use or presentational skills.	ttle or lack of analytical and critical comparison of them. Incottle or no integration of theories ineffective. or longer discussions & Weighting in final	ta and results to form m limited or marginally cal abilities, logical and rrectly utilize data and s, principles, data and No. of Hours 192 Assessment	
Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended reading and	Project-ba Activities Reading / Methods	Show little or no comprehen coherent thinking. Limited e results and/or unable to for methods. Organization and pised course Self study	presentational skills. Ision of the research project. Evidence of lit ision of the research project. Evidence of lit imployment of secondary sources and no of imappropriate conclusions. Demonstrate lit presentational skills are of very limited use or Details 8 hours per week for 24 weeks of meetings Details including a written report and an oral presentation	ttle or lack of analytical and critic pritical comparison of them. Inco ttle or no integration of theories ineffective. or longer discussions & Weighting in final course grade (%)	ta and results to form mimited or marginalitial abilities, logical and rectly utilize data and s, principles, data and No. of Hours 192 Assessment Methods to CLO Mapping	
Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended	Project-ba Activities Reading / Methods Dissertati Specialist	Show little or no comprehen coherent thinking. Limited e results and/or unable to for methods. Organization and pased course Self study on texts dependant on the selections.	presentational skills. Ision of the research project. Evidence of lit ision of the research project. Evidence of lit imployment of secondary sources and no of imappropriate conclusions. Demonstrate lit presentational skills are of very limited use or Details 8 hours per week for 24 weeks of meetings Details including a written report and an oral presentation	ttle or lack of analytical and critical comparison of them. Incottle or no integration of theories ineffective. or longer discussions & Weighting in final course grade (%)	ta and results to form limited or marginal cal abilities, logical an rrectly utilize data ans, principles, data an No. of Hours 192 Assessment Methods to CLO Mapping	

CSCI9001	Practica	ctical Chinese for science students (6 credits) Academic Year 2019			r 2019		
Offering Department	Chinese		•	Quota			
Course Co-ordinator	Mr K W W	Mr K W Wong, Chinese (kwwongb@hku.hk)					
Teachers Involved	(Dr K T La (Dr S F Le	(Dr C M Chan, Chinese) (Dr K T Lam, Chinese) (Dr S F Lee, Chinese) (Mr K W Wong, Chinese)					
Course Objectives	students t	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 constitution.					
Course Contents & Topics	good-news	s and goodwill messag documents: emails; p	rn Chinese - The Chinese writing syst ges, bad-news messages, and pers resentations - Styles and rhetoric	uasive messages - Tecl	nniques of writing		
Course Learning	On succes	ssful completion of this c	course, students should be able to:				
Outcomes	CLO 1 de	evelop a balanced compe	etency in modern Chinese and write v	vell-formed sentences			
			and stylistics, as well as practical writ		•		
		•	nmunication, initiate discussions and				
			wledge and their Chinese writing skil		ntation techniques		
		alytically, critically and c	creatively in different social or profess	ional discourses			
Pre-requisites (and Co-requisites	NIL						
and Impermissible							
combinations)							
Offer in 2019 - 2020	Y 1st	sem 2nd sem Offer	in 2020 - 2021 : Y	Examination	Dec May		
Grade Descriptors	A		erb ability to achieve the intended learning out				
(A+ to F)	apply, evaluate, and synthesize the language techniques for effective communication in all situations. B The student acquired the ability to achieve the intended learning outcomes of the course at all levels of learning: describe, apply,						
	evaluate, and synthesize the language techniques for effective communication in most situations. The student acquired adequate ability to achieve the intended learning outcomes of the course at low levels of learning (i.e. describe and apply the language techniques for effective communication) but not at high levels of learning (i.e. evaluate and synthesize the language techniques for effective communication).						
	D The student only has basic familiarity with the subject.						
	Fail	The student has very limited	familiarity with the subject.				
Course Type	Lecture-ba	ased course					
Course Teaching	Activities	S	Details		No. of Hours		
& Learning Activities	Lectures				12		
	Tutorials		Small group tutorials				
	Group work		144		12		
	Discussion		Workshops		12 24		
		n			24 24		
	Reading /	n Self study	Reading/self study (20 hours) and p	reparation (12 hours)	24 24 32		
	Reading / Assessme	n Self study	Reading/self study (20 hours) and p		24 24		
Assessment Methods and Weighting	Reading /	n Self study		reparation (12 hours) Weighting in final course grade (%)	24 24 32		
	Reading / Assessme	n Self study ent	Reading/self study (20 hours) and p Details Self-access & online exercises (40%) and Tutorial disscussion	Weighting in final	24 24 32 16 Assessment Methods		
	Reading / Assessme Methods	n Self study ent ents	Reading/self study (20 hours) and p Details Self-access & online exercises	Weighting in final course grade (%)	24 24 32 16 Assessment Methods		

EASC1020	Introdu	iction to climate sci	ience (6 credits)	Academic Yea	ar 2019		
Offering Department	Earth Sc			Quota			
Course Co-ordinator	Dr Z H L	⁻ Z H Liu, Earth Sciences <i>(zhliu</i> @ <i>hku.hk)</i>					
Teachers Involved		(Dr S H Li,Earth Sciences) (Dr Z H Liu,Earth Sciences)					
Course Objectives	controls geologic	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	geologic	Global climatic systems, climate classification, natural variability of climate, physical causes for changes through 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 globa					
Course Learning		essful completion of this	s course, students should be a	ble to:			
Outcomes	CLO 1		s of climatology and approache				
	CLO 2		nd physical processes controlling	e ,			
	CLO 3		g forces of Earth's climate cha				
	CLO 4		of Earth's climate change	3			
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL	j	J				
Offer in 2019 - 2020	Y 2r	nd sem Offer in 2020 -	- 2021 : Y	Examination	No Exam		
Grade Descriptors (A+ to F)	A	learning outcomes. Show knowledge to a wide rang appropriate and insightfu	v strong critical abilities and logical ge of complex, familiar and unfamilia	nsive knowledge and skills required for thinking, with evidence of original thoug r situations. Demonstrate critical use of c nd critical analysis / evaluation of inform	ht, and ability to apply lata and results to draw		
	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. 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 e of analytical and critical problems. Demonstrate	vidence of command of knowledge ar abilities, logical and coherent thinki	nd skills required for attaining the course l ng. Show very little or no ability to app unable to draw appropriate conclusions	oly knowledge to solve		
Course Type	Lecture-l	based course					
ourse Teaching	Activitie	es	Details		No. of Hours		
Learning Activities	Lectures	3			36		
	Tutorials	3			12		
	Project v	work			36		
	Reading	g / Self study			50		
Assessment Methods and Weighting	Method	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignm	nents		50	CLO 2,3		
	Essay			50	CLO 1,2,3,4		
Required/recommended reading and online materials		Essay 50 CLO 1,2,3,4 Ruddiman, W. F.: Earth's Climate Past and Future (W. F. Freeman, 2008, 2nd edition) Robert V. Rohli and Anthony J. Vega: Climatology (Jones and Bartlett Publishers, 2008)					

EASC1401	Blue Planet (6 credits) Academic Year 2019					
Offering Department	Earth Sciences Quota					
Course Co-ordinator	Dr P Bach, Earth Sciences (pabach@hku.hk)					
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	The 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,					
Geological Hazards, Climate Change, Human Impact and Environmental Changes) 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 Science CLO 2 demonstrate knowledge and understanding of the underlying concepts associated with the study Earth Systems and their dynamic interactive processes CLO 3 understand the extent and nature of global change and environmental concerns around us CLO 4 demonstrate the ability to make and record observations on Earth Systems processes in nature						

	environments					
	CLO 5 d	levelop skills to synthesiz	e observation and knowledge in a	report in essay form		
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL					
Offer in 2019 - 2020	Y 1s	t sem 2nd sem Offer	in 2020 - 2021 : Y	Examinatio	n Dec May	
Grade Descriptors (A+ to F)	Α					
	В	attaining most of the course some abilities to apply and effective observational skill draw appropriate and insigh	ommand of knowledge / competencies/s learning outcomes. Shows evidence for u d relate them in a range of complex inter s in field as well as organizational skills to ltful conclusions with some level of depth.	nderstanding of introductory ter ractive processes between Ear o present important observation	minology and concepts and the Systems. Demonstrates and uses them to	
	С	required for attaining most and concepts and some ab moderately effective observed.	incomplete command of knowledge / co of the course learning outcomes. Shows ev illities to apply and relate them in some int rational skills in field as well as organization results to draw appropriate conclusions.	vidence for some understanding eractive processes between Ea onal skills to present observation	of introductory terminology rth Systems. Demonstrates	
	D Demonstrate partial but limited command of knowledge / competencies/skills at an Earth Science introductory level required for attaining some of the course learning outcomes. Shows evidence of limited understanding of introductory terminology and concepts and limited abilities to apply and relate them in some interactive processes between Earth Systems. Demonstrates limited observational skills in field. Applies limited or barely effective organizational and presentational skills to present observed details and facts correctly. Limited ability to draw appropriate conclusions.					
	Fail	for attaining the course le concepts and little or no ab observational skills in field.	dence of command of knowledge / competeraning outcomes. Shows little or no evi- litities to apply and relate them in interaction incherent organizational and poce to draw appropriate conclusions.	dence of understanding of into we processes between Earth Sy	oductory terminology and estems. Demonstrates poo	
Course Type	Lecture v	vith laboratory componer	nt course			
Course Teaching	Activitie	s	Details		No. of Hours	
& Learning Activities	Lectures				24	
	Laborato	•			24	
	Field wo	rk	Compulsory 2-day field camp		16	
	Reading	/ Self study			100	
Assessment Methods and Weighting	Methods	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Examina	ation		40	CLO 1,2,3	
	Laborato	ory reports		20	CLO 1,2,4	
	Project report		Field project report and field note book	30	CLO 1,2,3,4,5	
	Test		Online Quizzes	10	CLO 1,2,3	
Required/recommended reading and online materials		est Online Quizzes 10 CLO 1,2,3 cinner B.J and Murck B.W. : The Blue Planet (2011) urphy, B and Damian N.: Earth Science Today (1999)				

EASC1402	Principle	s of geology (6 credits)	A	Academic Year	2019	
Offering Department	Earth Scie	nces		Quota		
Course Co-ordinator	Prof M Sur	n, Earth Sciences (minsun@hku.hk)				
Teachers Involved	(Dr M C CI	g,Earth Sciences) neung,Earth Sciences) n,Earth Sciences)				
Course Objectives			es and concents in geology			
Course Contents & Topics	This course is an introduction to fundamental principles and concepts in geology. - Earth's formation, history and geological time scale - Rocks and rock cycle - Plate tectonics: a unifying theory - Earthquakes and Earth's interior - Igneous processes and igneous rocks - Geomorphology and surficial processes - Sedimentary rocks - Folds, Faults and Metamorphism - Metamorphic rocks - Principles of stratigraphy; stratigraphic dating methods - Biostratigraphic methods; fossils and index fossils - Padigmetric dating methods					
Course Learning Outcomes	CLO 1 r CLO 2 c CLO 3 e CLO 4 c	CLO 2 describe the overall structure of the earth and the key external and internal processes CLO 3 explain the major geological phenomena in the context of plate tectonics theory CLO 4 describe the methods in geological dating				
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL	· ·				
Offer in 2019 - 2020	Y 1st	sem Offer in 2020 - 2021 : Y	E	xamination	Dec	
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced le learning outcomes. Show strong analytical and crititot apply knowledge to a wide range of complex, presentational skills.	cal abilities and logical thinking, with	n evidence of origina	al thought, and ability	
	В	Demonstrate substantial command of a broad rang	e of knowledge and skills required	for attaining at leas	t 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 i outcomes. Show evidence	ncomplete command of knowledge	and skills required for attaining most is and logical thinking, and ability to a		
	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 critical a	emonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to soblems. Organization and presentational skills are minimally effective or ineffective.			
Course Type	Lecture w	vith 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	3	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Examina	tion	2-hour written exam	40	CLO 1,2,3,4,5	
	Laboratory reports		Practical/field reports	40	CLO 1,2,3,4,5	
	Project report		Presentation and report	20	CLO 1,2,3,4,5	
Required/recommended reading and online materials	Tarbuck E	buck E.J. and Lutgens F.K.: The Earth: An Introduction to Physical Geology (latest edition)				

EASC1403	Geological heritage of Hong Kong (6 credits) Academic Ye			ear 2019		
Offering Department	Earth Sc			Quota	35	
Course Co-ordinator	Prof M F	Prof M F Zhou, Earth Sciences (mfzhou@hku.hk)				
Teachers Involved		Cheung,Earth Scie F Zhou,Earth Scien				
Course Objectives			e geology of Hong Kong, potential go of Hong Kong's infrastructure.	eological resources for tou	rism and the role o	
Course Contents & Topics	knowled	ge pertaining to lar	ogy of Hong Kong, geology of Hong K ge scale construction project plus at le to localities of geological interest.			
Course Learning	On succ	essful completion of	f this course, students should be able to	0:		
Outcomes	CLO 1 a	acquire an apprecia	tion of the processes leading to the for	mation of various landforms		
	CLO 2 d	demonstrate unders	tanding of the major morphological fea	tures in Hong Kong		
	CLO 3 e	enhance the observ	ation and analytical skills, and physical	ability through participation	in the field excursion	
	CLO 4 L	understanding the d	ifferent impacts on / importance of geo	logical heritage of Hong Ko	ng	
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL					
Offer in 2019 - 2020	Y 2r	nd sem Offer in 20	20 - 2021 : Y	Examination	n 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.					
	В					
	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 cr abilities, logical and coherent thinking. Very little or no ability for field observation and for solving problems. Poor organization and presentational skills.				
Course Type	Lecture-l	based course				
Course Teaching	Activitie	es	Details	Details		
& Learning Activities	Lectures	3	6 sessions x 2 hours	6 sessions x 2 hours		
	Field wo	ork	4 field trips		32	
	Group w		1 presentation and report	1 presentation and report		
		g / Self study				
	Assessr	ment	1 essay	1 essay		
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignm	nents	attendance of compulsory guided field trips	15	CLO 1,2,3,4	
	Essay		1 individual essay	15	CLO 1,2,3,4	
	Examina	ation	2-hour written examination	50	CLO 1,2,4	
	Project r	report	1 group project	20	CLO 1,2,3,4	

EASC1404	Early life on earth (6 credits)	Academic Year	2019
Offering Department	Earth Sciences	Quota	50
Course Co-ordinator	TBC, Earth Sciences ()		

Teachers Involved					
Course Objectives	This course focuses on the origins of life. It provides an overview of Earth's early environments, how life is thought to have originated on Earth, and how the Earth's dynamic environment impacted the origin of life. This course will also provide a basic overview of habitable environments on Earth and elsewhere in the Solar system.				
Course Contents & Topics	oceans; t Solar sys	the central role of water stem; possible conditions	ving topics: the composition and pr in life; abundance of biological elem for the synthesis of life's first buildir signatures in the solar system and b	nents on the early Earthing blocks; the (geo)chem	and elsewhere in the
Course Learning	On succe	essful completion of this	course, students should be able to:	•	
Outcomes			al and chemical conditions on the ea	•	
	m	nolecules	role of water and extreme geocher		
			lifferent geological environments pla		life
		dentify challenges associ nvestigate a current origi	iated with each step in the origins of	lite	
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL				
Offer in 2019 - 2020	N Of	fer in 2020 - 2021 : N		Examination)
Grade Descriptors (A+ to F)	B C D	learning outcomes. Shows ability to apply his/her know combine knowledge from Student shows the ability to Student demonstrates subscourse learning outcomes. range of problems in the fie to better understand poterorganizational and presents Student demonstrates genlearning outcomes. Show knowledge to a range of progranizational and presents Student demonstrates part outcomes. Show evidence ability understand key top organizational and presents Student demonstrates little.	eral but incomplete command of knowledg evidence of some analytical and critical ab problems in the field of the "origins of life". ational skills. iial but limited command of knowledge and so of some coherent and logical thinking, but pics in the "origins of life" field. Student so	gical thinking, with evidence of other around "origins of life" top toential early Life processes sentational skills. sidge and skills required for atta early and appable to combine knowledge sewhere. Student shows the eand skills required for atta illities and logical thinking, are student shows the ability to a skills required for attaining sor with limited analytical and critishows the ability to apply lire and skills required for attaining sor with limited analytical and critishows the ability to apply lire and skills required for attaining sor with limited analytical and critishows the ability to apply lire and skills required for attaining sor with limited analytical and critishows the ability to apply lire and skills required for attaining sor with standard s	f original thought, and the ics, and at the same, can on Earth and elsewhere. an aining at least most of the ply his/her knowledge to a from the natural sciences ability to apply effective ining most of the course in ability to apply his/her pply moderately effective me of the course learning cal abilities. Show limited inted or barely effective ining the course learning the course l
Cauraa Turaa	Lasturau		related to the origins of life. Organization and	presentational skills are minim	ally effective or ineffective.
Course Type Course Teaching	Activitie	vith laboratory componer	Details		No. of Hours
& Learning Activities	Lectures		Details	24	
.	Laborato				24
	Reading	/ Self study			100
Assessment Methods and Weighting	Methods	5	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignm	ents	1 midterm, group presentations, short-essay	60	
	Examina		2-hour written examination	40	
Required/recommended reading and online materials	K.W. Plax	Examination 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) I. Gilmour & M.A. Sephton: An Introduction to Astrobiology (Cambridge University Press, 2004)			

EASC1405	Peacef	ul use of nuclear technologies (6 credits)	Academic Year	2019			
Offering Department	Earth Sc	iences	Quota				
Course Co-ordinator	Dr S H L	i, Earth Sciences <i>(shli@hku.hk)</i>					
Teachers Involved	(Dr S H I	_i,Earth Sciences)					
Course Objectives		de students with the science backgrounds and knowledge on appli o invoke an awareness of current applications of nuclear sciences b		nnologies in daily			
Course Contents & Topics	engineer	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	On succe	essful completion of this course, students should be able to:					
Outcomes	CLO 1 r	ecognize 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						
		demonstrate the knowledge and understanding of the underlying echnologies	g concepts associate	ed with nuclear			
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL						
Offer in 2019 - 2020	N O	ffer in 2020 - 2021 : Y	Examination				
Grade Descriptors (A+ to F)	Α	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	Demonstrate general but incomplete command of knowledge and skills requi outcomes. Show evidence of some analytical and critical abilities and logical the					

Course Type	D Demonstrate partial Show evidence of s knowledge to solve Fail Demonstrate little o of analytical and co	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 Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited 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 ou of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge problems. Organization and presentational skills are minimally effective or ineffective.				
Course Teaching	Activities	Details		No. of Hours		
& Learning Activities	Lectures	Bottano		36		
•	Tutorials			12		
	Field work			6		
	Group work			6		
	Project work			6		
	Reading / Self study			92		
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments	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 announced					

EASC1406	Introduc	ction to the earth-li	ife system (6 credits)	Academic Ye	ar 2019
Offering Department	Earth Scie				
Course Co-ordinator	Dr S Crow	ve, Earth Sciences (sa	crowe@hku.hk)		
Teachers Involved	(Dr S Crov	we,Earth Sciences)			
Course Objectives	biological deep geo	interpretations on the	with an introduction to the biosphe co-evolution of the biosphere, at nt Earth-Life interactions with the	mosphere, hydrosphere and	geosphere through
Course Contents & Topics			n cycle; plate tectonics, climate life; life in the Phanerozoic; the Ea		
Course Learning Outcomes	CLO 1 ur tir CLO 2 ex CLO 3 ur	ne oplain why the Earth is nderstand the biologica	e living world on Earth throu rn and past Earth system		
Pre-requisites (and Co-requisites		nalyse qualitatively que	and understanding of the natural o		
and Impermissible combinations)					
Offer in 2019 - 2020	Y 2nd	sem Offer in 2020 -		Examination	No Exam
Grade Descriptors (A+ to F)	A Demonstrate thorough and complete grasp of the subject in order to fulfil most or all learning outcomes. understanding of the connections between the geosphere, hydrosphere and biosphere of the modern Earth and in past. Able to understand the interactions between human beings and the nature only happens as the latest process Demonstrate understanding at an advanced level of extensive knowledge and skills with evidence for attaining learning outcomes. Show understanding of the connections between the geosphere, hydrosphere and biosphere Earth and in the geological past. Can demonstrate the interactions between human being and the nature only latest geological time. C Demonstrate general but incomplete understanding required for attaining most of the course learning outcomes. Sof 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 evide coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to solve problems 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 critical abilities, logical and coherent thinking. Very little or no ability for solving problems. Poor organization and skills.				arth and in the geological set processes on Earth. attaining all the course biosphere of the modern ature only happen in the atcomes. Show evidence tation skills. Show evidence of some a problems. Apply limited at Lack of analytical and
Course Type	_	ased course			
Course Teaching & Learning Activities	Activities Lectures Tutorials Reading / Self study		Details No.		No. of Hours 36 12 100
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 (C	ambridge Universit

EASC2401	Fluid/solid interactions in earth processes (6 credits)	Academic Year	2019
Offering Department	Earth Sciences	Quota	
Course Co-ordinator	Dr K H Lemke, Earth Sciences (kono@hku.hk)		
Teachers Involved	(Dr K H Lemke,Earth Sciences)		

Course Objectives	This cours	This course provides an overview of the physical and chemical principles that govern Earth processes				
Course Contents	List topics	s with approximate numb	per of weeks			
& Topics	- Earth in	the laboratory, scaling ti	me and space (1)			
			and the concept of equilibrium (2)			
			s - sublimation, condensation, crystall	sation and melting (2)		
		solution interfaces (1)				
			onments: convection, conduction and i			
		•	ppe fractionation on geological time sc	ales(1)		
		an mechanics and basic	` '			
		w and particle transport (· ,			
Course Learning		ional, geostrophic and ce	course, students should be able to:			
Outcomes			es of equilibrium thermodynamics as a	policed to the Earth Scien	ncoc	
Outcomes			splain processes of fluid/solid interacti	• •		
		se priase diagrams to ex nd solids	tplain processes of huld/solid interacti	ons, in particular syster	ns containing mens	
	CLO 3 de	escribe how energy is ex	changed throughout the Earth Systen	٦,		
		emonstrate an understar nd across fluid/solid and	nding of principles governing isotope e	xchange reactions in si	ngle phase systems	
			s of motion and the basic forces affect	ting movement of gases	s liquids and solids	
		n Earth	o or motion and the basic forces affect	ang movement or gase.	o, ilquius una solius	
Pre-requisites		ASC1401 or EASC1402				
(and Co-requisites and Impermissible combinations)	1 435 111 2	1 833 III EAGG 1407 OF EAGG 1402				
Offer in 2019 - 2020	Y 2nd	d sem Offer in 2020 - 2	0021 · V	Examination	No Exam	
Grade Descriptors	A 2110		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.					
	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. 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		dence of command of knowledge and skills req		learning outcomes. Lack	
	4	of analytical and critical at	bilities, logical and coherent thinking. Show by presentational skills are minimally effective or i	very little or no ability to ap		
Course Type	Lecture w	ith laboratory componen	t course			
Course Teaching	Activities	s	Details		No. of Hours	
& Learning Activities	Lectures		12 sessions x 2 hour		24	
	Laborato	ry	paper exercises		24	
	Reading	/ Self study			100	
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Project re	eport	3 projects	45	CLO 1,2,3,4,5	
		-p*	Two in-class examination (one for			
	Test		15% and another one for 40%)	55	CLO 1,2,3,4,5	
Required/recommended reading and	Academic	Press	ics for Geoscientists, (2012) Bruce Fe		'	
online materials	Kevin Hef	evin Hefferan, John O'Brien (2010) Earth Materials, John Wiley & Sons				

EASC2402	Field a	nd laboratory methods (6 credits)	Academic \	ear	2019		
Offering Department	Earth S	iences	Quota		40		
Course Co-ordinator	Dr J A k	ng, Earth Sciences (jessking@hku.hk)					
Teachers Involved	,	(ing,Earth Sciences) Cheung,Earth Sciences)					
Course Objectives	This course is hands-on field and laboratory-based that introduces basic geological and geomorphological field and mapping techniques and the use of geological equipment and air photographs, an overview of the geology and natural environment of Hong Kong.						
Course Contents & Topics	- Interp structur unconfo - Interp - Field o - Field o	- Maps and map reading, map reference system (lectures and class practice) - Interpretation of geological and topographic maps: topographic and geological cross sections, geological structures from outcrop patterns and structural contour lines (horizontal, inclined strata, folded, and faulted strata, unconformities (lectures and class practice) - Interpretation and use of air photographs (class practice) - Field observation and description of rocks, outcrops (with fieldtrips in Hong Kong) - Field observation and description of landscape units (with fieldtrips in Hong Kong)					
Course Learning Outcomes	 Laboratory equipment and technicues (lectures and lab sessions) On successful completion of this course, students should be able to: CLO 1 read geological maps and comprehend 3-D geological structures from 2-D geological maps CLO 2 construct a geological cross section showing interpreted subsurface rocks and structures, a landscape units CLO 3 demonstrate techniques for basic field observations, measurements and identifications CLO 4 create and interpret an internally consistent geological and landscape maps from a set of coll observations and data CLO 5 develop skills in integrating geological field data in determining a geological and landscape h writing a structured field report CLO 6 understand to the basics of a series of laboratory techniques for geological and environmental si 						

Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	ASC1401 or EASC1402				
Offer in 2019 - 2020	Y 1st	sem Offer in 2020 - 20	021 : Y	Examination	No Exam	
Grade Descriptors (A+ to F)	Α	Demonstrate thorough and complete grasp of the subject in order to fulfill most or all learning outcomes. Shows strong ability to record observations on earth processes in the field and to apply knowledge to familiar and unfamiliar situations. Evidence of strong independent analytical, critical and logical thinking. Show strong ability to synthesize all observations made and knowledge in a field report and geological map with highly 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.				
	С	Demonstrate general but incomplete grasp of the subject required for most of the learning outcome. Evidence of some ability to 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 field report and geological map with moderately effective organizational and presentational skills.				
	D	Demonstrate partial but limited grasp of the subject required for most of the learning outcome. Evidence of limited ability to record observations on earth processes in the field and limited application of knowledge to solve problems. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to synthesize some observations made and knowledge in a field report and geological map with barely effective organizational and presentational skills.				
	Fail	observations on earth procellittle or lack of analytical	asp of the subject required for most of the seses in the field and show very little or and critical abilities, coherent and logowledge in a field report and geological	no ability to apply knowledge to solvical thinking. Shows very little or	ve problems. Évidence of no ability to synthesize	
Course Type	Field cam	ps				
Course Teaching	Activities	3	Details		No. of Hours	
& Learning Activities	Lectures		12 sessions x 1 hour		12	
	Field worl	<	5-day field camp & 2 day trips		56	
	Laborator	v work	12 hours paper exercises		12	
		Self study			100	
Assessment Methods and Weighting	Methods	<u> </u>	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents	Lab Assignments	10	CLO 1,2	
	Report		Field Work Assessment	70	CLO 2,3,4,5	
	Test			20	CLO 1,2	
Required/recommended reading and online materials		ensive Course Notes pro les: Basic Geological Ma	ovided. apping (Wiley, 1995, 3rd edition))		

EASC2404	Introdu	ction to atmosphere and hydrosphere (6 credits)	Academic Year	2019			
Offering Department	Earth Sci		Quota	50			
Course Co-ordinator	Dr J R Ali	i, Earth Sciences (jrali @hku.hk)					
Teachers Involved	(Dr J R A	ang,Earth Sciences) di,Earth Sciences)					
Course Objectives	This cour with one	rse introduces the atmosphere and hydrosphere systems, and exanother.	xplains at a basic level	how they interact			
Course Contents & Topics	forces si Composit Moisture Pressure Coasts;	Introduction and course plan, Earth within a broader context (Solar System and other key features); Geological forces shaping the floor of the Oceans and Seas; Water Structure, Ocean Structure and Seawater Composition/Chemistry; Introduction to the Atmosphere; Heating Earth's surface and Atmosphere; Temperature; Moisture and Atmospheric Stability; Forms of condensation and precipitation; Hydrological Cycle - an overview; Air Pressure and Winds; Intro to Atmospheric Circulation and Weather Systems; Ocean Circulation; Waves; Tides; Coasts; Groundwater basics; Groundwater usage, contamination, caves and karst; Glaciers and glacial landscapes; Climate system, proxy data, causes of climate change; Effects of climate change.					
Course Learning	On succe	essful completion of this course, students should be able to:	•				
Outcomes	CLO 1 understand the important features which distinguish Earth from the other planets within our Solar System, particularly with regards to its outer fluid envelopes						
	CLO 2 appreciate that on a geological timescale, the ocean basins and the seas are continually changing their location and morphology, and why this is the case						
	CLO 3 understand the key features of water, and the critical role the compound plays in the Atmosphere- Hydrosphere system						
	CLO 4 understand the basic physical phenomena associated with the Atmosphere and the Oceans/Seas and their important lower-order elements						
	CLO 5 have an awareness of the scientifically "hot" Atmosphere and Hydrosphere topics						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	EASC1401 or EASC1402					
Offer in 2019 - 2020	Y 1st	t sem Offer in 2020 - 2021 : Y	Examination	Dec			
Grade Descriptors (A+ to F)	Α	Thorough grasp of the subject; evidence of strong critical abilities and log presentational skills; insightful use and critical analysis / evaluation of informa and to quote/reference aptly; integration of the full range of appropriate theories	tion drawn from a full range o	f high quality sources			
	В						
	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						
	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.						

Course Type	Lecture with laboratory com	Lecture with laboratory component course					
Course Teaching	Activities	No. of Hours					
& Learning Activities	Lectures			24			
	Laboratory	including tutorials & dis	cussion	24			
	Project work			10			
	Reading / Self study			90			
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignments		20	CLO 4,5			
	Essay		25	CLO 1,2,3,4,5			
	Examination		50	CLO 1,2,3,4,5			
	Presentation		5	CLO 1,2,3,4,5			
Required/recommended reading and online materials		raphy: An Invitation to Marine S dward J. Tarbuck: The Atmosp	cience here: An Introduction to Meteorology	•			

EASC2406	Geoche	mistry (6 credits)		Academic Year	2019		
Offering Department	Earth Scie	ences		Quota			
Course Co-ordinator	Dr S H Li,	Earth Sciences (shli@h	nku.hk)				
Teachers Involved	(Dr S H Li	,Earth Sciences)					
Course Objectives	introduces earth.	This course provides an understanding of the fundamentals and approaches for geochemical analysis. It introduces students to the basic chemical principles, modern techniques and quantitative analysis for studying the earth.					
Course Contents & Topics	 Physical and chemical state of the earth, Differentiation of and cosmic abundance of elements, Aqueous solutions and chemistry of natural water, Trace element, Chemistry of igneous rocks, Chemical controls on soil formation, Radioactive isotope geochemistry, Stable isotope geochemistry, Oxidation and reduction, Chemical weathering 						
Course Learning Outcomes	On succes CLO 1 de st CLO 2 de CLO 3 ap	On successful completion of this course, students should be able to: 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					
Pre-requisites (and Co-requisites and Impermissible combinations)	CLO 4 demonstrate knowledge of the chemical weathering processes Pass in EASC1402						
Offer in 2019 - 2020	Y 1st	sem Offer in 2020 - 20	021 : Y	Examination	Dec		
Grade Descriptors (A+ to F)	Demonstrate extensive knowledge and skills at an advanced level required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, and ability to apply highly effective lab skills and techniques to solve problems. 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. Show evidence of analytical and critical abilities and logical thinking, and ability to apply effective lab skills and techniques to solve problems. 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. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply moderately effective lab skills and techniques to solve problems. Mostly correct but some erroneous use of data and results 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 source learning outcomes.						
		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 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, and ability to apply minimally effective or ineffective lab skills and techniques to solve problems. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.						
Course Type		ith laboratory componer	nt course				
Course Teaching	Activities	3	Details		No. of Hours		
& Learning Activities	Lectures		12 sessions x 2 hours		24		
	Laborator	У	paper exercises		24		
	Tutorials	(O 15)			6		
	-	Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents		40	CLO 1,2,3,4		
	Examinat			60	CLO 1,2,3,4		
Required/recommended reading and online materials	Krauskop	Fure G.: Principle and applications of Geochemistry (Prentice Hall, 1998, 2nd ed.) Krauskopf K.B. and Bird D.K. Introduction to Geochemistry (McGraw-Hill, Inc. 1995, 3rd ed.) Walther J.V.: Essentials of Geochemistry (Jones and Bartlett Publishers 2005)					

EASC2407	Mineralogy (6 credits)	Academic Year	2019
Offering Department	Earth Sciences	Quota	30

Course Co-ordinator	Prof M Su	n, Earth Sciences (mins	un @hku.hk)			
Teachers Involved		Zhou,Earth Sciences) un,Earth Sciences)				
Course Objectives	To provid	To provide essential knowledge of mineralogy, to familiarize students with common minerals that are basis fo study of petrography of igneous, sedimentary and metamorphic rocks.				
Course Contents		crystallization, mineral ch		LIUCKS.		
Topics		symmetry, Miller indices	lennsu y			
Торісэ		properties of minerals				
		composition, structure ar	nd classification			
		ation of rock forming min				
		etrographic microscope				
	- Optical p	properties under plane po	olarized light			
		properties under orthosco				
	- Optical p	properties under conosco	pic illumination			
		ation of rock forming mine	erals in thin sections			
		al variations of minerals				
ourse Learning			ourse, students should be ab			
Outcomes	CLO 1		nd systems used in classifica			
	CLO 2		erties to identify rock-forming	minerals		
	CLO 3	describe the principle of	,			
		•	k-forming minerals in hand s	pecimens and thin sections		
Pre-requisites	Pass in E	ASC1402				
and Co-requisites						
and Impermissible						
combinations)	V 4 1	011 . 0000 00	204 1/		D	
Offer in 2019 - 2020 Grade Descriptors	Y 1st	sem Offer in 2020 - 20		Examination vel required for attaining all the course		
(A+ to F)	strong analytical and critical abilities and logical thinking, and ability to apply highly effective lab skills and techniques to solve problems. 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. Show evidence of analytical and critical abilities and logical thinking, and ability to apply effective lab skills and techniques to solve problems. Correct use of data of results to draw appropriate conclusions. Apply effective organizational					
	С	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 moderately effective lab skills and techniques to solve problems. Mostly correct but some erroneous use of data and results 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, 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 Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack					
	ı alı	of analytical and critical abili	ties, logical and coherent thinking, and some street and results are results and results and results are results and results and results are results are results and results are results are results and results are results a	and ability to apply minimally effective of dor unable to draw appropriate conclu	r ineffective lab skills ar	
Course Type	Lecture w	ith laboratory componen	·			
Course Teaching	Activities	• •	Details		No. of Hours	
Learning Activities	Lectures		12 sessions x 2 hours		24	
	Laborato	٧	12 sessions x 2 hours		24	
	Reading / Self study		12 CCCCIOTIO X 2 TIOGIO		100	
ssessment Methods nd Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods	
	Accianna	nto		40	to CLO Mappin	
	Assignme				CLO 1,2,3,4	
Required/recommended reading and	C. Klein a	Examination 60 CLO 1,2,3,4 C. Klein and C.S. Hurlbat: Manual of Mineralogy (Wiley, 1999, 1st ed.) W.D. Nesse: Introduction to Optical Mineralogy (Oxford University Press, 1998, 2nd ed).				

EASC2408	Planetary geology (6 credits)	Academic Year	2019				
Offering Department	Earth Sciences	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 particular 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 describe the basic features of our Solar System and its constituents						
	CLO 2 explain how this knowledge is acquired through observations and experiments						
	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 compare and contrast our own planet Earth with other planetary bodies						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in EASC1401 or EASC1402 or PHYS1650						
Offer in 2019 - 2020	Y 2nd sem Offer in 2020 - 2021 : 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.				
	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	Show evidence of some coh	nerent and logical thinking, but wil	skills required for attaining some of the countries the limited analytical and critical abilities. She organizational and presentational skills.		
	Fail	Demonstrate little or no evic of analytical and critical at	dence of command of knowledge	and skills required for attaining the course nking. Show very little or no ability to ap		
Course Type	Lecture w	ith laboratory componen	t course			
Course Teaching	Activities		Details	No. of Hours		
& Learning Activities	Lectures		12 sessions x 2 hours	24		
	Laboratory		12 sessions x 2 hours		24	
	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	
	Examina	tion		50	CLO 1,2,3,4	
	Presenta	tion		15	CLO 1,2,3,4	
	Test			15	CLO 1,2,3,4	
Required/recommended reading and online materials	N. McBrid	le and I. Gilmour: An Intr	oduction to the Solar Syste	em (Cambridge University Press, 2	2004)	

EASC2409	Regiona	al field studies	(6 credits)	Academic Yea	r 2019		
Offering Department	Earth Scient	ences	•	Quota	10		
Course Co-ordinator	Dr J R Ali	r J R Ali, Earth Sciences (jrali@hku.hk)					
Feachers Involved	(Dr J R Al	(Dr A A G Webb (Japan Field Trip) in Sem 2,Earth Sciences) (Dr J R Ali (Taiwan Field Trip) in Sem 1,Earth Sciences) (Dr T Nakagawa (Japan Field Trip) in Sem 2,Earth Sciences)					
Course Objectives	through h	This course is field-based and introduces geology of China, Taiwan and/or regions in the vicinity of Hong Kon hrough hands on studies and field excursions. The course is compulsory for students doing the Geology (Intensive) major.					
Course Contents & Topics Course Learning Outcomes	Geologica - Geologic - Recogni - Field rec - Stratigra - Field ge - Enginee - Manage - Basic ge On succe CLO 1 h S CLO 2 b m CLO 3 ha	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 On successful completion of this course, students should be able to: CLO 1 have acquired a broad understanding of the geology of east Asia, in particular, Taiwan, Japan and/o South China CLO 2 be able to undertake basic field observations, stratigraphic measurements and identifications of rocks and minerals 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 structure					
Pre-requisites and Co-requisites and Impermissible combinations)	-	field report Pass in EASC1401 or EASC1402; and consent of course coordinator					
Offer in 2019 - 2020	Y 2nd	d sem Offer in 20)20 - 2021 : Y	Examination	No Exam		
Grade Descriptors (A+ to F)	A 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. C 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	Demonstrate limited	understanding of the geology of the study s	ites and limited ability to apply field meas	urement 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						
Course Type	Field cam	measurement techni	ques.				
Course Type	Activities	•	Deteile		No. of Hours		
Learning Activities		•		Details			
Learning Activities	Field wor		14 days		100		
		/ Self study			20		
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin		
	Report			100	CLO 1,2,3,4		
Required/recommended reading and		port 100 CLO 1,2,3,4 mprehensive course notes provided					

online materials	
Additional Course	Priority for being able to take this course is given to those students who have already participated in the linked
Information	Wuhan trip in 2018-19 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.

EASC2410	Data an	alysis and mode	ling in earth sciences (6 credits)	Academic Ye	ar 2019		
Offering Department	Earth Scie	ences		Quota			
Course Co-ordinator	Dr B Zhar	ng, Earth Sciences (i	binzh @hku.hk)				
Teachers Involved	(Dr B Zha	ng,Earth Sciences)					
Course Objectives			n approach to introduce the basic prough practical examples.	inciples of data analysis	and mathematica		
Course Contents & Topics	Python pridata anal	Python programming basics; NumPy and Matplotlib; Data wrangling with Pandas; Visualisation, Maps; Statistica 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 succe	ssful completion of the	nis course, students should be able to:				
Outcomes	CLO 1 E	xplain basic statistica	al concepts and their applications to ear	th science data processin	g and modeling		
	CLO 2 D	emonstrate knowled	ge in basic numerical methods, their ap	plications in earth science	s, and limitations		
		pply appropriate met oftware	hods to analyze, process and visualize	earth science data, with t	he help of compute		
Pre-requisites and Co-requisites and Impermissible combinations)	Pass in E	ASC1401					
Offer in 2019 - 2020	Y 2nd	d sem Offer in 202) - 2021 : 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.						
	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	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.						
Course Type	Lecture w	rith laboratory compo	nent course				
Course Teaching	Activities	S	Details		No. of Hours		
Learning Activities	Lectures						
	Laborato	ry					
	Reading	/ Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents	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	M. H. Tra	uth: MATLAB Recipe	es for Earth Sciences (Springer, 2015)				

EASC3020	Global	change: anthropogenic impacts (6 credits)	Academic Year	2019			
Offering Department	Earth Sc	iences	Quota				
Course Co-ordinator	Dr Z H L	iu, Earth Sciences (zhliu@hku.hk)					
Teachers Involved	(Dr Z H L	(Dr Z H Liu,Earth Sciences)					
Course Objectives		This course will explore the role of humans in global change and the environmental responses to such changes Causes and impacts of climate change will be discussed.					
Course Contents & Topics	evolution	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					
Course Learning	On succe	essful completion of this course, students should be able to:					
Outcomes	CLO 1	recognise the complexity of global climate systems					
	CLO 2	CLO 2 recognise the controversy of anthropogenic global warming					
	CLO 3	CLO 3 identify modern environmental issues					
	CLO 4	assess the credibility of various scientific arguments					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	EASC2404 or ENVS2001					
Offer in 2019 - 2020	N Of	ffer in 2020 - 2021 : Y	Examination				
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive knowled learning outcomes. Show strong analytical and critical abilities and logical thi to apply knowledge to a wide range of complex, familiar and unfamiliar situati draw appropriate and insightful conclusions. Show insightful use and critical a range of high quality sources and to quote/reference aptly.	nking, with evidence of originations. Demonstrate critical use	al thought, and ability of data and results to			
	В	Demonstrate substantial command of a broad range of knowledge and skills learning outcomes. Show evidence of analytical and critical abilities and logical					

			ons. Demonstrate correct use of data and rons sources and ability to make meaningful of .			
	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	of analytical and critical ab	lence of command of knowledge and skills pilities, logical and coherent thinking. Sho suse of data and results and/or unable t ritical comparison of them.	w very little or no ability to ap	pply knowledge to solve	
Course Type	Lecture-l	based course				
Course Teaching	Activitie	es	Details	No. of Hours		
& Learning Activities	Lectures	3			36	
	Project v	work		30		
	Tutorials	5		12		
	Discuss	ion			24	
	Reading	g / Self study			48	
Assessment Methods and Weighting	Method	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Essay		Coursework Assessment	25	CLO 1,2,4	
	Examina	ation	One 2-hour written examination	50	CLO 1,2,4	
	Project r	report		25	CLO 2,3,4	

EASC3402	Petrolog	gy (6 credits)			Academic Yea	ar 2019	
Offering Department	Earth Scient	ences			Quota		
Course Co-ordinator	Prof G Zh	ao, Earth Sciences	(gzhao @hku.l	nk)			
Teachers Involved	(Prof G ZI	man,Earth Science hao,Earth Sciences un,Earth Sciences)	s) [′]				
Course Objectives	To give s	tudents an understa	anding of the fe		gneous and metamorphic roughly both hand specimens and		
Course Contents & Topics	- Magma volcanism - Basic igi - Intermed - Acid ign - Sedimer - Clastic s - Biochem - Metamo of metam - Meta-pe - Meta-ba	 Magma and magmatism; textures and structures of igneous rocks, classification of igneous rocks, including volcanism and plutonism Basic igneous rocks Intermediate igneous rocks Acid igneous rocks Sedimentary diagenesis, classification of sedimentary rocks; textures and structures of sedimentary rocks. Clastic sedimentary rocks: conglomerate and sandstone, siltstone and mudstone Biochemical sedimentary rocks: limestone and dolostone Metamorphism; controlling factors of metamorphism; textures and structures of metamorphic rocks; classification of metamorphic rocks Meta-pelitic rocks Meta-basic rocks Meta-carbonate rocks and meta-felsic rocks 					
Course Learning							
Outcomes	On successful completion of this course, students should be able to: 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						
			and write repo	rt on the above rock type	S		
Pre-requisites and Co-requisites and Impermissible combinations)	Pass in E	ASC2407					
Offer in 2019 - 2020	Y 2nd	d sem Offer in 202	20 - 2021 : Y		Examination	May	
Grade Descriptors (A+ to F)	В	learning outcomes. S to apply knowledge to	e thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course comes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability wledge to a wide range of complex, familiar and unfamiliar situations. e 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.					
	C	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						
	Fail				required for attaining the course ry little or no ability to apply know		
Course Type	Lecture w	rith laboratory comp	onent course				
Course Teaching	Activities	s	Details			No. of Hours	
& Learning Activities	Lectures		12 sessi	ons x 2 hours		24	
	Laborato	ry		specimen descriptions & thin-section observations under microscope		24	
	Reading	/ Self study				100	
Assessment Methods	Methods		Details		Weighting in final	Assessment	

and Weighting			course grade (%)	Methods to CLO Mapping
	Assignments		30	CLO 1,2,3,4
	Examination		70	CLO 1,2,3,4
Required/recommended reading and online materials	Harvey Blatt and Robert J. Tracy, I	Petrology (Second Edition; W.H. Fre	eman and Company, New	/ York)

EASC3403	Sedimer	ntary environme	ents (6 credits)	Academic Ye	ar 2019		
Offering Department	Earth Scie		· ·	Quota			
Course Co-ordinator	Dr N R Mo	R McKenzie, Earth Sciences (ryan00@hku.hk) King,Earth Sciences)					
Teachers Involved	(Dr J King	,Earth Sciences)	,				
	(Dr N R M	lcKenzie,Earth Ście	ences)				
Course Objectives	This cour	se discusses the	origin, diagenesis, classification a	nd economic importance of	sedimentary rocks		
	Students will learn features and processes of sedimentary geology, paleontology and depositional processes. - Overview of sedimentary geology						
Course Contents & Topics	- 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						
	- Sedimen	ntary environment a	round Hong Kong				
	- Sedimen	ntary environment o	on Mars				
Course Learning	On succes	In successful completion of this course, students should be able to:					
Outcomes	CLO 1	describe the natur	e and significance of sedimentary fe	atures and structures			
	CLO 2	identify carbonate	and siliciclastic rocks in hand samp	le			
	CLO 3	describe the facie	s in a depositional environment				
	CLO 4	undertake detailed	d study of a stratigraphic section in the	ne field			
	CLO 5	conduct basic obs	ervations and interpretations from o	utcrops			
Pre-requisites and Co-requisites and Impermissible combinations)		ASC2402 or EASC					
Offer in 2019 - 2020			20 - 2021 : Y	Examination	May		
Grade Descriptors (A+ to F)	A	Apply highly effective	h grasp of the subject. Show strong analytica lab/fieldwork skills and techniques. Apply hig	hly effective organizational and preser	ntational skills.		
	B Demonstrate substantial grasp of the subject. Show strong analytical abilities and logical thinking. Apply effective lab/fieldwork skills and techniques. Apply highly effective organizational and presentational skills. C Demonstrate general but incomplete grasp of the subject. Show some analytical abilities and logical thinking. Apply moderately						
	effective lab/fieldwork skills and techniques. Apply moderately effective organizational and presentational skills. Demonstrate partial but limited grasp of the subject. Show some analytical abilities and logical thinking. Apply partially effective						
	lab/fieldwork skills and techniques. Apply limited or barely effective organizational and presentational skills.						
	Fail		skills and techniques. Organization and pres		ninking. Apply minimal		
Course Type	Lecture w	ith laboratory comp					
Course Teaching	Activities		Details		No. of Hours		
Learning Activities	Lectures		12 sessions x 2 hours				
ŭ	Laborator	ν	6 sessionsx 2 hours		24 12		
	Field worl	,	1 day trip with field project		8		
	Project w		Examples for sedimentary en	vironments	12		
		Self study			90		
Assessment Methods and Weighting	Methods	·	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin		
	Examinat	ion		40	CLO 1,2,3,4		
	Laborator		Labs and Field Exercise	30	CLO 1,2,3,4,5		
	Presentat	tion		10	CLO 3		
	Test		Mid-term examination	20	CLO 1,2,3		
Required/recommended reading and online materials	Sedimento	ology and Stratigra	phy (Second Edition), Gary Nichols				

EASC3404	Structural geology (6 credits)	Academic Year	2019
Offering Department	Earth Sciences	Quota	40
Course Co-ordinator	Dr J R Ali, Earth Sciences (jrali@hku.hk)		
Teachers Involved	(Dr A A G Webb,Earth Sciences) (Dr J R Ali,Earth Sciences)		
Course Objectives	Structural Geology is the study of rock deformation. Participants in this cours kinematics, and mechanics of rock deformation, and how to answer structural involve heavy use and generation of geological maps and cross sections and structure.	geology questions	. The course will
Course Contents & Topics	Class-room based: lecture and laboratory - Introduction: basics on stress, strain, stress-strain relation - Stress - Stereonets - Deformation mechanisms - Strain - Joints		

	- Fault plan - Folds - Shear Zo - Fabrics (' - Contracti - Kink met - Structura - Balancec - Key Structura - Fieldwork - Joints - F - Folds plu - Shear zo	In digital dig	construction pretation bretation state of the surveus an associated day of self-surveurned fold limb Ma Tso Lung	,		
Course Learning	On succes	sful completion of this	course, students should be able	to:		
Outcomes	CLO 1	understand a mo	derate level rock deformation			
	CLO 2		al data from a geology map			
	CLO 3		structural data on a stereonet			
	CLO 4		ck and 4D rock-time relationships			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in EA	ASC2402 and EASC34	402			
Offer in 2019 - 2020	Y 1st	sem Offer in 2020 -	2021 : Y	Examination	Dec	
Grade Descriptors (A+ to F)	A Thorough grasp of the subject; evidence of strong critical abilities and logical thinking; apply knowledge to a wide range of complex, familiar and unfamiliar situations; highly effective fieldwork skills and techniques; critical use of data and results to draw appropriate and insightful conclusions; integration of the full range of appropriate theories, principles, evidence and techniques. Substantial grasp of the subject; evidence of critical abilities and logical thinking; apply knowledge to familiar and some unfamiliar situations; effective fieldwork skills and techniques; correct use of data and results to draw appropriate conclusions; general					
	С	integration of theories, principles, evidence and techniques. General but incomplete grasp of the subject; evidence of some critical abilities and logical thinking; apply knowledge to mos familiar situations; moderately effective fieldwork skills and techniques; mostly correct but some erroneous use of data and				
	D	results to draw appropriate conclusions; some partial integration of theories, principles, evidence and techniques. Limited grasp of the subject, retention of some relevant information of the subject; evidence of limited critical abilities; limited ability to apply knowledge to solve problems; partially effective fieldwork skills and techniques; limited ability to use data and results to draw appropriate conclusions; 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 coherent thinking; very little or no ability to apply knowledge to solve problems; minimally effective or ineffective fieldwork skills and techniques; misuse of data and results and/or unable to draw appropriate conclusions; little or no or inapt integration of theories, principles, evidence and techniques.					
Course Type		th laboratory compone				
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures		eleven 2-hour sessions		22	
	Laborator		stereonets, map interpretation	with a structural focus	22 24	
	Field work		additional 1-2 days self direct	3 days field work additional 1-2 days self directed 'field' studies of facing		
	Reading /	Self study	stones showing interesting structural features		50	
Assessment Methods and Weighting	Methods	20.1.01.00.	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	nts		60	CLO 1,2,3,4	
	Examinati	on		40	CLO 1,2,3,4	
Required/recommended reading and online materials	Suppe. 19	85. Principles of struc	Structural geology of rocks and re tural geology, # 551.8 S95. al Geology, 2nd edition. # 551.8 T	,	!	
onnine materiais			. Earth structure: an introduction t		onics. # 551.8 V21.	
Additional Course Information			sociated textbooks with many in t four named works are not require		there are lots of web	

EASC3405	Environmental remote sensing (6 credits)	Academic Year	2019
Offering Department	Earth Sciences	Quota	54
Course Co-ordinator	Dr J Michalski, Earth Sciences (jmichal@hku.hk)		
Teachers Involved	(Dr J Michalski,Earth Sciences) (Dr J Wu,Biological Sciences)		
Course Objectives	This course serves as an introduction to remote sensing of the Earth and other on remote sensing of the Earth using visible, infrared, and microwave radiation. Familiarity with remote sensing data is an essential skill for the modern d scientist. This course will teach you not only about the fundamentals of remosuch as: 1) how to obtain remote sensing data, 2) how to process, correct an results to scientific problems, 4) how to report on your results, 5) how to use or represent your new skills on your CV.	ay geoscientist ar ate sensing, but als d interpret images	d environmental so practical skills (3) how to apply
Course Contents & Topics	 Explanation of the fundamentals of remote sensing Description of key remote sensing platforms, sensers and their purposes. How to obtain data of sites on Earth and other planets. How to process, analyse and correct remote sensing data. How to interpret remote sensing data. How to use software for remote sensing. You will be an expert in highly emplemental to the process of the process of the process of the process of the purpose of the purpose of the process of the purpose of th	(GIS)	

	science.	nalata varining di ta 1.1		ha a musfacaiamaliti-t			
	9. How to relate your work to bigger career goals and how to be a professional scientist. 10. How to integrate your new skills into your CV so that you have an advantage in the job market.						
		· ,	, , ,	υ,	ket.		
Course Learning Outcomes			course, students should be a				
Outcomes	CLO 1 demonstrate knowledge of how remotely sensed data are acquired CLO 2 comprehend the basic techniques of image processing						
	CLO 3	-	0 0 .	•			
	CLO 4 understand how remotely sensed be used for environmental assessment						
	CLO 5 evaluate and interpret remotely sensed data						
	CLO 6	present and discuss r					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E/	Pass in EASC2404 or EASC2406 or EASC2407 or ENVS2002					
Offer in 2019 - 2020	Y 2nd	2nd sem Offer in 2020 - 2021 : Y Examination No E					
Grade Descriptors (A+ to F)	A	Demonstrate thorough ma strong analytical and critic	stery of extensive knowledge and s al abilities and logical thinking, and a cal use of data and results to dra	kills required for attaining all the course ability to apply knowledge to a wide range wappropriate and insightful conclusion	learning outcomes. Show e of complex, familiar and		
	В	learning outcomes. Show and some unfamiliar situa and presentational skills.	evidence of analytical and critical abitions. Correct use of data and resul	ledge and skills required for attaining at ilities and logical thinking, and ability to a Its to draw appropriate conclusions. Appl	oply knowledge to familiar y effective organizational		
	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. Mostly correct but some erroneous use of data and results 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, and limited ability to apply knowledge to solve problems. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.						
		knowledge to solve proble	ems. Limited ability to use data and				
	Fail	knowledge to solve proble effective organizational an Demonstrate little or no ev of analytical and critical a	ems. Limited ability to use data and d presentational skills. vidence of command of knowledge a bilities, logical and coherent thinking		s. Apply limited or barely learning outcomes. Lack ledge to solve problems.		
Course Type		knowledge to solve proble effective organizational an Demonstrate little or no ev of analytical and critical a Misuse of data and results effective or ineffective.	ems. Limited ability to use data and d presentational skills. ridence of command of knowledge a bilities, logical and coherent thinking s and/or unable to draw appropriate	If results to draw appropriate conclusions and skills required for attaining the course g. Show little or no ability to apply know	s. Apply limited or barely learning outcomes. Lack ledge to solve problems.		
7 1	Lecture wi	knowledge to solve proble effective organizational an Demonstrate little or no ev of analytical and critical a Misuse of data and results effective or ineffective. ith laboratory compone	ems. Limited ability to use data and d presentational skills. vidence of command of knowledge a bilities, logical and coherent thinkin, s and/or unable to draw appropriate ent course	If results to draw appropriate conclusions and skills required for attaining the course g. Show little or no ability to apply know	s. Apply limited or barely learning outcomes. Lack ledge to solve problems. tional skills are minimally		
Course Teaching	Lecture wi	knowledge to solve proble effective organizational an Demonstrate little or no ev of analytical and critical a Misuse of data and results effective or ineffective. ith laboratory compone	ems. Limited ability to use data and d presentational skills. ridence of command of knowledge a bilities, logical and coherent thinking s and/or unable to draw appropriate	If results to draw appropriate conclusions and skills required for attaining the course g. Show little or no ability to apply know	s. Apply limited or barely learning outcomes. Lack ledge to solve problems.		
Course Teaching	Lecture wi	knowledge to solve proble effective organizational an Demonstrate little or no ev of analytical and critical a Misuse of data and results effective or ineffective. ith laboratory compone is	ems. Limited ability to use data and d presentational skills. vidence of command of knowledge a bilities, logical and coherent thinkin, s and/or unable to draw appropriate ent course	If results to draw appropriate conclusions and skills required for attaining the course g. Show little or no ability to apply know	s. Apply limited or barely learning outcomes. Lack ledge to solve problems. tional skills are minimally		
Course Teaching	Lecture wind Activities Lectures Laborator	knowledge to solve proble effective organizational an Demonstrate little or no ev of analytical and critical a Misuse of data and results effective or ineffective. ith laboratory compones	ems. Limited ability to use data and d presentational skills. vidence of command of knowledge a bilities, logical and coherent thinkin, s and/or unable to draw appropriate ent course	If results to draw appropriate conclusions and skills required for attaining the course g. Show little or no ability to apply know	s. Apply limited or barely learning outcomes. Lack ledge to solve problems. tional skills are minimally No. of Hours 24		
Course Teaching	Lecture wind Activities Lectures Laborator Project wind Activities	knowledge to solve proble effective organizational and Demonstrate little or no ev of analytical and critical a Misuse of data and results effective or ineffective. ith laboratory compones	ems. Limited ability to use data and d presentational skills. vidence of command of knowledge a bilities, logical and coherent thinkin, s and/or unable to draw appropriate ent course	If results to draw appropriate conclusions and skills required for attaining the course g. Show little or no ability to apply know	s. Apply limited or barely learning outcomes. Lack ledge to solve problems. tional skills are minimally No. of Hours 24 24		
Course Teaching & Learning Activities Assessment Methods	Lecture wind Activities Lectures Laborator Project wind Activities	knowledge to solve proble effective organizational au Demonstrate little or no ev of analytical and critical a Misuse of data and results effective or ineffective. ith laboratory compone s Ty ork / Self study	ems. Limited ability to use data and d presentational skills. vidence of command of knowledge a bilities, logical and coherent thinkin, s and/or unable to draw appropriate ent course	If results to draw appropriate conclusions and skills required for attaining the course g. Show little or no ability to apply know	s. Apply limited or barely learning outcomes. Lack ledge to solve problems tional skills are minimally No. of Hours 24 24 12		
Course Teaching & Learning Activities Assessment Methods	Lecture wi Activities Lectures Laborator Project wi Reading /	knowledge to solve proble effective organizational an Demonstrate little or no ev of analytical and critical a Misuse of data and results effective or ineffective. iith laboratory compone s	ems. Limited ability to use data and d presentational skills. vidence of command of knowledge a bilities, logical and coherent thinkings and/or unable to draw appropriate ent course Details	d results to draw appropriate conclusions and skills required for attaining the course g. Show little or no ability to apply know conclusions. Organization and presental weighting in final course grade (%)	No. of Hours 24 24 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5,6		
Course Teaching & Learning Activities Assessment Methods	Lecture wi Activities Lectures Laborator Project wi Reading / Methods	knowledge to solve proble effective organizational an Demonstrate little or no ev of analytical and critical a Misuse of data and results effective or ineffective. iith laboratory compone s	ems. Limited ability to use data and d presentational skills. vidence of command of knowledge a bilities, logical and coherent thinkings and/or unable to draw appropriate ent course Details	weighting in final course grade (%) Weighting in final course grade (%)	No. of Hours 24 24 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5,6 CLO 1,2,3,4,5,6		
Course Teaching & Learning Activities Assessment Methods	Lecture wind Activities Lectures Laborator Project wind Reading / Methods Assignment	knowledge to solve proble effective organizational an Demonstrate little or no ev of analytical and critical a Misuse of data and results effective or ineffective. iith laboratory compone s	ems. Limited ability to use data and d presentational skills. idence of command of knowledge a bilities, logical and coherent thinkings and/or unable to draw appropriate ent course Details Details	d results to draw appropriate conclusions and skills required for attaining the course g. Show little or no ability to apply know conclusions. Organization and presental weighting in final course grade (%)	No. of Hours 24 24 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5,6		
Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended reading and	Lecture wind Activities Lectures Laborator Project wind Reading / Methods Assignment Laborator Test Remote S Author(s) Publisher Edition: 3 Print ISBN eText ISB If you sign	knowledge to solve proble effective organizational and Demonstrate little or no ev of analytical and critical a Misuse of data and results effective or ineffective. ith laboratory compone is ry ork / Self study ents ry reports densing: Principles and : Floyd F. Sabins : Waveland Press rd J: 9781577665076, 15 N: 9781478618171.0	ems. Limited ability to use data and d presentational skills. idence of command of knowledge a bilities, logical and coherent thinkings and/or unable to draw appropriate ent course Details Details Lab exercises Applications (3rd edition)	weighting in final course grade (%) Weighting in final course grade (%)	s. Apply limited or barely learning outcomes. Lack ledge to solve problems. tional skills are minimally No. of Hours 24 24 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5,6 CLO 1,2,3,4,5,6 CLO 1,2,3,4,5,6		
Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended reading and online materials	Lecture wind Activities Lectures Laborator Project wind Reading / Methods Assignment Laborator Test Remote S Author(s) Publisher Edition: 3 Print ISBN eText ISB If you sign the material	knowledge to solve proble effective organizational and Demonstrate little or no ev of analytical and critical a Misuse of data and results effective or ineffective. Ith laboratory compone is Ty Ork Y Self study ents ry reports Gensing: Principles and : Floyd F. Sabins : Waveland Press ird N: 9781577665076, 15 N: 9781478618171.0 In up for the course, plainal from the book.	ems. Limited ability to use data and d presentational skills. idence of command of knowledge a bilities, logical and coherent thinkings and/or unable to draw appropriate ent course Details Details Lab exercises Applications (3rd edition)	Weighting in final course grade (%) Weighting in final course grade (%) 25 25 50	s. Apply limited or barely learning outcomes. Lack ledge to solve problems. tional skills are minimally No. of Hours 24 24 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5,6 CLO 1,2,3,4,5,6 CLO 1,2,3,4,5,6		
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended reading and online materials Course Website Additional Course	Lecture wind Activities Lectures Laborator Project wind Reading / Methods Assignment Laborator Test Remote S Author(s) Publisher Edition: 3 Print ISBN eText ISB If you sign the materi http://www.	knowledge to solve proble effective organizational and Demonstrate little or no ev of analytical and critical a Misuse of data and results effective or ineffective. ith laboratory compone is Ty ork / Self study ents ry reports densing: Principles and : Floyd F. Sabins : Waveland Press and N: 9781577665076, 15 N: 9781478618171.0 In up for the course, platial from the book. v.clays.space	ems. Limited ability to use data and d presentational skills. idence of command of knowledge a bilities, logical and coherent thinkings and/or unable to draw appropriate ent course Details Details Lab exercises Applications (3rd edition)	Weighting in final course grade (%) Weighting in final course grade (%) 25 25 50 -version is inexpensive. You will	s. Apply limited or barely learning outcomes. Lack ledge to solve problems. tional skills are minimally No. of Hours 24 24 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5,6 CLO 1,2,3,4,5,6 CLO 1,2,3,4,5,6		

EASC3406	Recons	struction of past climate (6 credits) Academic Year	2019			
Offering Department	Earth Sci	iences Quota				
Course Co-ordinator	Dr S H Li	i, Earth Sciences (shli@hku.hk)				
Teachers Involved	(Dr S H L	Li,Earth Sciences)				
Course Objectives		rse provides students with an understanding of how dynamic earth is and how it has cha in years. This course introduces the theory and methods of climate reconstructions.	nged over the las			
Course Contents & Topics	Climate control Driven for Quantitating Pollen and Climate control Climate control Climate control Climate control Global was	ternary period (1), changes in the last 2.6 million years (1), process of climate change (1) tive reconstruction methods (1) nalysis and biological proxies (2) change in arid regions (1) ary geochronology (1) changes in East Asia (1) change impacts on human evolution and society (1) arming and future climate change (1) change in Asia and Europe				
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 understand the earth climate change during last 2.6 million years					
	CLO 2	understand the driving forces of climate changes in different scales				
	CLO 3	learn the methods for palaeo-environment reconstruction				
	CLO 4	understand the impacts of climate changes				
	CLO 5	synthesize and interpret data sets of climate change proxies				

Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E.	ASC2401				
Offer in 2019 - 2020	Y 2nd	sem Offer in 2020	- 2021 : N	E	Examination	No Exam
Grade Descriptors (A+ to F)	A	learning outcomes. Show	mastery at an advanced level of extens w strong analytical and critical abilities a a wide range of complex, familiar and	and logical thinking, with	n evidence of origi	inal thought, and ability
	В	learning outcomes. Show	command of a broad range of knowled v evidence of analytical and critical abiliti ations. Apply effective organizational and	ies and logical thinking,		
	С	outcomes. Show eviden	at incomplete command of knowledge ce of some analytical and critical abilitie moderately effective organizational and	es and logical thinking,		
	D	Show evidence of some	limited command of knowledge and skil coherent and logical thinking, but with lir lems. Apply limited or barely effective org	mited analytical and crit	tical abilities. Shov	
	Fail	of analytical and critical	evidence of command of knowledge and I abilities, logical and coherent thinking and presentational skills are minimally eff	g. Show very little or		
Course Type	Lecture w	ith laboratory compon	ent course			
Course Teaching	Activities	3	Details			No. of Hours
& Learning Activities	Lectures		12 sessions x 2 hours			24
	Laborato	Т У	2 sessions			4
	Field wor	k	1 half-day fieldtrip			5
	Tutorials		8 sessions			16
	Reading	Self study				90
Assessment Methods and Weighting	Methods		Details		ng in final grade (%)	Assessment Methods to CLO Mapping
	Assignme	ents		;	50	CLO 1,2,3,5
	Essay			;	50	CLO 1,2,3,4
Required/recommended reading and online materials	Longman W.F. Rud D.E. Ande	, 1997, 2nd ed) diman: Earths climate erson, A.S. Goudie an	r Reconstructing Quaternary E : Past and future (Freeman, 200 d A.G. Parker: Global Environme	8, 2nd ed.) ents through the Q	uaternary (Oxf	ŕ
Additional Course Information	Previous	course code & title: E	ASC2131 A Cool World: Ice Age	es and Climate Cha	ange	

	Geopny	sics (6 credits)		Academic Ye	ear 2019
Offering Department	Earth Sci	ences		Quota	
Course Co-ordinator	Dr T Nak	agawa, Earth Sciences	(ntakashi @hku.hk)		
Teachers Involved	(Dr B Zha	ang,Earth Sciences)			
		kagawa,Earth Sciences			
Course Objectives	geophysi	cal disciplines, includi	al characteristics and processe ng seismology, gravity, geothe ng the earth's interior and near s	ermometry, geomagnetism, as	
Course Contents & Topics	- Isostasy - Geomag - Paleoma	agnetism and rock mag I Properties of the Eartl			
Course Learning	On succe	essful completion of this	s course, students should be ab	le to:	
Outcomes	CLO 1	describe the approache	es and methods geophysicists u	se to study the interior of the ea	arth
	CLO 2	apply basic techniques	in measurements of earthquake	es and interpret a seismogram	
	CLO 3	describe the procedure	and their interpretation		
			s of paleomagnetism and descr		
	CLO 5	describe how density, p	pressure and temperature of the	earth's interior are determined	
Dro-roquisitos	Page in F	$\Delta SC2401$ or $E\Delta SC240$	12 or PHVS2250		
(and Co-requisites and Impermissible	Pass in E	ASC2401 or EASC240)2 or PHYS2250		
(and Co-requisites and Impermissible combinations)		ASC2401 or EASC240		Examination	No Exam
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors		d sem Offer in 2020 -	- 2021 : Y th understanding of the subject well a	above the expected level of an university	rsity undergraduate ar
Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	Y 2n	d sem Offer in 2020 - Demonstrated an in-depi achieving over 80% of tot Demonstrate an underst	- 2021 : Y th understanding of the subject well a al marks and an ability to pursue advan anding of the subject at the approprial	above the expected level of an unive ce-level study in some of the geophysic te level of a university student and ac	ersity undergraduate are cs subdisciplines. chieving 70% of the to
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Y 2n	d sem Offer in 2020 - Demonstrated an in-depi achieving over 80% of tot Demonstrate an understa course marks. A greater & Coursework and examina analysis. Achieved 60-70'		above the expected level of an unive ce-level study in some of the geophysic te level of a university student and act d if student plans to pursue further stud standing of the subject without the ab	ersity undergraduate ar as subdisciplines. Thieving 70% of the to by of geophysics. We carry out in-dep
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Y 2nd	d sem Offer in 2020 - Demonstrated an in-depi achieving over 80% of tot Demonstrate an understa course marks. A greater of Coursework and examina analysis. Achieved 60-70' Demonstrated an insuffic	- 2021 : Y th understanding of the subject well a al marks and an ability to pursue advan anding of the subject at the appropriat effort and further preparation are neede- ation results reflect only a basic under	above the expected level of an unive ce-level study in some of the geophysic te level of a university student and act d if student plans to pursue further stud standing of the subject without the ab	ersity undergraduate ar as subdisciplines. Thieving 70% of the to by of geophysics. We carry out in-dep
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Y 2nd	d sem Offer in 2020 - Demonstrated an in-depi achieving over 80% of tot Demonstrate an understa course marks. A greater of Coursework and examina analysis. Achieved 60-70' Demonstrated an insuffic reflective only of the time	• 2021 : Y th understanding of the subject well a l marks and an ability to pursue advan anding of the subject at the appropriat effort and further preparation are needer ation results reflect only a basic under % of total course marks. ient understanding of the subject as	above the expected level of an unive ce-level study in some of the geophysis te level of a university student and ac d if student plans to pursue further stud standing of the subject without the ab- total course mark achieved is below	rrsity undergraduate ar s subdisciplines. shieving 70% of the to y of geophysics. ility to carry out in-dep 60%. The pass grade
and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	Y 2nd A B C D	d sem Offer in 2020 - Demonstrated an in-depi achieving over 80% of tot Demonstrate an understa course marks. A greater of Coursework and examina analysis. Achieved 60-70' Demonstrated an insuffic reflective only of the time	th understanding of the subject well a al marks and an ability to pursue advan anding of the subject at the appropriat effort and further preparation are needeation results reflect only a basic under % of total course marks. either understanding of the subject as the student puts in on the subject.	above the expected level of an unive ce-level study in some of the geophysis te level of a university student and ac d if student plans to pursue further stud standing of the subject without the ab- total course mark achieved is below	risity undergraduate and as subdisciplines. whieving 70% of the to y of geophysics. We carry out in-degradow. The pass grade
and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching	Y 2nd A B C D	d sem Offer in 2020 - Demonstrated an in-depi achieving over 80% of tot Demonstrate an understate course marks. A greater of Coursework and examina analysis. Achieved 60-70' Demonstrated an insuffic reflective only of the time A total lack of effort and in vith laboratory componer	th understanding of the subject well a al marks and an ability to pursue advan anding of the subject at the appropriat effort and further preparation are needeation results reflect only a basic under % of total course marks. either understanding of the subject as the student puts in on the subject.	above the expected level of an unive ce-level study in some of the geophysis te level of a university student and ac d if student plans to pursue further stud standing of the subject without the ab- total course mark achieved is below	risity undergraduate and as subdisciplines. whieving 70% of the to y of geophysics. We carry out in-degradow. The pass grade
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(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching	Y 2nd A B C D Fail Lecture w	d sem Offer in 2020 - Demonstrated an in-depi achieving over 80% of tot Demonstrate an understate course marks. A greater of Coursework and examina analysis. Achieved 60-70' Demonstrated an insuffice reflective only of the time A total lack of effort and in vith laboratory componers	th understanding of the subject well a la marks and an ability to pursue advantanding of the subject at the appropriate after and further preparation are needer of total course marks. Sient understanding of the subject as the student puts in on the subject as under the student puts in on the subject as under the student puts in on the subject as understanding of the subject as understanding of the subject as understand the subject course Details 12 sessions x 2 hours	above the expected level of an unive ce-level study in some of the geophysis te level of a university student and ac d if student plans to pursue further stud standing of the subject without the ab- total course mark achieved is below	rsity undergraduate ar se subdisciplines. shieving 70% of the toty y of geophysics. illity to carry out in-dep 60%. The pass grade vailable course marks.
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching	Y 2nd A B C D Fail Lecture w Activitie Lectures Laborato	d sem Offer in 2020 - Demonstrated an in-depi achieving over 80% of tot Demonstrate an understate course marks. A greater of Coursework and examina analysis. Achieved 60-70' Demonstrated an insuffice reflective only of the time A total lack of effort and in vith laboratory componers	th understanding of the subject well a la marks and an ability to pursue advantanding of the subject at the appropriate ation results reflect only a basic under of total course marks. Sient understanding of the subject as the student puts in on the subject as subject ability to understand the subject course. Details 12 sessions x 2 hours 2 computer exercises, 2 fi	above the expected level of an unive ce-level study in some of the geophysic le level of a university student and at dif student plans to pursue further stude standing of the subject without the ab- total course mark achieved is below ect and failure to achieve 50% of the ar-	rsity undergraduate allowed substitution of the to y of geophysics. White to carry out in-deption of the pass grade wallable course marks. No. of Hours 24

Laboratory reports	2 field reports and 2 computer lab report.	100	CLO 1,2,3,4,5	
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EASC3409	igneous	s and metamorphi	c petrogenesis (6 credits)	Academic Year	r 2019
Offering Department	Earth Sci			Quota	30
Course Co-ordinator		un, Earth Sciences (m.	insun@hku.hk)		
Teachers Involved		Zhao,Earth Sciences)	,		
	,	Sun,Earth Sciences)			
Course Objectives	To providigneous	de a comprehensive and metamorphic ro	coverage of the principles and teck cks and their cause-and-effect rel		
Sauraa Camtanta	evolution		unical acceditions and to stonic cotting		
Course Contents & Topics	- Applicat	tion of trace elements	emical conditions and tectonic setting and isotopes to the study of magma		
	- Granitio - Magma - Magma - Types o - Chemic		naracteristics Indaries n brium in metamorphism; metamorph	ic phase diagrams (ACF, A'K	F, AFM, etc)
	- Metamo		eactions d evolution of pelitic rocks d evolution of mafic rocks		
	- Metam		ectonic settings; metamorphic pres	sure-temperature-time (P-T-t	t) paths and the
Course Learning			s course, students should be able to	•	
Outcomes	CLO 1 u		textures, structures and geochemic		e petrogenesis c
	CLO 2 u	ise magmatic rocks to	study the mantle and crustal charact	eristics	
	CLO 3 a	apply mineral assembla nfer the tectonotherma	ages, microtextures, mineral reactio I evolution of metamorphic rocks	n relationships and metamor	
			e and understanding of magmatic an tectonic settings and crustal evolution		nd their cause-an
Pre-requisites and Co-requisites and Impermissible	Pass in E	EASC3402	·		
.งเทยเทสแบทร์)					
•	Y 2n	d sem Offer in 2020	- 2021 : Y	Examination	Mav
Offer in 2019 - 2020		d sem Offer in 2020		Examination guired for attaining all the course lea	May arning outcomes. Sho
combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	Α	Demonstrate extensive k strong analytical and crit problems. Critical use of and presentational skills.	knowledge and skills at an advanced level re- tical abilities and logical thinking, and ability of data and results to draw appropriate and in	quired for attaining all the course lea to apply highly effective lab skills ar nsightful conclusions. Apply highly e	arning outcomes. Sho nd techniques to solv effective organization
Offer in 2019 - 2020 Grade Descriptors		Demonstrate extensive lestrong analytical and crit problems. Critical use of and presentational skills. Demonstrate substantial learning outcomes. Show and techniques to solve	knowledge and skills at an advanced level rectical abilities and logical thinking, and ability if data and results to draw appropriate and in command of a broad range of knowledge as wevidence of analytical and critical abilities problems. Correct use of data of results to descriptions.	quired for attaining all the course lea to apply highly effective lab skills an nsightful conclusions. Apply highly e and skills required for attaining at lea and logical thinking, and ability to a	arning outcomes. Sho nd techniques to solveffective organizations ast most of the cours pply effective lab skil
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Offer in 2019 - 2020 Grade Descriptors	B C D Fail Lecture v Activitie Lectures Laborato Reading Methods Assignm	Demonstrate extensive lestrong analytical and crif problems. Critical use of and presentational skills. Demonstrate substantial learning outcomes. Show and techniques to solve and presentational skills. Demonstrate general bu outcomes. Show evidenlab skills and techniques conclusions. Apply mode conclusions. Apply mode permonstrate partial but Show evidence of some partially effective lab sk conclusions. Apply limite Demonstrate little or not of analytical and critical a techniques to solve propresentational skills are rewith laboratory components.	crowledge and skills at an advanced level redical abilities and logical thinking, and ability if data and results to draw appropriate and in command of a broad range of knowledge aw evidence of analytical and critical abilities problems. Correct use of data of results to dust incomplete command of knowledge and correct but some analytical and critical abilities and so solve problems. Mostly correct but some rately effective organizational and presentatic limited command of knowledge and skills recoherent and logical thinking, but with limite tills and techniques to solve problems. Lim do ro barely effective organizational and preservidence of command of knowledge and skills abilities, logical and coherent thinking, and at olems. Misuse of data and results and/or uninimally effective or ineffective.	quired for attaining all the course lea to apply highly effective lab skills an insightful conclusions. Apply highly earns and logical thinking, and ability to an araw appropriate conclusions. Apply of logical thinking, and ability to apply the apply of logical thinking, and ability to apply the erroneous use of data and result on al skills. Quired for attaining some of the cour d analytical and critical abilities, and litted ability to use data and results national skills. The apply minimally effective or in able to draw appropriate conclusions to draw appropriate conclusions. Weighting in final course grade (%)	arning outcomes. Should techniques to solveffective organization ast most of the course play leffective organization of the course learning outcomes. It is to draw appropriate to draw appropriate arning outcomes. Laneffective lab skills arons. Organization armones. Organization armones. Organization armones. Assessment Methods to CLO Mappin CLO 1,2,3,4
Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching Learning Activities Assessment Methods and Weighting Required/recommended eading and	B C D Fail Lecture v Activitie Lectures Laborato Reading Methods Assignm Examina	Demonstrate extensive lestrong analytical and crif problems. Critical use of and presentational skills. Demonstrate substantial learning outcomes. Show and techniques to solve and presentational skills. Demonstrate general but outcomes. Show evidentab skills and techniques conclusions. Apply mode Demonstrate partial but Show evidence of some partially effective lab sk conclusions. Apply limite Demonstrate little or not of analytical and critical techniques to solve propresentational skills are rewith laboratory components. Solvey of Self study senents	crowledge and skills at an advanced level redical abilities and logical thinking, and ability if data and results to draw appropriate and in command of a broad range of knowledge aw evidence of analytical and critical abilities problems. Correct use of data of results to dust incomplete command of knowledge and correct but some analytical and critical abilities and so solve problems. Mostly correct but some rately effective organizational and presentatic limited command of knowledge and skills recoherent and logical thinking, but with limite tills and techniques to solve problems. Lim do ro barely effective organizational and preservidence of command of knowledge and skills abilities, logical and coherent thinking, and at olems. Misuse of data and results and/or uninimally effective or ineffective.	quired for attaining all the course lea to apply highly effective lab skills an insightful conclusions. Apply highly end skills required for attaining at lea and logical thinking, and ability to a provide a skills required for attaining most of display and a skills required for attaining most of display and ability to apply the erroneous use of data and result and skills. The provided and skills are still and critical abilities, and ited ability to use data and result and analytical and critical abilities, and ited ability to use data and results national skills. It is required for attaining the course lesility to apply minimally effective or in nable to draw appropriate conclusion. Weighting in final course grade (%) 30 70	aming outcomes. Should techniques to solveffective organization ast most of the courseply effective lab skilleffective organization of the course learning by moderately effective to draw appropriate to draw appropriate arning outcomes. Language of the course lab skills arons. Organization armons. Organ
Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching Learning Activities Assessment Methods and Weighting Required/recommended	B C D Fail Lecture v Activitie Lectures Laborato Reading Methods Assignm Examina M.G. Bes	Demonstrate extensive lestrong analytical and crit problems. Critical use of and presentational skills. Demonstrate substantial learning outcomes. Show and techniques to solve and presentational skills. Demonstrate general but outcomes. Show evidenlab skills and techniques conclusions. Apply mode Demonstrate partial but Show evidence of some partially effective lab sk conclusions. Apply limite Demonstrate little or not of analytical and critical attechniques to solve propresentational skills are a with laboratory components. See Sory / Self study sents sents attion st: Igneous and Metam	crowledge and skills at an advanced level retical abilities and logical thinking, and ability if data and results to draw appropriate and in command of a broad range of knowledge at we vidence of analytical and critical abilities problems. Correct use of data of results to dust incomplete command of knowledge and cot of some analytical and critical abilities and so solve problems. Mostly correct but some rately effective organizational and presentatic limited command of knowledge and skills recoherent and logical thinking, but with limite illist and techniques to solve problems. Lim do robarely effective organizational and preservidence of command of knowledge and skills reduced to the command of knowledge and skills abilities, logical and coherent thinking, and abilities, logical end coherent thinking, and abilities. Details Details	quired for attaining all the course lea to apply highly effective lab skills an insightful conclusions. Apply highly earns and logical thinking, and ability to a graw appropriate conclusions. Apply easilist required for attaining most of logical thinking, and ability to apple erroneous use of data and result on a skills. Quired for attaining some of the courd analytical and critical abilities, and ited ability to use data and results on a skills. Some and the second and the second analytical and critical abilities, and ited ability to use data and results on the second and the second shills. Some and the second shills are required for attaining the course leading to apply minimally effective or in able to draw appropriate conclusion. Weighting in final course grade (%) 30 70 Science, 2003, 2nd ed.)	arning outcomes. Should techniques to solveffective organization ast most of the course play leffective organization of the course learning outcomes. It is to draw appropriate to draw appropriate arning outcomes. Laneffective lab skills arons. Organization armones. Organization armones. Organization armones. Assessment Methods to CLO Mappin CLO 1,2,3,4

EASC3410	Hydrogeology (6 credits)	Academic Year	2019
Offering Department	Earth Sciences	Quota	40
Course Co-ordinator	Prof J J Jiao, Earth Sciences (jjiao @hku.hk)		
Teachers Involved	(Prof J J Jiao,Earth Sciences)		
Course Objectives	This course aims to introduce some basic concepts and theories of groundwater studies in HK. It consists of three components: 1) fundamentals of groundwater evaluation of groundwater as a resource; and 3) influence of groundwater of engineering	er physics; 2) we	ell hydraulics and
Course Contents	Hydrologic Cycle And water Budgets, Introduction to Hydrogeology (1 Week)		

& Topics	Hydraulic Basic Equ Groundwa Analysis (Well insta Regional Groundwa	ater Flow To Wells Of Aquifer Test(2 W Illation & pumping t Groundwater Flow ater contamination	(2 Weeks) rater Flow (1 Week) (1 Week) /eeks) eest design(1 Week) Systems (HK case study)(1 We (China case study)(Week 12)	,	
Course Learning Outcomes			this course, students should be		
Outcomes	CLO 2 ui	nderstand basic co nd surface water	ncepts of hydrological cycle and	chnical and environmental enginee d water balance, and interaction b	etween groundwater
	CLO 4 ui			ter system and geology and topog operties, hydraulic head, flow net,	
	CLO 5 us	se basic field aquife	er tests to estimate some import	ant aquifer parameters	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	ASC2402			
Offer in 2019 - 2020	Y 1st	sem Offer in 202	20 - 2021 : Y	Examination	Dec
Grade Descriptors (A+ to F)	A	learning outcomes. S	Show strong analytical and critical abiliti	ktensive knowledge and skills required for es and logical thinking, with evidence of or plems. Apply highly effective organizational	riginal thought, and ability
	to apply knowledge to a wide range of complex practical problems. 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 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	Show evidence of so	me coherent and logical thinking, but w	I skills required for attaining some of the c ith limited analytical and critical abilities. Sh ly effective organizational and presentation	now limited ability to apply
	Fail	of analytical and critic		e and skills required for attaining the course ag. Show very little or no ability to apply kno ly effective or ineffective.	
Course Type	Lecture w	rith laboratory comp	oonent course		
Course Teaching	Activitie		Details		No. of Hours
& Learning Activities	Lectures		12 sessions x 2 hours	12 sessions x 2 hours	
	Laborato	•	10 x 2 hours		
	Field wor		Half day field trip		5
		/ Self study			100
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignme	ents		30	CLO 1,2,3,4
	Examina	tion		70	CLO 1,2,3,4,5
Required/recommended reading and online materials	C. W. Fet	ter: Applied Hydrog	geology (Pearson Education Lim	nited, 2014, 4th ed.)	

EASC3412	Earth re	sources (6 credits)	Academic Yea	r 2019
Offering Department	Earth Scient	nces	Quota	40
Course Co-ordinator	Prof M F	Zhou, Earth Sciences (mfzhou@hku.hk)		
Teachers Involved	(Prof G Z	nao,Earth Sciences)		
	(Prof M F	Zhou,Earth Sciences)		
Course Objectives	understar	e students with knowledge about the clas d the processes that lead to their formatio tudents should gain knowledge about the wo	n; to gain hand on experience with min	ng procedures. In
Course Contents	Concepts	in mineral deposits and mining industrial;	exploration and mining methods, classi	fication of mineral
& Topics	deposit,	nineral deposit models, magmatic oxide	and sulfide deposits, skarn deposits, p	orphyre deposits,
	volcanoge	nic massive sulfide deposits, coal, oil and ga	as, resource evaluation.	
Course Learning		ssful completion of this course, students shou		
Outcomes	CLO 1	inderstand the terminology and nomenclature	e in the mining industrial and mineral depo	sits
		inderstand factors that are key to the formation		
		inderstand the controls of earth resources in		
	CLO 4	nderstand methods of exploration and explo	itation for mineral deposits	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	ASC2402 or EASC3402		
Offer in 2019 - 2020	Y 1st	sem Offer in 2020 - 2021 : Y	Examination	Dec
Grade Descriptors (A+ to F)	A	Demonstrate thorough understanding at an advanced course learning outcomes. Show strong analytical excellent field observation and ability to solve problem	and critical abilities and logical thinking. Evidence	of original thoughts,
	В	Demonstrate substantial understanding at an advance course learning outcomes. Show analytical and critica field observation. Effective organization and presental	al abilities and logical thinking. Evidence of original t	
	С	Demonstrate general but incomplete understanding rung of some analytical and critical abilities and logical thin	king. Moderately effective organization and presenta	tion skills.
	D	Demonstrate partial but limited understanding for all coherent and logical thinking, but with limited analytic or barely effective organizational and presentational s	al and critical abilities. Show limited ability to solve	
	Fail	No or little knowledge about the subject. No evidence		of analytical and critical

	abilities, logical and and presentational s		bility for field observation and for solving prol	blems. Poor organization
Course Type	Lecture with laboratory com	ponent course		
Course Teaching	Activities	Details		No. of Hours
& Learning Activities	Lectures	2 hour lectures per wee	ek for 10 weeks	20
	Laboratory			20
	Field work	Field work		8
	Reading / Self study			100
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Examination		68.5	CLO 1,2,3,4
	Laboratory reports		31.5	CLO 1,2
Required/recommended reading and	TBC			

EASC3413	Enginee	ring geology (6 cr	edits)	Academic Ye	ear 2019
Offering Department	Earth Scie	ences	·	Quota	35
Course Co-ordinator	Dr L N Y \	Nong, Earth Sciences	(Inywong@hku.hk)	·	
Teachers Involved		Wong,Earth Sciences liao,Earth Sciences)			
Course Objectives		nt some of the concep by case histories.	ts and skills of importance in the	profession of Engineering G	eology and illustrate
Course Contents	Introduction	on to engineering desi	gn and the role of the Engineerin	g Geologist; site investigation	n concepts and skills
& Topics	(air photo	•	nd rock description, engineering		•
Course Learning	On succes	ssful completion of this	s course, students should be able	to:	
Outcomes			ngineering design is carried out rticularly the economic- and safet		of the geologist on
			g-geological models and underst n design should be carried out	and how desk study, site rec	onnaissance survey
		arry out simple air pho r engineering purpose	to interpretation tasks and elemes s	entary soil and rock description	on and classification
	CLO 4 ur	nderstand major types	of slope failures and basic metho	ds to control and mitigate lan-	dslides
		arry out stability analy ethod	ses using methods such as the	e limit equilibrium and stere	ographic projection
Pre-requisites (and Co-requisites and Impermissible combinations)		ASC3410 and EASC3 se is only for final year	414, or already enrolled in these of students.	courses	
Offer in 2019 - 2020	Y 2nd	sem Offer in 2020 -	· 2021 : Y	Examination	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 and skills to solve familiar and some unfamiliar 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 and skills to solve most familiar, but not unfamiliar, 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 and skills to solve familiar practical problems. Apply limited or barely effective organizational and presentational skills.			
	Fail	Demonstrate little or no e of analytical and critical a	vidence of command of knowledge and s abilities, logical and coherent thinking. S nization and presentational skills are minin	kills required for attaining the course how very little or no ability to apply	learning outcomes. Lack
Course Type	Lecture w	ith laboratory compone	ent course		
Course Teaching	Activities	3	Details		No. of Hours
& Learning Activities	Lectures				24
	Laborator	У			20
	Field wor	k	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
	Assignme	ents	including field report	30	CLO 2,3,4,5
	Examinat			70	CLO 1,2,3,4,5
Required/recommended reading and online materials	Goodman	, R. E.: Engineering G	eology (Wiley, 1993).	·	· · · · ·

EASC3414	Soil and rock mechanics (6 credits)	Academic Year	2019
Offering Department	Earth Sciences	Quota	40
Course Co-ordinator	Prof J J Jiao, Earth Sciences (jjiao@hku.hk)		
Teachers Involved	(Dr L N Y Wong,Earth Sciences) (Prof J J Jiao,Earth Sciences)		
Course Objectives	To provide a basic knowledge of soil and rock mechanics for those wishing to on in engineering geology/geotechnics.	consider further sto	udies on a career
Course Contents	Stress and strain; properties and classifications of soil and rock; clay minerals;	pore pressure and	d effective stress;

& Topics		and failure criteria, initial ground treatment metho		surement; deformation; consolidation	; planes of weakness
Course Learning	On succe	essful completion of this	course, students should	l be able to:	
Outcomes		nderstand basic concep riteria	ots of stress and strain,	pore pressure and effective stress,	strength and failure
		nderstand basic properti			
		ppreciate the process of		oil consolidation	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	ASC3410, or already en	nrolled in this course		
Offer in 2019 - 2020	Y 2n	d sem Offer in 2020 - 2	2021 : Y	Examination	May
Grade Descriptors (A+ to F)	A			of extensive knowledge and skills required for abilities and logical thinking. Apply highly eff	
	В			knowledge and skills required for attaining at critical abilities and logical thinking. Apply efforts	
	С			owledge and skills required for attaining mos al abilities and logical thinking. Apply moderate	
	D		oherent and logical thinking,	and skills required for attaining some of the c but with limited analytical and critical abilities	
	Fail	Demonstrate little or no evi	dence of command of knowle	edge and skills required for attaining the course ninking. Organization and presentational skills	
Course Type	Lecture v	vith laboratory componer	nt 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	3	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignm	ents		30	CLO 1,2,3
	Examina	tion		70	CLO 1,2,3
Required/recommended reading and online materials		ig: Soil Mechanics (Chap odman: Introduction to R		Viley & Sons, 1989)	·

EASC3415	Meteor	ology (6 credits)	Academic Year	2019
Offering Department	Earth Sc		Quota	
Course Co-ordinator	Dr Jed K	aplan, Earth Sciences (jkaplan@hku.hk)		
Teachers Involved		olan,Earth Sciences) Lee,Earth Sciences)		
Course Objectives		rse provides students with a modern understanding of weather that govern atmospheric structure and behavior, weather eleme		
Course Contents & Topics	and pres	budget, radiative forcing, and greenhouse effect; stability, convectorsure; thermodynamic diagrams; weather charts; Forces, winds, and fronts; thunderstorms, mid-latitude cyclones, and tropic ere; weather forecasting.	and general circulation	n; Monsoons, air
Course Learning	On succe	essful completion of this course, students should be able to:		
Outcomes	CLO 1	describe key aspects of weather phenomena		
	CLO 2	explain essential elements of atmospheric processes governing	weather	
	CLO 3	apply physical principles to construct models for some basic asp	ects of weather	
	CLO 4	explain synoptic charts (weather maps)		
	CLO 5	interpret Hong Kong weather (typhoons etc.)		
(and Co-requisites				
and Impermissible combinations) Offer in 2019 - 2020		t sem Offer in 2020 - 2021 : Y	Examination	Dec
combinations)	Y 1s	Demonstrate thorough mastery at an advanced level of extensive knowledg learning outcomes. Show strong analytical and critical abilities and logical thir to apply knowledge to a wide range of complex, familiar and unfamiliar situatic draw appropriate and insightful conclusions. Show insightful use and critical ar	ge and skills required for attanking, with evidence of originations. Demonstrate critical use	aining all the course al thought, and ability of data and results to
combinations) Offer in 2019 - 2020 Grade Descriptors		Demonstrate thorough mastery at an advanced level of extensive knowledg learning outcomes. Show strong analytical and critical abilities and logical thir to apply knowledge to a wide range of complex, familiar and unfamiliar situation	ge and skills required for atta nking, with evidence of origina Demonstrate critical use nalysis / evaluation of informa required for attaining at leas I thinking, and ability to apply to draw appropriate conclusio	aining all the course al thought, and ability of data and results to tion drawn from a ful at most of the course knowledge to familia ns. Show critical use
combinations) Offer in 2019 - 2020 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 situatic draw appropriate and insightful conclusions. Show insightful use and critical ar range of high quality sources and to quote/reference aptly. 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. Demonstrate correct use of data and results to of relevant information from sources and ability to make meaningful compari	ge and skills required for attanking, with evidence of originations. Demonstrate critical use enalysis / evaluation of informate required for attaining at least thinking, and ability to apply to draw appropriate conclusions between different seconquired for attaining most of all thinking, and ability to apply data and results to draw applata and results to draw applates.	aining all the course at thought, and ability of data and results to tion drawn from a ful at most of the course knowledge to familian ns. Show critical use ndary interpretations the course learning y knowledge to most ropriate conclusions.
combinations) Offer in 2019 - 2020 Grade Descriptors	A B C	Demonstrate thorough mastery at an advanced level of extensive knowledge learning outcomes. Show strong analytical and critical abilities and logical thir to apply knowledge to a wide range of complex, familiar and unfamiliar situatio draw appropriate and insightful conclusions. Show insightful use and critical ar range of high quality sources and to quote/reference aptly. 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. Demonstrate correct use of data and results to frelevant information from sources and ability to make meaningful compariand to quote/reference aptly. Demonstrate general but incomplete command of knowledge and skills reoutcomes. Show evidence of some analytical and critical abilities and logical familiar situations. Demonstrate mostly correct but some erroneous use of deshow use of relevant information from sources and ability to make comp quote/reference aptly. Demonstrate partial but limited command of knowledge and skills required for Show evidence of some coherent and logical thinking, but with limited analytic knowledge to solve problems. Demonstrate limited ability to use data and resu	ge and skills required for attanking, with evidence of origina on Demonstrate critical use on slysis / evaluation of information or required for attaining at least at thinking, and ability to apply to draw appropriate conclusions between different secon quired for attaining most of all thinking, and ability to apply data and results to draw appropriate of the course all and critical abilities. Show I allist to draw appropriate conclusions and critical abilities.	aining all the course at thought, and ability of data and results to tion drawn from a full at most of the course knowledge to familiar ins. Show critical use indary interpretations the course learning y knowledge to most ropriate conclusions, terpretations and to be learning outcomes, imited ability to apply sions. Show use and
combinations) Offer in 2019 - 2020 Grade Descriptors	B C	Demonstrate thorough mastery at an advanced level of extensive knowledg learning outcomes. Show strong analytical and critical abilities and logical thir to apply knowledge to a wide range of complex, familiar and unfamiliar situation draw appropriate and insightful conclusions. Show insightful use and critical arrange of high quality sources and to quote/reference aptly. 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. Demonstrate correct use of data and results to frelevant information from sources and ability to make meaningful compariand to quote/reference aptly. Demonstrate general but incomplete command of knowledge and skills reoutcomes. Show evidence of some analytical and critical abilities and logical familiar situations. Demonstrate mostly correct but some erroneous use of data was the situations. Demonstrate mostly correct but some erroneous use of data of the source and ability to make computor/reference aptly. Demonstrate partial but limited command of knowledge and skills required for Show evidence of some coherent and logical thinking, but with limited analytical knowledge to solve problems. Demonstrate limited ability to use data and results.	ge and skills required for atta- king, with evidence of origina- ins. Demonstrate critical use- inalysis / evaluation of informa- required for attaining at leas- I thinking, and ability to apply- to draw appropriate conclusio- isons between different seco- quired for attaining most of I thinking, and ability to apply- barisons between different in r attaining some of the course all and critical abilities. Show I alls to draw appropriate conclus- is and comparison. defor attaining the course lear I little or no ability to apply	aining all the course al thought, and ability of data and results to tion drawn from a full at most of the course knowledge to familiar ins. Show critical use indary interpretations the course learning y knowledge to most ropriate conclusions. terpretations and to be learning outcomes. Lack knowledge to solve

Course Teaching	Activities Details			No. of Hours				
& Learning Activities	Lectures			36				
	Project work		36					
	Tutorials			12				
	Reading / Self study			48				
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping				
	Assignments		40	CLO 1,2,3				
	Examination	2-hour written exam	50	CLO 1,2,4				
	Test		10					
Required/recommended reading and online materials	2013).	C. Donald Ahrens, Meteorology Today, An Introduction to Weather, Climate and the Environment (Brooks/Cole,						

EASC3416	Advance	ed geochemistry a	nd geochronology (6 credits)	Academic Ye	ar 2019			
Offering Department	Earth Scie	ences		Quota	50			
Course Co-ordinator	Prof M F Z	Zhou, Earth Sciences (mfzhou @hku.hk)					
Teachers Involved								
Course Objectives	To present key concepts of modern geochemistry and geochronology and their application to environmental and Earth science problems.							
Course Contents & Topics	Principles of radiogenic isotopic dating and modern instruments Zircon U-Pb isotopic dating and its application Principles and techniques for dating mineral deposits Introduction to Quaternary geochronology Principle, development and applications of Luminescence dating							
Course Learning			course, students should be able to:					
Outcomes	CLO 1 de	emonstrate knowledge	of concepts and ideas of modern geo	chemistry				
	CLO 2 ex	plain principles of radi	ogenic isotopic dating					
	CLO 3 un	derstand how modern	analytical techniques are applied to d	ating earth materials				
		nderstand how geoche iiences	mical methods are applied to gain ins	ight into process in enviro	onmental and Earth			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in EA	ASC2401 or EASC240	6 or EASC2407					
Offer in 2019 - 2020	N Offe	er in 2020 - 2021 : N		Examination				
Grade Descriptors	A		rough mastery at an advanced level of extensi					
(A+ to F)	B C	ability to apply his/her kn knowledge in geochemist fluxes of materials over organizat-ional and preser Student demonstrates sut course learning outcomes range of problems in geominerals, fluids and gase organizational and presen Student demonstrates ge learning outcomes. Show knowledge to a range of p on a global scale. Student Student demonstrates pa	ostantial command of a broad range of knowle. Show evidence of analytical and critical abilitie chemistry, and at the same combine knowledges over geological time periods and on a glot tational skills. In the same to the same compared but incomplete command of knowledger evidence of some analytical and critical abirroblems in geochemistry and how interactions shows the ability to apply moderately effective trial but limited command of knowledge and s	chemistry, and at the same, carals, fluids and gases and how e. Student shows the ability the dge and skills required for attained and logical thinking, and apple in geochemistry to understant ball scale. Student shows the analysis of the same logical thinking, and among minerals, fluids and gasing organizational and presentation kills required for attaining some	n combine fundamental these processes impact to apply highly effective hing at least most of the y his/her knowledge to a d material fluxes among ability to apply effective ing most of the course ability to apply his/her se impact material fluxes all skills.			
	Fail	outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limits ability to understand key topics in geochemistry and limited capability to transfer this knowledge to geological phenomen Student shows the ability to apply limited or barely effective organizational and prefer the control of the providence of t						
	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.							
Course Type		ith laboratory compone						
Course Teaching	Activities	3	Details		No. of Hours			
& Learning Activities	Lectures				24			
	Laborator	•	Up to 24 hours		24			
	Group wo				24			
	Discussio		Up to 24 hours		24			
	Reading /	Self study			60			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Examinat	ion	One 2-hour written examination	60	CLO 1,2,3,4			
	Presentat	tion		20	CLO 1,2,3,4			
	Project re	port		20	CLO 1,2,3,4			
Required/recommended reading and online materials		Project report 20 CLO 1,2,3, Geochemistry by William M. White (Wuley, Apr 1, 2013)						

EASC3417	Earth through time (6 credits)	Academic Year	2019
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							
		•	the evolution of Earth and life on	0 11	. c. sai piaco ili tile			
Course Contents	Geological time, the origin of life, fossils and diversification of life through time, Important events in Earth history							
& Topics	such as	Snowball Earth, the 0	Cambrian explosion of life, the	Permian/Triassic mass extincti	on, the Cretaceous			
		Tertiary extinction event, the origins of humans						
Course Learning			s course, students should be abl	e to:				
Outcomes	CLO 1 define basic geological principles							
		explain critical geologi	•					
		•	ne development of our planet					
	CLO 4	interpret the geologica	I record of evolution through time	•				
	CLO 5	compare and contrast	various hypotheses put forward t	to explain major events in Earth	history			
	CLO 6	describe major fossil g	roups					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	EASC3403						
Offer in 2019 - 2020	Y 1s	t sem Offer in 2020 -	· 2021 : Y	Examination	Dec			
Grade Descriptors (A+ to F)	Α	to draw appropriate and	and critical abilities and logical thinking, with insightful conclusions. Apply highly ef ving strong ability in experiments, data sults.	fective organizational and presentation	nal skills. Attend all the			
	В	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							
	D	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. Attend >50% of the laboratory classes; showing ability in experiments, data processing and analysis; presenting lab reports with acceptable results.						
	Fail 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. Miss more than hall of lab work; not able to turn laboratory reports; cannot properly use computer and software for data processing; the lab report fail to give correct result.							
Course Type	Lecture v	vith laboratory compor	ent course					
Course Teaching	Activitie	s	Details		No. of Hours			
& Learning Activities	Lectures	3			24			
	Laborato	ory			12			
	Project v	vork			10			
	Reading	/ Self study			90			
Assessment Methods and Weighting	Methods	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Examina	ntion		40	CLO 1,2,3,4,5,6			
	Laborato	ory reports		20	1			
	Presenta	· ·	Group Presentation	20				
	Test		MCQ Test	20	CLO 2,4,5			
Required/recommended	Stanley,	S. M and Luczaj, J. A.:	Earth System History (4th Edition	on)				
reading and online materials		,		•				

EASC3418	Coasts	Coasts and coastal change (6 credits) Academic Year 2019)					
Offering Department	Earth Sc	Earth Sciences Quota											
Course Co-ordinator	Prof YQ	Zong,	, Earth Sci	ences (yqzo	ong @h	ku.hk)							
Teachers Involved	\ \	,	arth Scienc g,Earth Sci	,									
Course Objectives	fieldtrips.	s. Tea drivers	ching mat s for coast	nts an oppo erial covers al landform	short-	term to	long-term	n processes	s of diffe	rent c	oastal syst	ems,	natural and
Course Contents & Topics	Major cNaturalCoastalHuman	coasta al drive al proc in drive	l environmers for coastesses: see	se includes: nents: rocky stal processo diment trans stal change: astal chango	es: wa port ar settler	ve, tide, ond depos ments, in	coastal co ition, biol frastructu	urrents, fres ogical activ ires and coa	shwater a rity astal haz	nd sed		harge	
Course Learning	On successful completion of this course, students should be able to:												
Outcomes	CLO 1 Describe the tectonic geomorphological processes that shape landscapes												
	CLO 2	Ass	ess quant	itatively upli	ft and	erosion							
	CLO 3 Demonstrate knowledge of weathering processes and relationship to climate												
	CLO 4	Und	derstand fu	undamental	eleme	ntal cycle	s at Eart	h's surface					
	CLO 5	App	oly method	ls and proxie	es for E	Earth sur	ace proc	ess studies	3				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in E	EASC	2401 and	EASC2402	OR Pa	iss in EN	VS2001						
Offer in 2019 - 2020	N Of	Offer in	2020 - 20	21 : Y						Exam	nination	Ī	
Grade Descriptors (A+ to F)	Α	evid	dence of ori	orough master ginal thought, ghly effective or	ánd abi	lity to appl	y knowledg	ge to a wide l					

	В	Demonstrate substantial command of the course material and an ability to apply knowledge to familiar and some unfar situations. Show evidence of analytical, critical thought to some complex issues. Apply effective organizational presentational skills Demonstrate general but incomplete command of the course material and an ability to apply knowledge to most fan situations. Show evidence of some critical and logical thinking abilities. Apply moderately effective organizational presentational skills.						
	С							
	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	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.						
Course Type	Lecture wi	th laboratory componer	nt course					
Course Teaching	Activities		Details	No. of Hours				
& Learning Activities	Lectures		12 lectures @2 hours ea	24				
	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			
	Examinati	on		50	CLO 1,2,3,4			
	Laborator	/ reports	Labs & Field work	50	CLO 1,2,3,4			
Required/recommended reading and online materials				nd Geomorphology. Cambridge Un al Processes and Geomorphology.				

EASC3419	Earth Sy	stem Science Fi	Earth System Science Field Studies (6 credits) Academic Y					
Offering Department	Earth Scie	nces	•	Quota	15			
Course Co-ordinator	Dr Jed O.	Or Jed O. Kaplan, Earth Sciences <i>(jkaplan @hku.hk)</i>						
Teachers Involved	(Dr Jed O.	Kaplan,Earth Scien	ces)					
		S. Khan, Earth Scien						
Course Objectives			idents will study the structure and dynar					
			ndforms. Students will learn basic method		and survey so as t			
0		•	etween the different components of the Ea	•				
Course Contents			the atmospheric, oceanic, and terrestria					
& Topics	,	lynamics of mountain glaciers; structure, mineral composition, and the role of wind in the formation of deserts and bess landforms.						
Course Learning			is course, students should be able to:					
Outcomes			etween the sea, atmosphere and terrestri	ial environments at the	coastal zone			
			acteristics of mountain glaciers, deserts a		0000001 20110			
			namic processes of these environments					
			critical understanding of the systematic rel	lationships between the	se environments			
			in analyzing the sustainable developmer					
Pre-requisites		ne of the following 20	, ,		'			
(and Co-requisites		2 or ENVS2001 or G						
and Impermissible	Or upon sp	pecial arrangement v	with the course coordinator					
combinations)								
Offer in 2019 - 2020		er in 2020 - 2021 : Y		Examination				
Grade Descriptors	Α		mastery at an advanced level of knowledge and s					
(A+ to F)	strong analytical and critical abilities and logical thinking, with evidence of insights, and the ability to apply the knowledge to analyze the Earth system structure. Can insightfully combine the field investigation and indoor analysis to understand the							
	interactions between the different components of the Earth system and human impact. Show high competence in integratin							
	knowledge and presentation skills.							
	B Demonstrates a substantial grasp of a wide range of knowledge and skills required for a planned field investigation. Show evidence of analytical and critical abilities and logical thinking, and apply the knowledge to analyze the Earth system structure							
	Can combine the field investigation and indoor analysis to understand the difference between the natural and human-impacted							
	processes. Show competence in integrating knowledge and presentational skills. C Demonstrates a general but incomplete grasp of knowledge and skills required for a planned field investigation. Show evidence							
	of some analytical and critical abilities and logical thinking, and ability to apply the knowledge to analyze some Earth System							
	problems and the difference in rates and processes between natural and human-impacted processes. Shows the ability to							
	integrate the learned knowledge and presentational skills. Demonstrates partial but limited command of knowledge and some skills required for attaining 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 processes in Earth Systems and limited capability to link this knowledge to the other systems. Shows certain							
	ability to apply limited or barely effective organizational and presentational skills. Fail Demonstrate little evidence of getting the knowledge and skills required for attaining the course learning outcomes. Lack of							
	analytical abilities, logical and coherent thinking. Show little ability to apply knowledge to understand the basic processes in Ear							
			lity to integrate the collected materials and minimally	/ effective or ineffective prese	entational skills.			
Caa Ta	Field serve			•				
	Field camp		Detaile	·				
Course Teaching	Activities		Details		No. of Hours			
Course Teaching	Activities Field work	(Field trip (23 days x 8 hours per day))	No. of Hours 184			
Course Teaching & Learning Activities	Activities Field work Reading /		Field trip (23 days x 8 hours per day) Preparation of final video (in groups)		No. of Hours 184 16			
Course Teaching & Learning Activities Assessment Methods	Activities Field work	(Field trip (23 days x 8 hours per day)	Weighting in final	No. of Hours 184 16 Assessment			
Course Teaching & Learning Activities Assessment Methods	Activities Field work Reading /	(Field trip (23 days x 8 hours per day) Preparation of final video (in groups)		No. of Hours 184 16 Assessment Methods			
Course Teaching & Learning Activities Assessment Methods	Activities Field work Reading / Methods	s C Self study	Field trip (23 days x 8 hours per day) Preparation of final video (in groups) Details	Weighting in final course grade (%)	No. of Hours 184 16 Assessment Methods to CLO Mappin			
Course Teaching & Learning Activities Assessment Methods	Activities Field work Reading / Methods Assignme	s C Self study	Field trip (23 days x 8 hours per day) Preparation of final video (in groups) Details Daily assessement	Weighting in final course grade (%)	No. of Hours 184 16 Assessment Methods to CLO Mappin CLO 1,2,3			
Course Teaching & Learning Activities Assessment Methods	Activities Field work Reading / Methods Assignme Report	s C Self study	Field trip (23 days x 8 hours per day) Preparation of final video (in groups) Details Daily assessement Video project	Weighting in final course grade (%) 33 34	No. of Hours 184 16 Assessment Methods to CLO Mappin CLO 1,2,3 CLO 1,2,3,4,5			
Course Teaching & Learning Activities Assessment Methods and Weighting	Activities Field work Reading / Methods Assignme Report Test	Self study	Field trip (23 days x 8 hours per day) Preparation of final video (in groups) Details Daily assessement Video project Oral examination	Weighting in final course grade (%)	No. of Hours 184 16 Assessment Methods to CLO Mappin CLO 1,2,3 CLO 1,2,3,4,5			
Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended	Activities Field work Reading / Methods Assignme Report Test Required in	Self study ents reading to be annour	Field trip (23 days x 8 hours per day) Preparation of final video (in groups) Details Daily assessement Video project Oral examination nced.	Weighting in final course grade (%) 33 34 33	No. of Hours 184 16 Assessment Methods to CLO Mappin CLO 1,2,3 CLO 1,2,3,4,5			
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended reading and online materials	Activities Field work Reading / Methods Assignme Report Test Required in Three two	Self study ents reading to be annour	Field trip (23 days x 8 hours per day) Preparation of final video (in groups) Details Daily assessement Video project Oral examination nced. meetings, including one film screening and	Weighting in final course grade (%) 33 34 33	No. of Hours 184 16 Assessment Methods to CLO Mappin CLO 1,2,3 CLO 1,2,3,4,5			
Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended reading and	Activities Field work Reading / Methods Assignme Report Test Required r Three two- Practical s	Self study ents reading to be annour chour pre-trip course	Field trip (23 days x 8 hours per day) Preparation of final video (in groups) Details Daily assessement Video project Oral examination nced. meetings, including one film screening and	Weighting in final course grade (%) 33 34 33 and discussion.	No. of Hours 184 16 Assessment Methods to CLO Mappin CLO 1,2,3,4,5 CLO 1,2,3,4,5			
Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended reading and online materials	Activities Field work Reading / Methods Assignme Report Test Required r Three two Practical s Starting of transect to	Self study ents reading to be annour hour pre-trip course eminar with a docum n the eastern slope to the Pacific coast, o	Field trip (23 days x 8 hours per day) Preparation of final video (in groups) Details Daily assessement Video project Oral examination need. meetings, including one film screening and mentary filmmaker.	Weighting in final course grade (%) 33 34 33 and discussion. Destern U.S.A., we will a range of landscapes f	No. of Hours 184 16 Assessment Methods to CLO Mappin CLO 1,2,3 CLO 1,2,3,4,5 CLO 1,2,3,4,5 make a three-weefrom glaciated alpir			

encompasses range of landforms, climates, geology, soils, and biomes that are both relatively easy to access and visible over short distances.

Priority of enrollment will be given to Earth System Science major students.

EASC3999	Directe	d studies in earth sci	ences (6 credits)	Academic Ye	ar 2019				
Offering Department	Earth Sci	iences		Quota					
Course Co-ordinator	Prof M S	Prof M Sun, Earth Sciences (minsun@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 learning and critical thinking skills.								
Course Contents	The student undertakes a self-managed study on a topic in earth sciences under the supervision of a sta								
& Topics	The topic review or	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	On succe	On successful completion of this course, students should be able to:							
Outcomes		CLO 1 enhance the ability in self-learning, data-collection and analysis, critical thinking, doing independent research in earth sciences							
	CLO 2 w	vrite scientific dissertation,	and conduct oral presentation of the	he research results					
Pre-requisites (and Co-requisites and Impermissible combinations)	System S Cumulati This cour Earth Sys	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 2019 - 2020		ear long Offer in 2020 - 2	•	Examination	No Exam				
Grade Descriptors (A+ to F)	A	original thought. Insightful use and critical analysis / evaluation of information drawn from a full range of high quality sources an to quote/reference aptly. Critical use of 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 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	C 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	i i							
	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.								
Course Type	Project-b	ased course							
Course Teaching	Activitie	es	Details		No. of Hours				
& Learning Activities	Reading	/ Self study	The student is expected to spend the project	d at least 120 hours on	120				
Assessment Methods and Weighting	Methods	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping				
	Researc	h report	Report and presentation	100	CLO 1,2				

EASC4403	Biogeochemical cycles (6 credits)	Academic Year	2019				
Offering Department	Earth Sciences	Quota					
Course Co-ordinator	Dr Y Li, Earth Sciences (yiliang@hku.hk)						
Teachers Involved	(Dr Y Li,Earth Sciences)						
Course Objectives	This course presents how the basic geochemistries of the Earth system hydrosphere, have been and are being affected by the origin, evolution particular, from the rapid consumption of resources to the destruction of are leading to rapid changes in the geochemistry of the Earth systems.	n and existence of life. He	uman activities ir				
Course Contents & Topics	1) Origin of elements, the Solar system and the Earth 2) Geobiology and biogeochemical cycles: their role in the Earth system 3) Terrestrial biogeochemical cycles 4) Aquatic biogeochemical cycles 5) Marine biogeochemical cycles 6) Phosphorous cycle 7) Sulfur cycle 8) Carbon cycle 9) Nitrogen cycle 10) Biogeochemical cycles and impacts from human activities						
Course Learning Outcomes	, , ,						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in EASC3403 or EASC3416 or ENVS3313	J,g-					

Offer in 2019 - 2020	Y 1st	sem Offer in 2020 - 20	021 : Y	Examination	Dec			
Grade Descriptors (A+ to F)	Α	learning outcomes. Show st	trong analytical and critical act					
(11 10 1)	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcome. Show evidence of analytical and critical abilities and logical thinking.						
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Apply moderately effective organizational and presentational skills. Show interest in the taught topics, and to answer most questions correctly.							
	D	Show evidence of some col	herent and logical thinking, bu	and skills required for attaining some of the cout with limited analytical and critical abilities. Staught topics. Able to answer more than half of	he limited ability to apply			
	Fail	of analytical and critical al	bilities, logical and coherent	dge and skills required for attaining the course thinking. Show very little or no ability to ap able to answer most of questions.				
Course Type	Lecture-b	ased course						
Course Teaching	Activitie	s	Details		No. of Hours			
& Learning Activities	Lectures				28			
	Tutorials				10			
	Field work			8				
	Group wo	ork	PBL group work	10				
	Project w	ork	Writing course thesis	30				
	Reading	/ Self study			54			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Essay			60	CLO 1,2,3,4			
	Examina	tion		40	CLO 1,2,3,4			
Required/recommended reading and online materials		1. Biogeochemistry: An Analysis of Global Change, William H. Schlesinger, Emily Bernhardt. 2. Introduction to marine biogeochemistry, Susan M. Libes, Elsevier, 2009.						

EASC4406	Earth dynamics & global tectonics (6 credits)	Academic Year	2019					
Offering Department	Earth Sciences	Quota						
Course Co-ordinator	Prof G Zhao, Earth Sciences (gzhao@hku.hk)							
Teachers Involved	(Dr T Nakagawa,Earth Sciences)							
	(Prof G Zhao,Earth Sciences)							
Course Objectives	To review the concepts and processes that shape the configuration o This course is intended to provide students with an understanding of global outcome of these processes through an examination of dire	the driving forces of Earth p	processes and the					
	hypotheses, and critical thinking.							
Course Contents & Topics	 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; differ atmosphere and oceans; the earliest felsic crust; Late Heavy Bombar Archean cratons: greenstones and TTG gneisses; origin of komattiformation and evolution; when did plate tectonics start on Earth? Paleoproterozoic collision tectonics. Supercontinents in Earth history: the assembly, outgrowth and b Rodinia and Pangea. 	dment. tes; role of mantle plumes i	n Archean crusta					
Course Learning	On successful completion of this course, students should be able to:							
Dutcomes	CLO 1 have an appreciation of the Earth as a dynamic planet							
	CLO 2 understand how energy release within the Earth is translated into geological processes							
	CLO 3 appreciate the importance of a knowledge of the history of investigation of global scale tectonic processes							
	CLO 4 distill of a wide range of data to differentiate competing geological theories							
	CLO 5 produce concise written and oral summaries of literature research on specific topics in global dynamics							
Pre-requisites (and Co-requisites and Impermissible	Pass in EASC3403 or EASC3404 or EASC3408 or EASC3409							
combinations) Offer in 2019 - 2020	Y 2nd sem Offer in 2020 - 2021 : Y	Examination	Mav					
Grade Descriptors	The student should show a thorough mastery of the knowledge and skill							
(A+ to F)	In depth grasp of the subject, and provide evidence of strong analytical Show outstanding and effective organizational and presentation skills, a sources to undertake a high level of critical analysis and draw appropriate theories, principles, and evidence.	and logical thinking, where possible nd the insightful use of data, literat	with original thought ure reviews and othe					
	B 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, compet course outcomes, and a general grasp of the subject. Show some evide effective organizational and presentational skills. The student should appropriate conclusions, should be able to use relevant information different interpretations, through partial integration of theories, principles	ence of critical ability and logical thing the moderately effective in the from sources and able to make of	inking and moderatel use of data to drav					
	The student should have a partial but limited command of the knowle number of the course learning outcomes, and a limited grasp of the sub-	edge, competencies and skills nec						

		critical thinking and at least marginally effective organizational and presentational skills. Have limited ability to results to draw appropriate conclusions and use and reference a variety of sources mainly in summary rather analysis and comparison.						
	Fail	outcomes, lacks an little ability to a apply	The student shows little or no evidence of knowledge and skills required for attaining even the minority of course learn outcomes, lacks an overall grasp of the subject area and shows an absence of analytical and critical thinking abilities. She little ability to a apply knowledge to solve problems and has poor and ineffective presentation and/or organizational skills. She little evidence of the integration of theories, principles and evidence.					
Course Type	Lecture-b	pased course						
Course Teaching	Activitie	s	Details		No. of Hours			
& Learning Activities	Lectures			24				
	Tutorials	•	student seminars and exercises	20				
	Reading	/ Self study	essay, presentation plus additiona	100				
Assessment Methods and Weighting	Methods	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Essay		Including essays and seminars	50	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	obal tectonics (Oxford: Blackwell Science : Geodynamics (Cambridge Univ Press, 2 convection for geologists (Cambridge 20	2002, 2nd ed.)				

EASC4407	Region	nal geology (6 credits	5)	Academic Ye	ear 2019		
Offering Department	Earth So		,	Quota	40		
Course Co-ordinator	Dr A A C	G Webb, Earth Sciences (aagwebb @hku.hk)				
Teachers Involved	`	G Webb,Earth Sciences) Ali,Earth Sciences)	,				
Course Objectives		urse explores regional g cal questions.	geologies as well as the approa	aches that geologists use	to resolve regiona		
Course Contents & Topics	can test various of East America	We will use case studies to explore how regional investigations integrating field-based and analytical research tools 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 Outcomes	CLO 1	appreciate the influential (course, students should be able to and commonly conflicting) model		to explain a range o		
	CLO 2	regional tectonic phenome understand the various "t the evolution of tectonicall	ools" that are commonly used by	geo-scientists to test and	develop models fo		
			entific literature review on a key tten communication in an engagir	0 0	•		
Pre-requisites and Co-requisites and Impermissible combinations)	Pass in	EASC3402; and (EASC34	403 or EASC3404)				
Offer in 2019 - 2020	Y 19	st sem Offer in 2020 - 20	021 : Y	Examination	No Exam		
Grade Descriptors	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 antiv						
(A+ to F)			ful use and critical analysis / evaluation o				
•	В	presentational skills; insight and to quote/reference aptly Substantial grasp of the su	ful use and critical analysis / evaluation o /. ubject; evidence of critical abilities and l ant information from sources, showing a	f information drawn from a full rang ogical thinking; effective organizat	ge of high quality source		
•		presentational skills; insight and to quote/reference aptly Substantial grasp of the su skills; critical use of releva secondary interpretations an General but incomplete gr	ful use and critical analysis / evaluation o , bject; evidence of critical abilities and I ant information from sources, showing a nd to quote/reference aptly. "asp of the subject; evidence of some ational skills; use of relevant information fi	f information drawn from a full rang ogical thinking; effective organizat bility to make meaningful compai critical abilities and logical thinkir	ge of high quality source tional and presentationa risons between differer ng; moderately effective		
•	В	presentational skills; insight and to quote/reference aptly Substantial grasp of the su skills; critical use of releve secondary interpretations an General but incomplete groganizational and presente different interpretations and Limited grasp of the subject	ful use and critical analysis / evaluation or bject; evidence of critical abilities and I ant information from sources, showing a nd to quote/reference aptly. asp of the subject; evidence of some ational skills; use of relevant information in to quote/reference aptly. t, retention of some relevant information in nal and presentational skills; use and re	f information drawn from a full rang- ogical thinking; effective organizat bility to make meaningful compal critical abilities and logical thinking from sources, showing ability to ma of the subject; evidence of limited	ge of high quality source tional and presentationa risons between differer ng; moderately effective ke comparisons betweet critical abilities; limited of		
•	В	presentational skills; insight and to quote/reference aptly Substantial grasp of the suskills; critical use of releve secondary interpretations and General but incomplete grorganizational and presenta different interpretations and Limited grasp of the subject barely effective organizatio rather than analysis and could the property of the knowledge of the subject o	ful use and critical analysis / evaluation or bject; evidence of critical abilities and I ant information from sources, showing a nd to quote/reference aptly. asp of the subject; evidence of some ational skills; use of relevant information in to quote/reference aptly. t, retention of some relevant information in nal and presentational skills; use and re	f information drawn from a full rang- ogical thinking; effective organizat billity to make meaningful compai critical abilities and logical thinking from sources, showing ability to ma of the subject; evidence of limited of eference of several sources, but re- little or no evidence of critical abilit	ge of high quality source tional and presentationarisons between differenting; moderately effective ke comparisons between critical abilities; limited of mainly through summar ties and logical / coherer		
(A+ to F)	B C D	presentational skills; insight and to quote/reference aptly Substantial grasp of the standing skills; critical use of relevasecondary interpretations at General but incomplete groganizational and presente different interpretations and Limited grasp of the subject barely effective organization rather than analysis and cor Little or no grasp of the knothinking; incoherent organiz	ful use and critical analysis / evaluation or	f information drawn from a full rang- ogical thinking; effective organizat billity to make meaningful compai critical abilities and logical thinking from sources, showing ability to ma of the subject; evidence of limited of eference of several sources, but re- little or no evidence of critical abilit	ge of high quality source tional and presentationarisons between differenting; moderately effective ke comparisons between critical abilities; limited of mainly through summar ties and logical / coherer		
Course Type	B C D	presentational skills; insight and to quote/reference aptly Substantial grasp of the suskills; critical use of relevasecondary interpretations at General but incomplete grorganizational and presented different interpretations and Limited grasp of the subject barely effective organization rather than analysis and cortitle or no grasp of the known thinking; incoherent organization. With laboratory componer	ful use and critical analysis / evaluation or	f information drawn from a full rang- ogical thinking; effective organizat billity to make meaningful compai critical abilities and logical thinking from sources, showing ability to ma of the subject; evidence of limited of eference of several sources, but re- little or no evidence of critical abilit	ge of high quality source tional and presentationarisons between differenting; moderately effective ke comparisons between critical abilities; limited of mainly through summar ties and logical / coherer		
(A+ to F) Course Type Course Teaching	B C D Fail	presentational skills; insight and to quote/reference aptly Substantial grasp of the statistic content of the secondary interpretations at General but incomplete grorganizational and presented different interpretations and Limited grasp of the subject barely effective organization rather than analysis and cortification or grasp of the known thinking; incoherent organization. With laboratory componer es	ful use and critical analysis / evaluation or	f information drawn from a full rang- ogical thinking; effective organizat billity to make meaningful compai critical abilities and logical thinking from sources, showing ability to ma of the subject; evidence of limited of eference of several sources, but re- little or no evidence of critical abilit	ge of high quality source tional and presentations risons between differering; moderately effectively experience of the comparisons between critical abilities; limited of mainly through summar ties and logical / coheren no critical comparison of the critical compa		
Course Type	B C D Fail Lecture Activiti	presentational skills; insight and to quote/reference aptly Substantial grasp of the statistic content of the statistic c	ful use and critical analysis / evaluation or	f information drawn from a full rang- ogical thinking; effective organizat bility to make meaningful compai critical abilities and logical thinking om sources, showing ability to ma- of the subject; evidence of limited of efference of several sources, but r little or no evidence of critical abilitied use of secondary sources and	ge of high quality source tional and presentationarisons between differer ng; moderately effective ke comparisons between critical abilities; limited of mainly through summar ties and logical / coheren no critical comparison of		
(A+ to F) Course Type Course Teaching	B C D Fail Lecture Activiti Lecture Laborat	presentational skills; insight and to quote/reference aptly Substantial grasp of the statistic content of the statistic c	ful use and critical analysis / evaluation or	f information drawn from a full rang- ogical thinking; effective organizat bility to make meaningful compai critical abilities and logical thinking om sources, showing ability to ma- of the subject; evidence of limited of efference of several sources, but r little or no evidence of critical abilitied use of secondary sources and	ge of high quality source tional and presentation: risons between differering; moderately effectively ke comparisons between critical abilities; limited mainly through summar ties and logical / cohereno critical comparison. No. of Hours 28		
•	B C D Fail Lecture Activiti Lecture Laborat	presentational skills; insight and to quote/reference aptly Substantial grasp of the statistic content of the statistic c	ful use and critical analysis / evaluation or	f information drawn from a full rang- ogical thinking; effective organizat bility to make meaningful compai critical abilities and logical thinking om sources, showing ability to ma- of the subject; evidence of limited of efference of several sources, but r little or no evidence of critical abilitied use of secondary sources and	ge of high quality source tional and presentations risons between differer ring; moderately effectiv ke comparisons between critical abilities; limited of mainly through summar ties and logical / cohere no critical comparison of No. of Hours 28 20		
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EASC4408	Special topics in earth sciences (6 credits)	Academic Year	2019
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 of universe, the origins of our planetary system, and geological processes in extr Students will explore the concept of abiotic chemical evolution and learn ab targeted for life detection in modern space exploration missions. The course a meteorites and their relationship to the origin of the Earth, solar system & univ	eme extraterrestrout various impo lso provides oppo	ial environments rtant biomarkers rtunities to stud

	 2. Star formation and the accretion of planets 3. Meteorites and comets 4. Impacts and craters 5. Evolution of other terrestrial planets 					
		tic chemistry and t thetic isotopic frac	•			
	,	rker and molecular				
		etry-breaking mec				
		spectrometry for o	organic geochemists ents			
			ble planet and moons			
Course Learning	On successful completion of this course, students should be able to:					
Outcomes			netary materials in the Solar System a anetary events shaped the history of th			
	CLO 3 re	ecognise and diffe	rentiate between the organic signatur r chemical structures as molecular fos	res of biotic and abiotic mater	ials, and appreciate	
	CLO 4 e	valuate contempo	orary theories on the origin of life and ivery to planetary surfaces	d the formation of complex of	rganic molecules in	
	g	enerated from the	rtical techniques to reconstruct orga latest planetary missions sts and curiosity in the field of planetar		and interpret data	
Pre-requisites and Co-requisites and Impermissible			EASC4XXX course	y dolonoc		
combinations)						
Offer in 2019 - 2020	1	fer in 2020 - 2021		Examination		
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, and evidence of productive reading supplementing lectures. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to synthesize and apply knowledge to a wide range of complex, familiar and unfamiliar situations. Demonstrate critical use of data, literature reviews, and other sources to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills.					
(A. 101)		familiar and unfamil	liar situations. Demonstrate critical use of data,	, literature reviews, and other sources		
(A. 181)	В	familiar and unfamil insightful conclusior Demonstrate substa learning outcomes. knowledge to famili	liar situations. Demonstrate critical use of data, ns. Apply highly effective organizational and pre antial command of a broad range of knowledg Show evidence of analytical and critical abili iar and some unfamiliar situations, but falling n, literature reviews, and other sources to draw	literature reviews, and other sources seentational skills. je and skills required for attaining at tities and logical thinking, and ability short on excellence in some of thes	least most of the course to synthesize and apply se aspects. Demonstrate	
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(2.101)		familiar and unfamil insightful conclusior Demonstrate substalearning outcomes. Incoming outcomes, knowledge to familicorrect use of data presentational skills Demonstrate gener outcomes. Show e knowledge to most sources to draw app Demonstrate partial Show evidence of synthesize and app	liar situations. Demonstrate critical use of data, ns. Apply highly effective organizational and pre antial command of a broad range of knowledg Show evidence of analytical and critical abili iar and some unfamiliar situations, but falling I, literature reviews, and other sources to draw s. ral but incomplete command of knowledge a vidence of some analytical and critical abilitic familiar situations. Demonstrate mostly correct	literature reviews, and other sources seentational skills. ge and skills required for attaining at ities and logical thinking, and ability short on excellence in some of thes w appropriate conclusions. Apply effering skills required for attaining most es and logical thinking, and ability to but some erroneous use of data, lite ve organizational and presentational singuired for attaining some of the cultimited analytical and critical abilities te limited ability to use of data, literated.	least most of the course to synthesize and apply se aspects. Demonstrate ective organizational and to f the course learning to synthesize and apply return reviews, and othe skills. Ourse learning outcomes s. Show limited ability to ature reviews, and othe	
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Course Type Course Teaching	Fail Lecture w Activitie Lectures Laborato Group w Tutorials Reading Assessm Methods	familiar and unfamil insightful conclusion Demonstrate substal learning outcomes. knowledge to famili correct use of data presentational skills Demonstrate gener outcomes. Show e knowledge to most sources to draw app Demonstrate partial Show evidence of synthesize and app sources to draw app Demonstrate little of analytical and crisolve problems. D conclusions. Organivith laboratory coms	liar situations. Demonstrate critical use of data, ns. Apply highly effective organizational and pre antial command of a broad range of knowledg Show evidence of analytical and critical abiliar and some unfamiliar situations, but falling iar and some unfamiliar situations, but falling vidence of some analytical and critical abilitical abil	ilterature reviews, and other sources seentational skills. ge and skills required for attaining at ities and logical thinking, and ability short on excellence in some of these wappropriate conclusions. Apply effect and skills required for attaining most est and logical thinking, and ability to but some erroneous use of data, lite ve organizational and presentational is required for attaining some of the color limited analytical and critical abilities the limited ability to use of data, literate fective organizational and presentation skills required for attaining the course bow very little or no ability to synthesize we, and other sources and/or unab ffective or ineffective. Weighting in final course grade (%)	least most of the course to synthesize and apply se aspects. Demonstrate ective organizational and to synthesize and apply to synthesize and apply to synthesize and apply to synthesize and apply the synthesize and apply knowledge to dearning outcomes. Lact and apply knowledge to dearning outcomes. Lact and apply knowledge to draw appropriate No. of Hours	
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Course Type Course Teaching & Learning Activities	C Fail Lecture w Activitie Lectures Laborato Group w Tutorials Reading Assessm Methods Assignme	familiar and unfamil insightful conclusion Demonstrate substal learning outcomes. In which we have been also been al	liar situations. Demonstrate critical use of data, ns. Apply highly effective organizational and pre antial command of a broad range of knowledg. Show evidence of analytical and critical abiliar and some unfamiliar situations, but falling in the property of the property	iliterature reviews, and other sources seentational skills. ge and skills required for attaining at ities and logical thinking, and ability short on excellence in some of thes w appropriate conclusions. Apply effective and logical thinking, and ability is but some erroneous use of data, lite ve organizational and presentational some climited analytical and critical abilities the limited analytical and critical abilities the limited analytical and presentations were very little or no ability to synthesize over the course of the	least most of the course to synthesize and applyse aspects. Demonstrate ective organizational and to five the course learning to synthesize and applys rature reviews, and othe skills. I show limited ability to ature reviews, and other of the course learning outcomes. Show limited ability to ature reviews, and other of the course learning outcomes. Lact and apply knowledge to learning outcomes. Lact and apply knowledge to draw appropriate No. of Hours 24 12 15 12 60 15 Assessment Methods to CLO Mapping CLO 1,2,3,4,5,6 CLO 1,2,3,4,5,6	
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EASC4911	Earth system: contemporary issues (6 credits)	Academic Year	2019			
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	The Earth as an integrated system.					

& Topics	The intera	ctions between Earth's c	component parts.			
	The evolution of Earth's global climates in deep time.					
		as a fine-tuning system.				
	Natural resource and managements.					
		zards and management	S.			
		ces and Bioethics.				
		nd in oil and natural gas.				
		Global trend in mineral resources (non-metals, ferrous metals and rare earth elements).				
Course Learning		•	ourse, students should be able to:			
Outcomes			h the nature of the issues confronti	•		
			errelationships through feedback lo			
	CLO 3 sy	nthesize scientific data	available from a variety of source	ces and apply the data t	o problem solving,	
	pa	rticularly in areas of con	temporary concern			
	CLO 4 un	derstand how past and p	present activities on the planet will	affect its future		
Pre-requisites and Co-requisites	Science M	lajor including at least tw	anced level (level 3 or 4) disciplina o of the following courses: EASC3 System Science Major students onl	410, EASC3415 or ENVS	,	
and Impermissible			,	,		
combinations) Offer in 2019 - 2020		sem Offer in 2020 - 20	ed to take this capstone course is t		No Evom	
			U∠ I ∶ Y ery at an advanced level of extensive kno	Examination	No Exam	
Grade Descriptors (A+ to F)	A	learning outcomes. Show str to synthesize and apply kno	orly at all advanced level of extensive kild rong analytical and critical abilities and logi lowledge to a wide range of complex, famil other sources to draw appropriate and ins	cal thinking, with evidence of ori iar and unfamiliar situations. De	ginal thought, and ability monstrate critical use of	
	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 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, anders sources and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.					
Course Type	Project-ba	sed course				
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities		vith supervisor		36		
J		Self study		80		
	Assessme	•			24	
Assessment Methods and Weighting	Methods	51K	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Oral prese	antation		40	CLO 1,2,3,4	
Required/recommended eading and online materials	Research report 60 CLO 1,2,3,4 Earth system science: from biogeochemical cycles to global change / edited by Michael C. Jacobson et al., San Diego, California: Academic Press, c2000.					
	The earth system. Lee R. Kump, James F. Kasting, Robert G. Crane. Upper Saddle River, N.J.: Pearson Prentice Hall, c2004. Living in the environment / G. Tyler Miller, Jr., Scott E. Spoolman.					
		CA : Brooks/Cole, c2012				

EASC4955	Integrated field studies (6 credits)	Academic Year	2019
Offering Department	Earth Sciences	Quota	35
Course Co-ordinator	Dr J A King, Earth Sciences (jessking@hku.hk)		
Teachers Involved	(Dr A A G Webb,Earth Sciences) (Dr J A King,Earth Sciences) (Dr R McKenzie,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 skills to complexity. 3) opportunities to study at first-hand areas of particular geological interest an The course requires integration of geological knowledge from multiple geological states.	d importance of an c	
Course Contents & Topics	Students will visit areas of geological interest and will undertake independent solving exercises in each area. The curriculum comprised 3 x 6-day long printerest), 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. $(15\% \times 3 = 45\%)$ A cross-section of the area. $(5\% \times 3 = 15\%)$ To accompany these maps, the students must prepare ONE report (15%) tectonic evolution of region, synthesized from the all three projects and site of the section		

	depositional environments, magmatic events and structural data. To assess field skills: 3 one-day field exam, where students, working INDEPENDENTLY of other students and faculty, construct a					
	geologic one-day t		ons in a small (~1km x ~1km) area			
Course Learning		•	his course, students should be ab	le to:		
Outcomes			phy and petrogenesis of rocks and			
			ting from lithologies and stratigrap			
	CLO 3 M	leasure, record and	analyse structural data.	•		
	CLO 4 C	Construct geological r	naps and cross-sections.			
		Synthesize varied geo volution.	ological information pertaining to a	an area in order to de	rive a basio	model of tectonic
	CLO 6 Id	dentify and basically	evaluate areas of potential natural	hazard/economic pot	tential.	
Pre-requisites (and Co-requisites and Impermissible combinations)	Geology This mus This caps	Major (Intensive). t include either a PA stone course is for G	advanced level (level 3 or 4) disci SS in, or student must be already eology Major/ Geology Major (Inte	enrolled in EASC3403 nsive) students only.	3, EASC340	0,
			allowed to take this capstone cour			
Offer in 2019 - 2020		d sem Offer in 202			mination	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. Apply highly 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 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.					
	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					
	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 and minimally effective or ineffective.					
Course Type	Field can	nps				
Course Teaching	Activitie	s	Details			No. of Hours
& Learning Activities	Lectures		18 sessions x 1 hour	18 sessions x 1 hour		
	Field wo	rk	18 field days x 5 hours/day	18 field days x 5 hours/day		
	Reading	/ Self study				72
Assessment Methods and Weighting	Methods	5	Details	Weighting course gra		Assessment Methods to CLO Mapping
	Assignm	ents	Area Maps & Cross-sections 20% each	s (3 x 60		CLO 1,2,3,4
	Report		1 Final Report (15%) + 10° 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	the right to withdraw any studen e semester (semester 2) prior to erm examination result or laborato	leaving for field ca		

EASC4966	Earth sci	ences intern	ship (6 cı	edits)		Academic Year	2019	
Offering Department	Earth Scien	nces		•		Quota		
Course Co-ordinator	Dr M C Ch	eung, Earth Sci	ences (hmo	c @hku.hk)				
Teachers Involved	(Dr M C Cl	(Dr M C Cheung,Earth Sciences)						
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 tas (2) Outside will be sup Departmer	ks as instructed the university: ervised under a nt/School of the	by the Sup The stude staff memb student (the	pervisor. Int will work in an oper of the external Be Internal Supervis	d by a staff member (S external agency related agency (the External Su sor). The work to be pe ement of the Internal Su	to the major of st upervisor) and a st rformed by the stu	tudy. The student aff member of the	
Course Learning	On successful completion of this course, students should be able to:							
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)	Pass in at System So This cours Earth Syste	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 2019 - 2020	Y 1st s	sem 2nd sem	Summer	Offer in 2020 - 2	021 : Y	Examination	No Exam	
Grade Descriptors (Pass /Pass with distinction /Fail)	Pass	assigned by super the job. Successfu	visor(s). Estal lly fulfills the r	olishes effective collab requirements set out in	place. Successfully handles a pration and communication w the Course Description rega strating excellent performanc	vith supervisor(s), colle rding working hours, w	agues, and clients in ritten and oral report,	
		Very limited or no	ability to solve	problems in the works	lace. Fails to handle or carry	out the work required i	in the job or assigned	

	jób	by supervisor(s). Fails to establish effective collaboration or communication with supervisor(s), other colleagues, or cli job. Fails to satisfy the requirements set out in the Course Description regarding working hours, written and oral evaluation by supervisor(s), etc.				
Course Type	Internship					
Course Teaching	Activities		Details			No. of Hours
& Learning Activities	Internenia 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 repor	t	written report, feedback and oral	employer's presentation	100	CLO 1,2,3
Additional Course Information	contact the De Enrolment of	epartment to obtain this course is not co	the approval. onducted via the onlin	ne course select	re interested to enrol in ion system and should b om the course coordinato	e made through the

EASC4999	Earth s	sciences project	(12 credits)	Academic Ye	ear 2019	
Offering Department	Earth Sc	ciences		Quota		
Course Co-ordinator	Prof M S	Sun, Earth Sciences	(minsun @hku.hk)			
Teachers Involved	(Various	teachers in the Dep	artment,Earth Sciences)			
Course Objectives	To enha	ince the student's kn	owledge, ability and interest in ad	vanced studies in the Earth Se	ciences by providing	
			ty to be engaged in an advanced re			
Course Contents & Topics	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	essful completion of	this course, students should be abl	e to:		
Outcomes		•	esearch experience in earth scientification that is the supervision of a supervisor	ences by doing an individua	l research project	
		select research topion critical thinking	cs, design research path, choose	research technology, and me	ore importantly use	
			doing independent earth/environm		· ·	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in the Geology or Ear 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.					
Offer in 2019 - 2020		ear long Offer in 20	allowed to take this course is their	•	No Exam	
Grade Descriptors	Α		nz0 - z0z i . it n grasp of the subject. Show strong analyt	Examination		
(A+ to F)		original thought. Insig to quote/reference as highly effective organ work beyond that is re	htful use and critical analysis / evaluation o tily. Critical use of first-hand data and res izational and presentational skills. [Work o quired in wider areas relevant to the topic.]	f information drawn from a full range of ults to draw insightful conclusions an f A+ should show considerable creative	f high quality sources and d solve problems. Apply te thinking and additional	
	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.					
	С	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.					
Course Type	Project-b	pased course				
Course Teaching	Activitie	es	Details	Details		
& Learning Activities	Reading	g / Self study	The student is expected to the project	The student is expected to spend at least 240 hours on		
Assessment Methods and Weighting	Method	ls	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Disserta	ation	Dissertation and presentatio	n 100	CLO 1,2,3	

ENVS1401	Introduction to environmental science (6 credits)	Academic Year	2019
Offering Department	Earth Sciences	Quota	
Course Co-ordinator	Dr C Dingle, Biological Sciences (cdingle@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 Environm interconnections between biological, geological, and chemical processes. To convey the basic science behind environmental interactions and place it will and dependence on the natural world. To better understand how humans interact, manage, and sustain the environments, governments and individual choices.	thin the context o	f human impacts
Course Contents & Topics	The teaching and learning will be organized around key issues, and loosely divider Part I: The basics: application of science to solve environmental problems; ket		

	problem	ns (human population grov	,	Ŭ	, 0			
	Part II: Using and conserving our resources: how we use and misuse key natural resources; the difficul 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 contribution to global climate change.							
Course Learning	On succ	successful completion of this course, students should be able to:						
Outcomes	CLO 1 Explain and describe connections between the physical and biological components of the environment.							
	CLO 2	Discuss the impacts of hu	ıman activities on the enviro	nment.				
		Explain the concept of er to achieve sustainability.	nvironmental sustainability a	nd give examples o	of how society	can adapt behavior		
		Understand how we are problems presented in cla	overusing our resources and	d compare differen	t approaches	to resolving specific		
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL							
Offer in 2019 - 2020	Y 1	st sem Offer in 2020 - 2	021 : Y		Examination	Dec		
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.							
	B Demonstrate a good understanding of the subject and an ability to apply knowledge to familiar and s Show evidence of logical thinking abilities. Coursework completed on time and to a good academic star							
	C 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.							
	D							
	Fail Demonstrate little or no understanding of the subject and very little or no ability to apply knowledge to familiar situations. Shown to evidence of logical or coherent thinking. Coursework missing or substandard.							
Course Type	Lecture-	-based course						
Course Teaching	Activiti	ies	Details			No. of Hours		
& Learning Activities	Lecture	s				24		
	Tutorial	s	group discussion/case studies			24		
	Field w		two half day field trips			10		
	Readin	g / Self study				100		
Assessment Methods and Weighting	Method	ds	Details		ig in final grade (%)	Assessment Methods to CLO Mapping		
	Assignr	ments	Group projects an independent work	d 4	.0	CLO 1,2,3,4		
	Examin	ation		4	.0	CLO 1,2,3,4		
	Test		4 quizzes	2	.0	CLO 1,2,3,4		
Required/recommended reading and online materials			Thomson, 2007, 15th ed.) onmental Science (Wiley, 20	008)				

ENVS2020	Biogeochemistry o	f the environment (6 credits)	Academic Year	2019
Offering Department	Earth Sciences	•	Quota	
Course Co-ordinator	, ()		·	'
Teachers Involved				
Course Objectives				
Course Contents & Topics				
Course Learning Outcomes	On successful completi	on of this course, students should be ab	le to:	
Pre-requisites (and Co-requisites and Impermissible combinations)				
Offer in 2019 - 2020	N Offer in 2020 - 20	021 : N	Examination	
Grade Descriptors	Α			
(A+ to F)	В			
	С			
	D			
	Fail			
Course Type	i			
Course Teaching & Learning Activities	Activities	Details		No. of Hours
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping

ENVS3004	Environment, society and economics (6 credits)	Academic Year	2019
Offering Department	Earth Sciences	Quota	
Course Co-ordinator	Prof Y Q Zong, Earth Sciences (yqzong@hku.hk)		
Teachers Involved	(Prof Y Q Zong,Earth Sciences)		
Course Objectives	This course follows up issues highlighted in the introductory course and urban environments for students to examine the problems of resource s		

Course Contents & Topics	environme environme water and sustainable Valuing the Basic cond	ental problems and exploental restoration/protection biomass, and explore e economies. e environment cepts of Environmental E		can be applied for resource of key natural resource	ce management and es such as land, air,	
	Manageme Energy po	management for land, a ent of waste licies and economics and regulations for a sus				
Course Learning Outcomes	CLO 1 de hu CLO 2 red	monstrate knowledge a man society and the nat cognise appropriate use	ourse, students should be able to: and critical understanding of the cural environment and misuse of natural resources and policies for solving environme		ectedness between	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in on	e of the following course	es: CHEM2041, EASC2404, ENVS	2001 or ENVS2002		
Offer in 2019 - 2020	Y 1st	sem Offer in 2020 - 20	021 : Y	Examination	Dec	
Grade Descriptors (A+ to F)	A					
	В	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 solv problems. Lack of critical thinking abilities and incoherent thinking. Organization and presentational skills are minimally effective or ineffective.					
Course Type	Lecture-ba	ased course				
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures		12 sessions of 2 hrs		24	
	Project wo				12	
	Discussio		Interactive learning		24	
A		Self study			100	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Examination			50	CLO 1,2	
	Project re	ports		50	CLO 1,2,3	
Required/recommended reading and online materials	Keller and Kaufmann	Botkin: Essential Environand Cleveland: Environ	ntal economics and policy onmental Science (John Wiley & Sc mental Science (Amazon, 2008) An Introduction to Environmental Is	,		
Additional Course		ourse code: ENVS2004		, ,,		
		ry to 4-year students				

ENVS3007	Natural h	hazards	and mitiga	tion (6 cred	its)		Academic Year	2019
Offering Department	Earth Scie	ences					Quota	
Course Co-ordinator	Dr N S KH	HAN, Eart	h Sciences <i>(n</i> :	skhan @hku.hk	()			
Teachers Involved	\ \	,	h Sciences) arth Sciences)					
Course Objectives	landslide a natural, ar protection	and tsun and unders and mit	ami. The tead standing the fi igation measi	ching emphas requency and ures. With ca	izes the fundam processes of the	nental concepts: ese hazards is e course will he	uding earthquake, natural hazards essential in develo lp students explo	are not entirely oping prevention,
Course Contents & Topics	Geological Climatic ha Preparedn Risk asses	al hazards nazards ar ness and essment a	nd disaster ma	n measures neasures arge natural di				
Course Learning Outcomes	CLO 1 de	emonstrat	e knowledge a	and critical und	its should be able derstanding of the nnologies used to	e key characteri	stics of major nat	ural hazards, the
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in EA	ASC2404	or ENVS2001	or ENVS2002	2			
Offer in 2019 - 2020	Y 1st	sem Of	fer in 2020 - 2	:021 : Y			Examination	No Exam
Grade Descriptors (A+ to F)	A	evidence	of original thoug	ht, and ability to	apply knowledge to	a wide range of c	nalytical, critical and lomplex, familiar and	
	В	B Demonstrate highly effective organizational and presentational skills. 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.				
	С		ncomplete command of the course material of some critical and logical thinking abiliti			
	D		ted command of the course material and a limit and logical thinking, but with limited analytica tional skills.			
	Fail		ridence of command of course material with inking abilities and incoherent thinking. Organiz			
Course Type	Lecture-ba	sed course				
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures				24	
	Tutorials		Project tutorials	8		
	Discussion		Group discussion	16		
	Reading / Self study			100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Project re	ports		40	CLO 1	
	Test		Four in-class quizzes (20%) and one in-class final examination (40%)	60	CLO 1	
Required/recommended reading and online materials	Bryant E.:	(40%) ith K.: Environmental Hazards. Assessing Risk and Reducing Disaster (Routledge, 2004) ant E.: Natural Hazards (Cambridge University Press, 2005) ndman and Hyndman: Natural Hazards and Diasters (Amazon, 2009)				
Additional Course Information	Previous c	ourse code: ENVS2007	·			

ENVS3042	Pollution	n (6 credits)		Academic Ye	ar 2019	
Offering Department	Earth Scie	ences		Quota	50	
Course Co-ordinator	Dr B Thibo	odeau, Earth Science	es (bthib@hku.hk)			
Teachers Involved	(Dr B Thib	odeau,Earth Science	es)			
Course Objectives	contamina pollution mechanisi	ints that pollute the e monitoring and env ms and pathways for	environment. The course will pro rironmental risk assessment.	 most important physical, chen ovide the basics of contaminant the The course will also explore and pollution. The student will also 	ransport, toxicolog in details differen	
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 Outcomes	CLO 1 i CLO 2 c CLO 3 e CLO 4 p	dentify the most imposed the mechan describe the mechan devaluate the environ or esent the most imp		ort of pollutants in the environmer of contamination collution	nt	
Pre-requisites and Co-requisites and Impermissible combinations)	Pass in E	ASC2401 or CHEM2	241 or BIOL2103 or ENVS2001			
Offer in 2019 - 2020	Y 1st	sem Offer in 2020	- 2021 : Y	Examination	Dec	
Grade Descriptors (A+ to F)	В	original thought. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills. B Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Correct use of data				
	С	of results to draw appropriate conclusions. Apply effective organizational and presentational skills. 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.					
Course Type	Lecture-ba	ased course	·	-		
Course Teaching	Activities	i	Details		No. of Hours	
Learning Activities	Lectures				24	
-	Tutorials				24	
	Reading /	Self study			92	
	Methods	•	Details	Weighting in final	Assessment	

	Examination		40	CLO 1,2,3,4,5
	Presentation		10	CLO 4,5
	Project reports		20	CLO 1,2,3,4,5
Required/recommended reading and online materials	Environmental and Pollution Science by Mark L. Brusseau (Author), Ian	•	ba (Author)	
Additional Course Information	The tutorials include theoretical and	d practical assignments.		

ENVS3202	Modelling the env	ironment (6 credits)	Academic Year	2019
Offering Department	Earth Sciences	<u>'</u>	Quota	
Course Co-ordinator	, ()			
Teachers Involved				
Course Objectives				
Course Contents & Topics				
Course Learning Outcomes	On successful comple	tion of this course, students should be a	able to:	
Pre-requisites (and Co-requisites and Impermissible combinations)				
Offer in 2019 - 2020	N Offer in 2020 -	2021 : N	Examination	
Grade Descriptors	Α			
(A+ to F)	В			
	С			
	D			
	Fail			
Course Type				
Course Teaching & Learning Activities	Activities	Details		No. of Hours
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping

ENVS3313	Enviror	mental oceanograph	ny (6 credits)	Academic Year	2019		
Offering Department	Earth Sci		,	Quota			
Course Co-ordinator	Dr C A N	ot, Earth Sciences <i>(cnot</i> @	Dhku.hk)	<u>'</u>	'		
Teachers Involved	(Dr C A N	lot,Earth Sciences)	,				
Course Objectives	important 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 on (paleo)climate, coastal resources, and nutrient cycling. Case studies specifically examining changes in sea level rise, El Nino, and (paleo)climate will be used to connect oceanographic principles to environmental problems.					
Course Learning	On succe	essful completion of this co	ourse, students should be able to:				
Outcomes	CLO 1 d	escribe the major surface	and deep currents of the ocean				
		lentify and describe imporansport	ortant processes in the ocean co	ntrolling large scale circulat	ion and nutrient		
	CLO 3 describe sources and distribution of critical chemicals and sea water properties in the ocean						
	CLO 3 d	escribe sources and distri	ibution of critical chemicals and sea	a water properties in the ocea	an		
	CLO 4 il	ustrate connections between	een physical ocean processes, clin				
(and Co-requisites and Impermissible	CLO 4 il	ustrate connections between					
(and Co-requisites and Impermissible combinations)	CLO 4 il Pass in E	ustrate connections between	een physical ocean processes, clin r ENVS2001 or ENVS2002				
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020	CLO 4 il Pass in E	d sem Offer in 2020 - 20 Demonstrate thorough maste learning outcomes. Show at results to draw appropriate an Demonstrate substantial con	een physical ocean processes, clin r ENVS2001 or ENVS2002 D21: Y ery at an advanced level of extensive know oblity to think logically and critically, with even dinsightful conclusions. Apply highly effection and insightful conclusions. Apply highly effecting and of a broad range of knowledge and	Examination Wedge and skills required for attain vidence of original thought. Critical tive organizational and presentation d skills required for attaining at leas	No Exam ing the entire course y evaluate data and al skills. It most of the course		
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Pass in E Y 2n	d sem Offer in 2020 - 20 Demonstrate thorough mast learning outcomes. Show at results to draw appropriate an Demonstrate substantial con learning outcomes. Show expensive the substantial con learning outcomes. Show expensive the substantial con learning outcomes. Show expensive the substantial contents are substantial contents.	een physical ocean processes, clin ir ENVS2001 or ENVS2002 021 : Y ery at an advanced level of extensive know bility to think logically and critically, with evend insightful conclusions. Apply highly effec	Examination Wedge and skills required for attain vidence of original thought. Critical tive organizational and presentation d skills required for attaining at leas	No Exam ing the entire course y evaluate data and al skills. It most of the course		
Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	Pass in E Y 2n	d sem Offer in 2020 - 20 Demonstrate thorough mast learning outcomes. Show at results to draw appropriate a Demonstrate substantial con learning outcomes. Show e Correctly use of data and res Demonstrate general but in outcomes. Show evidence c	een physical ocean processes, clin r ENVS2001 or ENVS2002 D21: Y ery at an advanced level of extensive know bility to think logically and critically, with end insightful conclusions. Apply highly effect mand of a broad range of knowledge and evidence of logical and critical thought. A sults to draw appropriate conclusions. complete command of knowledge and skept some logical and critical thinking. Apply	Examination Wedge and skills required for attain vidence of original thought. Critical titve organizational and presentation d skills required for attaining at leas upply effective organizational and wills required for attaining most of moderately effective organizational	No Exam ing the entire course by evaluate data and al skills. It most of the course presentational skills. The course learning		
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	CLO 4 iI Pass in E Y 2n A B	d sem Offer in 2020 - 20 Demonstrate thorough maste learning outcomes. Show at results to draw appropriate a Demonstrate substantial con learning outcomes. Show e Correctly use of data and res Demonstrate general but in outcomes. Show evidence c skills. Mostly correct but som Demonstrate partial but limits Show evidence of some corganizational and presentati	een physical ocean processes, clin r ENVS2001 or ENVS2002 D21:Y ery at an advanced level of extensive know bility to think logically and critically, with end insightful conclusions. Apply highly effectivence of logical and critical thought. A sults to draw appropriate conclusions. complete command of knowledge and skid some logical and critical thinking. Apply the erroneous use of data and results to draw ed command of knowledge and skills requipe the command of knowledge and skills requipe the command of knowledge and skills requipe the command of knowledge and skills requiped the command logical thinking, but with limitional skills. Limited ability to use data and re	Examination Wedge and skills required for attain vidence of original thought. Critical titve organizational and presentation of skills required for attaining at leas apply effective organizational and vidence of or attaining most of or moderately effective organizations or appropriate conclusions. We appropriate conclusions. We appropriate conclusions of the cours nited or attaining some of the cours nited critical abilities. Apply limited essults to draw appropriate conclusions.	No Exam ing the entire course by evaluate data and al skills. the course learning al and presentational elearning outcomes. or barely effective ss.		
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	CLO 4 iI Pass in E Y 2n A B	d sem Offer in 2020 - 20 Demonstrate thorough mast learning outcomes. Show at results to draw appropriate an Demonstrate substantial con learning outcomes. Show e Correctly use of data and res Demonstrate general but in outcomes. Show evidence c skills. Mostly correct but som Demonstrate partial but limit Show evidence of some corganizational and presentati Demonstrate little or no evid of critical, logical and/or cohe	een physical ocean processes, clin r ENVS2001 or ENVS2002 D21: Y ery at an advanced level of extensive know poility to think logically and critically, with end insightful conclusions. Apply highly effective man of a broad range of knowledge and evidence of logical and critical thought. A sults to draw appropriate conclusions. complete command of knowledge and skip of some logical and critical thinking. Apply the erroneous use of data and results to draw ed command of knowledge and skills required thinking, but with lim to the command of knowledge and skills required to the command of knowledge and skills required thinking, but with lim to the command of knowledge and skills required thinking, but with lim to the command of knowledge and skills required thinking, but with lim to the command of knowledge and skills required thinking, but with lim to the command of knowledge and skills required thinking, but with lim to the command of knowledge and skills required thinking, but with lim to the command of knowledge and skills required thinking, but with lim to the command of knowledge and skills required thinking, the command of knowledge and skills required thinking, the command of knowledge and skills required thinking, the command of knowledge and skills required thinking.	Examination Wedge and skills required for attain vidence of original thought. Critical tive organizational and presentation d skills required for attaining at least apply effective organizational and local vidence of or attaining most of a moderately effective organizational vappropriate conclusions. It is a proper interest of the course ited or attaining some of the course ited or attaining some of the course ited or attaining the conclusion required for attaining the course learning the course lear	No Exam ing the entire course by evaluate data and al skills. it most of the course presentational skills. the course learning al and presentational e learning outcomes. or barely effective ns. ming outcomes. Lack		
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	CLO 4 iI Pass in E Y 2n A B C D	d sem Offer in 2020 - 20 Demonstrate thorough mast learning outcomes. Show at results to draw appropriate an Demonstrate substantial con learning outcomes. Show e Correctly use of data and res Demonstrate general but in outcomes. Show evidence c skills. Mostly correct but som Demonstrate partial but limit Show evidence of some corganizational and presentati Demonstrate little or no evid of critical, logical and/or cohe	een physical ocean processes, clin r ENVS2001 or ENVS2002 D21: Y ery at an advanced level of extensive know billity to think logically and critically, with end insightful conclusions. Apply highly effective and insightful conclusions. Apply highly effective and insightful conclusions. Apply highly effective and a broad range of knowledge and swidence of logical and critical thought. A sults to draw appropriate conclusions. It is complete command of knowledge and skip some logical and critical thinking. Apply the erroneous use of data and results to draw ed command of knowledge and skills required thinking. Organization and presentation of the process of command of knowledge and skills rement thinking. Organization and presentaticalle to draw appropriate conclusions.	Examination Wedge and skills required for attain vidence of original thought. Critical tive organizational and presentation d skills required for attaining at least apply effective organizational and local vidence of or attaining most of a moderately effective organizational vappropriate conclusions. It is a proper interest of the course ited or attaining some of the course ited or attaining some of the course ited or attaining the conclusion required for attaining the course learning the course lear	No Exam ing the entire course by evaluate data and al skills. it most of the course presentational skills. the course learning al and presentational e learning outcomes. or barely effective ns. ming outcomes. Lack		
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching	CLO 4 iI Pass in E Y 2n A B C D	d sem Offer in 2020 - 20 Demonstrate thorough maste learning outcomes. Show at results to draw appropriate a Demonstrate substantial con learning outcomes. Show e Correctly use of data and res Demonstrate general but in outcomes. Show evidence coskills. Mostly correct but som Demonstrate partial but limits Show evidence of some corganizational and presentati Demonstrate little or no evidor of critical, logical and/or cohe data and results and/or unab vith laboratory component	een physical ocean processes, clin r ENVS2001 or ENVS2002 D21: Y ery at an advanced level of extensive know billity to think logically and critically, with end insightful conclusions. Apply highly effective and insightful conclusions. Apply highly effective and insightful conclusions. Apply highly effective and a broad range of knowledge and swidence of logical and critical thought. A sults to draw appropriate conclusions. It is complete command of knowledge and skip some logical and critical thinking. Apply the erroneous use of data and results to draw ed command of knowledge and skills required thinking. Organization and presentation of the process of command of knowledge and skills rement thinking. Organization and presentaticalle to draw appropriate conclusions.	Examination Wedge and skills required for attain vidence of original thought. Critical tive organizational and presentation d skills required for attaining at least apply effective organizational and local vidence of or attaining most of a moderately effective organizational vappropriate conclusions. It is a proper interest of the course ited or attaining some of the course ited or attaining some of the course ited or attaining the conclusion required for attaining the course learning the course lear	No Exam ing the entire course by evaluate data and al skills. it most of the course presentational skills. the course learning al and presentational e learning outcomes. or barely effective ns. ming outcomes. Lack		
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching	CLO 4 iI Pass in E Y 2n A B C D Fail	d sem Offer in 2020 - 20 Demonstrate thorough maste learning outcomes. Show at results to draw appropriate a Demonstrate substantial con learning outcomes. Show e Correctly use of data and res Demonstrate general but in outcomes. Show evidence of skills. Mostly correct but som Demonstrate partial but limit Show evidence of some corganizational and presentati Demonstrate little or no evide of critical, logical and/or unab vith laboratory component s	een physical ocean processes, clin r ENVS2001 or ENVS2002 D21: Y ery at an advanced level of extensive know billity to think logically and critically, with end insightful conclusions. Apply highly effect mand of a broad range of knowledge and evidence of logical and critical thought. A sults to draw appropriate conclusions. complete command of knowledge and skip some logical and critical thinking. Apply the erroneous use of data and results to draw ed command of knowledge and skills required to decommand of knowledge and skills required thinking. Organization and presentation of the control of the	Examination Wedge and skills required for attain vidence of original thought. Critical tive organizational and presentation d skills required for attaining at least apply effective organizational and local vidence of or attaining most of a moderately effective organizational vappropriate conclusions. It is a proper interest of the course ited or attaining some of the course ited or attaining some of the course ited or attaining the conclusion required for attaining the course learning the course lear	No Exam ing the entire course by evaluate data and al skills. it most of the course presentational skills. the course learning al and presentational e learning outcomes. or barely effective ins. ming outcomes. Lack ineffective. Misuse of		
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	CLO 4 ill Pass in E Y 2n A B C D Fail Lecture v Activitie	d sem Offer in 2020 - 20 Demonstrate thorough maste learning outcomes. Show at results to draw appropriate a Demonstrate substantial con learning outcomes. Show e Correctly use of data and results. Mostly correct but som Demonstrate partial but limits Show evidence of some conganizational and presentational presentational conditions of critical, logical and/or unabwith laboratory components.	een physical ocean processes, clin r ENVS2001 or ENVS2002 D21: Y ery at an advanced level of extensive know oblity to think logically and critically, with end insightful conclusions. Apply highly effect mand of a broad range of knowledge and evidence of logical and critical thought. A sults to draw appropriate conclusions. complete command of knowledge and ski of some logical and critical thinking. Apply the erroneous use of data and results to draw ed command of knowledge and skills required to the command of knowledge and skills required to the command of knowledge and skills remained logical thinking, but with limitional skills. Limited ability to use data and reservent thinking. Organization and presentatical to draw appropriate conclusions.	Examination Wedge and skills required for attain vidence of original thought. Critical tive organizational and presentation d skills required for attaining at least apply effective organizational and local vidence of or attaining most of a moderately effective organizational vappropriate conclusions. It is a proper interest of the course ited or attaining some of the course ited or attaining some of the course ited or attaining the conclusion required for attaining the course learning the course lear	No Exam ing the entire course by evaluate data and al skills. it most of the course presentational skills. the course learning al and presentational e learning outcomes. or barely effective ins. rning outcomes. Lack ineffective. Misuse of		

	Project work	group project		12			
	Reading / Self study			90			
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignments		50	CLO 1,2,3,4			
	Test	2-hour mid-term test, 2-hour final in-class exam	50	CLO 1,2,3,4			
Required/recommended reading and online materials		Garrison, 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 will be offered every year s	starting from 2014-2015 and coordi	nated by DES.				

ENVS3401	Human dimension	s of environmental science (6 credits)	Academic Year	2019
Offering Department	Earth Sciences	· · · · · · · · · · · · · · · · · · ·	Quota	
Course Co-ordinator	, ()		'	
Teachers Involved	, ,			
Course Objectives				
Course Contents & Topics				
Course Learning Outcomes	On successful comple	tion of this course, students should be able to:		
Pre-requisites (and Co-requisites and Impermissible combinations)				
Offer in 2019 - 2020	N Offer in 2020 - 2	2021 : N	Examination	
Grade Descriptors	Α			
(A+ to F)	В			
	С			
	D			
	Fail			
Course Type				
Course Teaching & Learning Activities	Activities	Details		No. of Hours
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping

ENVS3999	Directe	d studies in env	vironmental science (6 credits)	Academic Year	2019		
Offering Department	Earth Sci						
Course Co-ordinator	Dr C Dingle, Biological Sciences (cdingle@hku.hk)						
Teachers Involved		teachers (ERS),Ea teachers (SBS),Bio					
Course Objectives		nce students knowl al thinking skills.	edge on a particular topic in environment	tal science and students se	f-directed learning		
Course Contents & Topics	material		ive reading on a selected topic guided Students are required to analyze the written form.				
Course Learning			f this course, students should be able to:				
Outcomes	CLO 1		ch task independently in one or more top				
	CLO 2	show competence	e in formulating their own scientific argume	ent			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in Environmental Science Major. Cumulative GPA of 2.5 or above 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 2019 - 2020			Offer in 2020 - 2021 : 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.						
	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 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.						
Course Type	Project-b	ased course	-	· · · · · · · · · · · · · · · · · · ·			
Course Teaching	Activitie	S	Details		No. of Hours		
& Learning Activities	Reading	/ Self study	research work & report		120		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods		

		to CLO Mapping
Oral presentation	20	CLO 1,2
Research report	80	CLO 1,2

ENVS4955	Environmental science in practice (6 credits)			Academic Yea	ar 2019			
Offering Department	Earth Scie	nces		Quota	8			
Course Co-ordinator	Dr M Yasu	Dr M Yasuhara, Biological Sciences <i>(yasuhara</i> @hku.hk)						
Teachers Involved	(Dr M Yası	(Dr M Yasuhara, Biological Sciences)						
Course Objectives			earning experience in the field of					
	based on a fieldtrip.	based on an array of experiential studies covering essential areas of environmental science during a residential fieldtrip.						
Course Contents & Topics	residential sampling, geology/pa	Students to attend a residential field trip outside Hong Kong to learn about environmental science in practice. The 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			course, students should be able to	:				
Outcomes	CLO 1	· · · · · · · · · · · · · · · · · · ·	vironmental science in practice					
	CLO 2		rrent environmental problems and	solutions				
	CLO 3	-	icate their field observations and f					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in at Science M		Ivanced level (level 3 or 4) disci	plinary core/elective course	s in Environmental			
Offer in 2019 - 2020	N Offe	r in 2020 - 2021 : N		Examination				
Grade Descriptors (A+ to F)	A	original thought. Apply high and insightful conclusions.	sp of the subject. Show strong analytical lly effective lab / fieldwork skills and techn Apply highly effective organizational and pr	iques. Critical use of data and res resentational skills.	ults to draw appropriate			
	B Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Apply effective lab / 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 lab / 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 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 lab / 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 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.							
Course Type	Laboratory	and workshop course						
Course Teaching	Activities Details				No. of Hours			
& Learning Activities	Field work		Field work and other learning st least 66 hours of field trips and o		66			
	Reading /	Self study		-	100			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Laboratory	/ reports	field reports	30	CLO 1,2,3			
	Presentati	on	group presentations	30	CLO 1,2,3			
	Project rep	oorts	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 acc interested future acad academic of The select other facto The reside	So, interested student in Moriaki Yasuhara (yas semester course, but we be the discourse of the proposal state	al capacity of this course is limiter must apply for the course with a suhara@hku.hk) and Ms. Maria Love need applications well in advantable in clude the following: (1) (2) merit that you expect to receptive description of academic interph; (4) GPA; (5) Pre-requisite course on the quality of proposal and the ents through this application process of the proposal in the reading week. Studentact us for details and financial description of the course of the cours	hort proposal (2 pages maxi (gylo@hku.hk) not later that ce, on or before this date). Let the specific reason(s)/motivities from this course, especifiests. The CV should includifiest aken and grades receive justification of academic ress will be able to register this ents will need to pay for their	imum) and CV via e- in 1st August (Note: .ate applications will vation why you are ially regarding your e: (1) Personal and ved. nerit, in considering s course.			
	This course	e will be offered subject	t to a minimum enrollment number	and availability of teachers.	•			

ENVS4966	Environmental science internship (6 credits)	Academic Year	2019			
Offering Department	Earth Sciences	Quota				
Course Co-ordinator	Dr C Dingle, Biological Sciences (cdingle@hku.hk)					
Teachers Involved	(Dr C Dingle,Biological Sciences)					
Course Objectives	This course offers students the opportunity to gain work experience related to their major of study. This work experience will allow the students to apply their knowledge gained in their studies to the real environmental issues.					
Course Contents & Topics	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	On successful completion of this course, students should be able to:					

Outcomes	CLO 1 gain at least 4 weeks of work experience environmental-related firm or the Government						
	CLO 2	acquire an understandi	ng and appreciation of t	the real work environment			
	CLO 3	have some experience	with applying learned k	nowledge to solving real world problem	S		
Pre-requisites (and Co-requisites and Impermissible combinations)	Science M This caps	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 2019 - 2020			mer Offer in 2020 - 20		No Exam		
Grade Descriptors (Pass /Pass with distinction /Fail)	Pass	assigned by supervisor(s) the job. Successfully fulfill	. Establishes effective collabors the requirements set out in	place. Successfully handles and carries out the woration and communication with supervisor(s), or the Course Description regarding working hours strating excellent performance in the above working the course of t	olleagues, and clients in , written and oral report,		
	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.						
Course Type	Internship)					
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Internship work		it is expected that stu (or the equivalent of	160			
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Oral pres	sentation		10	CLO 3		
	Supervis	or's feedback		20	CLO 1,2		
	Written report			70	CLO 1,2,3		
Course Website	http://mod	odle.hku.hk/					
Additional Course Information	of 4 week Satisfacto be record interested Enrolmen	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 elevant Department/School office after approval has been obtained from the course coordinator.					

ENVS4999	Enviror	nmental science	e project (12 credits)	Academic Ye	ar 2019		
Offering Department	Earth Sc	Earth Sciences Quota					
Course Co-ordinator	Dr C Din	gle, Biological Scie	nces (cdingle@hku.hk)				
Teachers Involved		teachers (ERS), Ea					
		teachers (SBS),Bio					
Course Objectives	To enhance students knowledge and research skills in advanced level of environmental science.						
Course Contents & Topics	member.	Students undertake a research project in the form of an undergraduate dissertation under the supervision of a staff member. The project could be based on one of the four areas covered by the major and must show elements of interdisciplinary nature. The dissertation should show an element of originality and the research in a non-trivial manner					
Course Learning	On succe	essful completion o	f this course, students should be	able to:			
Outcomes	CLO 1	complete a disserta	ation project of undergraduate lev	el in one of the four areas of the m	najor		
	CLO 2	show competence	in formulation, data collection, an	alysis, and presentation of a resea	arch project		
Pre-requisites (and Co-requisites and Impermissible combinations)	Science Students This cap	Pass in at least 24 credits of advanced level (level 3 or 4) disciplinary core/elective courses in Environmental Science Major; and Students must have a cumulative GPA of 3.0 or above 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 2019 - 2020			2020 - 2021 : 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.]						
	В	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.					
	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						
Course Type	Project-b	ased course					
Course Teaching	Activitie	es	Details		No. of Hours		
& Learning Activities	Reading	/ Self study	research work & report		240		
Assessment Methods and Weighting	Method	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Disserta	tion		80	CLO 1,2		
	Oral pre	sentation		20	CLO 2		
Additional Course Information		Previous course code: ENVS3015. Consent from major coordinator is required.					

MATH1009	Basic ma	athematics for busin	ness and economics (6 credits	Academic Ye				
Offering Department	Mathemati			Quota	440			
Course Co-ordinator		Y M Chan (1st sem); Dr K H Law (2nd sem), Mathematics (ymchan@maths.hku.hk; lawkaho@maths.hku.h						
Teachers Involved	(Dr Y M Cł	(Dr K H Law,Mathematics) (Dr Y M Chan,Mathematics)						
Course Objectives	Business application	and Economics. Mathe	nportant topics of mathematics for in ematical concepts and methods, as not so that students could be furnished ines.	well as some Busine	ess and Economics			
Course Contents & Topics	3. Quadrat 4. Graphs 5. Differen 6. Unconst 7. Partial d 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) Differential equations (optional) Matrix algebra (optional)						
Course Learning Outcomes	CLO 1 de CLO 2 ap	monstrate knowledge ar ply mathematical skills t	ourse, students should be able to: nd understanding of the essential ma o model and solve basic problems in g with a higher level of mathematics re	business and economic	s			
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL The course Mathemati in these co	CLO 3 be more capable of coping with a higher level of mathematics required in various economic disciplines 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).						
Offer in 2019 - 2020		sem 2nd sem Offer i	n 2020 - 2021 : 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 the applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumental 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 theorem but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument appresentation 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 we substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation with substantial computational errors. Fail Demonstrates poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or							
Course Type	Lecture-ba	ased course						
Course Teaching	Activities	i	Details	No. of Hours				
& Learning Activities	Lectures				36			
	Tutorials	0 15 1 1			12			
A		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			
	Examinati			50	CLO 1,2,3			
	Test			40	CLO 1,2,3			
Required/recommended reading and online materials	M. J. Ross Martin Anti Methods a	lan Jacques: Mathematics for Economics and Business (New York: Pearson Education, 2018, 9th edition) M. J. Rosser: Basic Mathematics for Economists (London: Routledge, 2003, 2nd edition) Martin Anthony and Norman Biggs: Mathematics for Economics and Finance: Methods and Modelling (Cambridge: Cambridge University Press, 1996)						
Course Website								
Additional Course		p://moodle.hku.hk/ orial timetable: p://hkumath.hku.hk/~math/Timetable/timetable1920 S1.pdf						

MATH1011	University mathematics I (6 credits)	Academic Year	2019
Offering Department	Mathematics	Quota	
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) be basic knowledge of mathematics that serves as essential foundation in various followed by MATH1013.		
Course Contents & Topics	 Sets, Venn diagram, set operations. Permutations, combinations and elementary probabilities. Mathematical induction. Exponential and logarithmic functions. Trigonometric functions, trigonometric formulae. Limits of algebraic, exponential and logarithmic functions. Derivatives of algebraic, exponential and logarithmic functions. Differentiation rules: addition, product, quotient and chain rule. 		

	- Maxima	and minima.				
	- Indefinite and definite integrals.					
	- Area.	ion by substitution.				
		oidal rule with error estir	nation.			
Course Learning	On succe		course, students should be able to			
Outcomes	CLO 1		calculate probabilities; and prove I			
	CLO 2		ng exponential, logarithmic and tri	gonometric functions		
	CLO 3	evaluate limits and de				
	CLO 4		te and indefinite integrals	al activities of the altitude and a		
Duo vomiliaitos	CLO 5	solve practical probler	ns such as determining maxima ar	nd minima; finding area		
Pre-requisites (and Co-requisites and Impermissible combinations)	Mathema	itics or equivalent befor	te, but students are expected to e enrolling the course; and above in Module 1 or Module 2 of I			
Offer in 2019 - 2020		t sem 2nd sem Offe		Examination		
Grade Descriptors	A		understanding of key concepts and ideas		,	
(A+ to F)		applications through corre and being able to carry ou	ectly analysing problems, clearly and elega it computations carefully and correctly, and	ntly presenting correct logical rea with some innovative approaches	soning and argumentation 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	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	being able to complete the	adequate understanding by not being able e solution.	to identify appropriate theorems	or their applications, or no	
Course Type	Lecture-b	ased course				
Course Teaching	Activitie	s	Details	No. of Hours		
& Learning Activities	Lectures				36	
	Tutorials				12	
		/ Self study			100	
Assessment Methods and Weighting	Methods	3	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignments		assignments, tutorials, participation, etc	5	CLO 1,2,3,4,5	
	Examina	tion		50	CLO 1,2,3,4,5	
	Test		3 tests	45	CLO 1,2,3,4,5	
Required/recommended reading and online materials	(Custom textbook) MATH1011 (Pearson, 2014)					
Course Website	http://mod	odle.hku.hk/				
Additional Course	Tutorial ti	metable:				
Information			netable/timetable1920_S1.pdf netable/timetable1920_S2.pdf			

MATH1013	Universi	ty mathematics II (6 cr	edits)	Academic Year	2019	
Offering Department	Mathemat	ics		Quota	500	
Course Co-ordinator	Dr C W W	ong, Mathematics (cwwong	ab @hku.hk)			
Teachers Involved	(Dr C W W	/ong,Mathematics)				
Course Objectives	backgroun various di	nd and provides them with b	basic knowledge of calculu	Module 1 or Core Mathematics is and some linear algebra that of such as MATH2012, MATH21	an be applied in	
Course Contents & Topics	 Limits; cc Mean val Higher or Radian, c Definite a Complex Application 	numbers, polar form, de Mo ons: Solving simple ordinary	. cm; implicit differentiation; L d minima; graph sketching. ctions. gration by substitutions; inte bivre's formula. d differential equations.		artial fractions.	
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	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 compute derivatives and integrals; 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					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Ma	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				
Offer in 2019 - 2020	Y 1st	sem 2nd sem Offer in 20	020 - 2021 : Y	Examination	Dec May	
Grade Descriptors (A+ to F)	A	applications through correctly an	alysing problems, clearly and ele	as by being able to identify the appropriat gantly presenting correct logical reasonin nd with some innovative approaches to so	g and argumentation	

	В	applications through correct theorems or their application	tly analysing problems, but ns and presentation or with	and ideas by being able to identify the approp with some minor inadequacies in arguments, io some minor computational errors.	dentifying the appropriate		
	С		cepts and ideas by being able to correctly ident cms through incorrectly analysing problems w				
	D	Demonstrate some underst substantial inadequacies in with substantial computation					
	Fail	Demonstrate poor and inad being able to complete the		ot being able to identify appropriate theorems or	their applications, or not		
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			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	Adrian Ba 2007)	nner: The Calculus Life	esaver: All the Tools Y	ou Need to Excel at Calculus (Princel	ton University Press,		
online materials	George B	. Thomas, Maurice D. W	eir and Joel Hass: Th	omas' Calculus (12th edition, Addison \	Nesley)		
Course Website		dle.hku.hk/		· · · · · · · · · · · · · · · · · · ·			
Additional Course	Students	who have passed MATH	11013 are not allowed	to take MATH1009.			
Information	Tutorial tir	metable:					
		http://hkumath.hku.hk/~math/Timetable/timetable1920_S1.pdf http://hkumath.hku.hk/~math/Timetable/timetable1920_S2.pdf					

MATH1641	Mathen	natical laboratory	s) Academic	Year 2019		
Offering Department	Mathema	ntics		Quota	30	
Course Co-ordinator	TBC, Ma	thematics ()				
Teachers Involved						
Course Objectives	program	ning language will b Statistics and Manag	e taught via a number of	software Scilab for scientific re mathematical models in Phys portant techniques in Calculus	ics, Chemistry, Biology,	
Course Contents & Topics	Data fitti	ng modeĺs and simu		y models, epidemic models, h ariable. Random walk models inear algebra.		
Course Learning	On succe	essful completion of th	is course, students should b	e able to:		
Outcomes	CLO 1	recognize the importa	ance of numerical methods i	n mathematical modeling		
	CLO 2	demonstrate basic al	gebraic and arithmetic comp	utations in the Scilab environme	nt	
	CLO 3	write and interpret pre	ograms in Scilab programmi	ng language		
	CLO 4	solve simple numeric	al problems by using interac	tive Scilab commands		
	CLO 5	solve moderately cor	nplicated numerical problem	s by writing Scilab programs		
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL					
Offer in 2019 - 2020	N Of	fer in 2020 - 2021 : N		Examinat	ion	
Grade Descriptors (A+ to F)	A Demonstrate an excellent understanding of key concepts and Scilab skills by being able to identify the appropriate Scilab environments and their applications through correctly analysing problems, clearly and efficiently presenting correct algorithms and being able to solve numerical problems by writing Scilab programs carefully and correctly, and with some innovative approaches to solving problems.					
	В	Demonstrate a good understanding of key concepts and Scilab skills by being able to identify the appropriate Scilab environments and their applications through correctly analysing problems, but with some minor inadequacies in identifying the appropriate Scilab components or presenting correct algorithms or with some minor programming/computational errors.				
	С	Demonstrate an acceptable understanding of key concepts and Scilab skills by being able to correctly identify appropriate Scilab environments, but with some inadequacies in solving numerical problems with Scilab through incorrectly analysing problems with inappropriate Scilab environments or with a number of minor programming/computational errors.				
	D	environments, but with problems with inappropr	Demonstrate some understanding of key concepts and Scilab skills by being able to correctly identify appropriate Scilab environments, but with substantial inadequacies in solving numerical problems with Scilab through incorrectly analysing problems with inappropriate Scilab environments or with substantial programming/computational errors.			
	Fail Demonstrate poor and inadequate understanding by not being able to identify appropriate Scilab environments or their applications, or not being able to complete the solution.					
Course Type	Lecture-b	pased course				
Course Teaching	Activitie	s	Details		No. of Hours	
& Learning Activities	Lectures					
	Tutorials				12	
	Reading	/ Self study			100	
Assessment Methods and Weighting	Methods	S	Details	Weighting in fina course grade (%		
	Examina	ition		50	CLO 1,2,3,4,5	
	Test			50	CLO 1,2,3,4,5	
Required/recommended reading and online materials	F. R. Gio	cided by the course in ordano, M. D. Weir, W n Learning, 2003)		nathematical modeling (Pacific	Grove, CA: Brooks/Cole	

Academic Year 2019

MATH1821	Iviathema	atical methods for	actualiui cololloc i (o ci cai			
Offering Department	Mathemati	ics		Quota		
Course Co-ordinator	Dr J T Cha	an, Mathematics (jtchai	n @hku.hk)			
Teachers Involved	(Dr J T Ch	an,Mathematics)				
Course Objectives	backgroun single vari	This course is the first 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 or single variable calculus and elementary matrix theory. It aims at students with Core Mathematics plus Module 1 or Core Mathematics plus Module 2 background.				
Course Contents		s; graphs; inverse func				
& Topics	- Mean val - Bisection - Higher or - Taylor ap - Improper - Numerica - Basic ma - Simple d	 Limits, continuity and differentiability. Mean value theorem; implicit differentiation; L'Hopital's rule. Bisection method and Newton's method. Higher order derivatives, maxima and minima, graph sketching. Taylor approximation and error estimation. Improper integrals, partial fractions, integration by parts. Numerical integration, Trapezoidal rule and Simpson's rule. Basic matrix and vector (of orders 2 and 3) operations, determinants. Simple differential equations. On successful completion of this course, students should be able to: 				
Course Learning	On succes	sful completion of this	course, students should be able	to:		
Outcomes			unction and an inverse function			
	CLO 3 ap sk CLO 4 ap CLO 5 pe	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				
Pre-requisites		•	cond order ordinary differential ed hematics plus Module 1, or Leve		L	
(and Co-requisites	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.					
and Impermissible	Not for stu	idents who have passe	·	nd MATH1853), or have alre	eady enrolled in these	
and Impermissible combinations)	Not for stu courses. For BSc(A	idents who have passe		nd MATH1853), or have alre		
and Impermissible combinations) Offer in 2019 - 2020	Not for stu courses. For BSc(A	ctuarSc) students only sem Offer in 2020 - 2 Demonstrate an excellent applications through corre- and being able to carry out Demonstrate a good under	2021 : Y understanding of key concepts and idea computations carefully and correctly, an erstanding of key concepts and ideas b	Examination s by being able to identify the appreantly presenting correct logical read with some innovative approaches by being able to identify the appro	n Dec ropriate theorems and their ssoning and argumentation s to solving problems. priate theorems and their	
and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Not for stucourses. For BSc(A Y 1st:	ctuarSc) students only sem Offer in 2020 - 2 Demonstrate an excellent applications through correand being able to carry out Demonstrate a good undapplications through correte theorems or their application Demonstrate an	understanding of key concepts and idea city analysing problems, clearly and elegal computations carefully and correctly, an erstanding of key concepts and ideas butly analysing problems, but with some ons and presentation or with some minor le understanding of key concepts and ideas	Examination s by being able to identify the approaches d with some innovative approaches y being able to identify the approaches inadequacies in arguments, computational errors. eas by being able to correctly iden	n Dec opriate theorems and their soning and argumentation to solving problems. opriate theorems and their identifying the appropriate thify appropriate theorems,	
and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Not for stucourses. For BSc(A Y 1st:	ctuarSc) students only sem Offer in 2020 - 2 Demonstrate an excellent applications through corre and being able to carry out Demonstrate a good unde applications through corre theorems or their application Demonstrate an acceptabl but with some inadequar presentation or a number of Demonstrate some unders	understanding of key concepts and idea city analysing problems, clearly and elegal computations carefully and correctly, an arstanding of key concepts and ideas betty analysing problems, but with some ons and presentation or with some minor le understanding of key concepts and ideas in applying the theorems through of minor computational errors.	Examination s by being able to identify the appreantly presenting correct logical read with some innovative approaches y being able to identify the approminor inadequacies in arguments, computational errors. eas by being able to correctly iden incorrectly analysing problems eing able to correctly identify appreaches.	n Dec opriate theorems and their soning and argumentation to solving problems. priate theorems and their identifying the appropriate thify appropriate theorems, with poor argument and opriate theorems, but with	
and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Not for stucourses. For BSc(A Y 1st:	ctuarSc) students only sem Offer in 2020 - 2 Demonstrate an excellent applications through correand being able to carry out Demonstrate a good unde applications through corretheorems or their application but with some inadequatoresentation or a number of Demonstrate some under substantial inadequacies in with substantial computation Demonstrate poor and ina	understanding of key concepts and idea totyl analysing problems, clearly and eleg tomputations carefully and correctly, an erstanding of key concepts and ideas totyl analysing problems, but with some ons and presentation or with some minor le understanding of key concepts and ideas to in applying the theorems through of minor computational errors.	Examination s by being able to identify the approantly presenting correct logical read with some innovative approaches y being able to identify the approminor inadequacies in arguments, computational errors. eas by being able to correctly identincorrectly analysing problems eing able to correctly identify apprettly analysing problems with poor a	n Dec repriate theorems and their resoning and argumentation is to solving problems. repriate theorems and their ridentifying the appropriate ratify appropriate theorems, with poor argument and repriate theorems, but with rgument or presentation or	
and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	Not for stucourses. For BSc(A Y 1st: A B C D	ctuarSc) students only sem Offer in 2020 - 2 Demonstrate an excellent applications through correand being able to carry out Demonstrate a good unde applications through corretheorems or their application. Demonstrate an acceptable but with some inadequar presentation or a number of Demonstrate some under substantial inadequacies in with substantial computation. Demonstrate poor and ina being able to complete the	understanding of key concepts and idea totyl analysing problems, clearly and eleg tomputations carefully and correctly, an erstanding of key concepts and ideas totyl analysing problems, but with some ons and presentation or with some minor le understanding of key concepts and ideas to in applying the theorems through of minor computational errors.	Examination s by being able to identify the approantly presenting correct logical read with some innovative approaches y being able to identify the approminor inadequacies in arguments, computational errors. eas by being able to correctly identincorrectly analysing problems eing able to correctly identify apprettly analysing problems with poor a	n Dec repriate theorems and their resoning and argumentation is to solving problems. repriate theorems and their ridentifying the appropriate ratify appropriate theorems, with poor argument and repriate theorems, but with rgument or presentation or	
and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	Not for stucourses. For BSc(A Y 1st: A B C D Fail Lecture-ba	ctuarSc) students only sem Offer in 2020 - 2 Demonstrate an excellent applications through corre and being able to carry out Demonstrate a good unde applications through corre theorems or their application through corre theorems or their application. Demonstrate an acceptable but with some inadequar presentation or a number of Demonstrate some unders substantial inadequacies in with substantial computation. Demonstrate poor and ina being able to complete the ased course	understanding of key concepts and idea city analysing problems, clearly and eleg computations carefully and correctly, an erstanding of key concepts and ideas betly analysing problems, but with some ons and presentation or with some minor le understanding of key concepts and ideas in applying the theorems through of minor computational errors. standing of key concepts and ideas by be applying the theorems through incorrectional errors. dequate understanding by not being able solution.	Examination s by being able to identify the approantly presenting correct logical read with some innovative approaches y being able to identify the approminor inadequacies in arguments, computational errors. eas by being able to correctly identincorrectly analysing problems eing able to correctly identify apprettly analysing problems with poor a	n Dec opriate theorems and their soning and argumentation to solving problems. priate theorems and their identifying the appropriate thify appropriate theorems, with poor argument and opriate theorems, but with rgument or presentation or	
and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching	Not for stucourses. For BSc(A Y 1st: A B C D Fail Lecture-ba Activities	ctuarSc) students only sem Offer in 2020 - 2 Demonstrate an excellent applications through corre and being able to carry out Demonstrate a good unde applications through corre theorems or their application through corre theorems or their application. Demonstrate an acceptable but with some inadequar presentation or a number of Demonstrate some unders substantial inadequacies in with substantial computation. Demonstrate poor and ina being able to complete the ased course	understanding of key concepts and idea totyl analysing problems, clearly and eleg tomputations carefully and correctly, an erstanding of key concepts and ideas totyl analysing problems, but with some ons and presentation or with some minor le understanding of key concepts and ideas to in applying the theorems through of minor computational errors.	Examination s by being able to identify the approantly presenting correct logical read with some innovative approaches y being able to identify the approminor inadequacies in arguments, computational errors. eas by being able to correctly identify analysing problems eing able to correctly identify apprettly analysing problems with poor a	opriate theorems and their soning and argumentation to solving problems. Spriate theorems and their identifying the appropriate theorems, with poor argument and opriate theorems, but with rgument or presentation or their applications, or not	
and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching	Not for stucourses. For BSc(A Y 1st: A B C D Fail Lecture-ba Activities Lectures	ctuarSc) students only sem Offer in 2020 - 2 Demonstrate an excellent applications through corre and being able to carry out Demonstrate a good unde applications through corre theorems or their application through corre theorems or their application. Demonstrate an acceptable but with some inadequar presentation or a number of Demonstrate some unders substantial inadequacies in with substantial computation. Demonstrate poor and ina being able to complete the ased course	understanding of key concepts and idea city analysing problems, clearly and eleg computations carefully and correctly, an erstanding of key concepts and ideas betly analysing problems, but with some ons and presentation or with some minor le understanding of key concepts and ideas in applying the theorems through of minor computational errors. standing of key concepts and ideas by be applying the theorems through incorrectional errors. dequate understanding by not being able solution.	Examination s by being able to identify the approantly presenting correct logical read with some innovative approaches y being able to identify the approminor inadequacies in arguments, computational errors. eas by being able to correctly identify analysing problems eing able to correctly identify apprettly analysing problems with poor a	opriate theorems and their soning and argumentation to solving problems. Spriate theorems and their identifying the appropriate theorems, with poor argument and ropriate theorems, but with rgument or presentation or their applications, or not their applications, or not the solvent and the solvent applications or their applications, or not the solvent applications and the solvent applications are solvent applications are solvent applications are solvent applications are solvent applications.	
and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching	Not for stucourses. For BSc(A Y 1st: A B C D Fail Lecture-ba Activities Lectures Tutorials	ctuarSc) students only sem Offer in 2020 - 2 Demonstrate an excellent applications through correand being able to carry out Demonstrate a good under applications through correstheorems or their applications through correstheorems or their applications through correstheorems or their applications but with some inadequate presentation or a number of Demonstrate some unders substantial inadequacies in with substantial computation Demonstrate poor and inabeing able to complete the assed course	understanding of key concepts and idea city analysing problems, clearly and eleg computations carefully and correctly, an erstanding of key concepts and ideas betly analysing problems, but with some ons and presentation or with some minor le understanding of key concepts and ideas in applying the theorems through of minor computational errors. standing of key concepts and ideas by be applying the theorems through incorrectional errors. dequate understanding by not being able solution.	Examination s by being able to identify the approantly presenting correct logical read with some innovative approaches y being able to identify the approminor inadequacies in arguments, computational errors. eas by being able to correctly identify analysing problems eing able to correctly identify apprettly analysing problems with poor a	opriate theorems and their isoning and argumentation is to solving problems. Spriate theorems and their identifying the appropriate theorems, with poor argument and ropriate theorems, but with rgument or presentation or their applications, or not their applications, or not their applications and the spriate theorems are theorems. The spriate theorems is the spriate theorems and the spriate theorems is the spriate theorems. The spriate theorems is the spriate theorems are the spriate theorems and the spriate theorems is the spriate theorems. The spriate theorems is the spriate theorems are the spriate theorems and their applications or the spriate theorems are the spriate theorems.	
and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching & Learning Activities	Not for stucourses. For BSc(A Y 1st: A B C D Fail Lecture-ba Activities Lectures Tutorials Reading /	ctuarSc) students only sem Offer in 2020 - 2 Demonstrate an excellent applications through corre and being able to carry out Demonstrate a good unde applications through corre theorems or their application through corre theorems or their application. Demonstrate an acceptable but with some inadequar presentation or a number of Demonstrate some unders substantial inadequacies in with substantial computation. Demonstrate poor and ina being able to complete the ased course	understanding of key concepts and idea cityl analysing problems, clearly and elegal computations carefully and correctly, an erstanding of key concepts and ideas be city analysing problems, but with some ons and presentation or with some minor le understanding of key concepts and ideas in applying the theorems through of minor computational errors. standing of key concepts and ideas by be applying the theorems through incorrectional errors. dequate understanding by not being ablications. Details	Examination s by being able to identify the approantly presenting correct logical read with some innovative approaches y being able to identify the approminor inadequacies in arguments, computational errors. eas by being able to correctly identify analysing problems deing able to correctly identify approblems with poor a detailed to incorrectly analysing problems with poor a detailed to identify appropriate theorems of the correctly appropriate the correctly appropriate theorems of the correctly appropriate the correctly appropriate the correctly appropriate the correctly appropriate the correct	opriate theorems and their soning and argumentation to solving problems. Spriate theorems and their identifying the appropriate theorems, with poor argument and opriate theorems, but with rgument or presentation or their applications, or not No. of Hours 36 12 100	
and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching & Learning Activities Assessment Methods	Not for stucourses. For BSc(A Y 1st: A B C D Fail Lecture-ba Activities Lectures Tutorials	ctuarSc) students only sem Offer in 2020 - 2 Demonstrate an excellent applications through correand being able to carry out Demonstrate a good under applications through correstheorems or their applications through correstheorems or their applications through correstheorems or their applications but with some inadequate presentation or a number of Demonstrate some unders substantial inadequacies in with substantial computation Demonstrate poor and inabeing able to complete the assed course	understanding of key concepts and idea city analysing problems, clearly and eleg computations carefully and correctly, an erstanding of key concepts and ideas betly analysing problems, but with some ons and presentation or with some minor le understanding of key concepts and ideas in applying the theorems through of minor computational errors. standing of key concepts and ideas by be applying the theorems through incorrectional errors. dequate understanding by not being able solution.	Examination Is by being able to identify the approantly presenting correct logical red with some innovative approaches by being able to identify the approminor inadequacies in arguments, computational errors. eas by being able to correctly identify analysing problems are incorrectly analysing problems with poor a set to identify appropriate theorems are to identify appropriate	n Dec repriate theorems and their isoning and argumentation is to solving problems. priate theorems and their identifying the appropriate rify appropriate theorems, with poor argument and repriate theorems, but with rgument or presentation or or their applications, or not No. of Hours 36 12 100 Assessment Methods to CLO Mappping	
and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching & Learning Activities Assessment Methods	Not for stucourses. For BSc(A Y 1st: A B C D Fail Lecture-ba Activities Lectures Tutorials Reading /	ctuarSc) students only sem Offer in 2020 - 2 Demonstrate an excellent applications through corre and being able to carry out Demonstrate a good und applications through corre theorems or their applicatio Demonstrate an acceptabl but with some inadequad presentation or a number of Demonstrate some unders substantial inadequacies in with substantial computatio Demonstrate poor and ina being able to complete the ased course Self study	understanding of key concepts and idea cityl analysing problems, clearly and elegal computations carefully and correctly, an erstanding of key concepts and ideas be city analysing problems, but with some ons and presentation or with some minor le understanding of key concepts and ideas in applying the theorems through of minor computational errors. standing of key concepts and ideas by be applying the theorems through incorrectional errors. dequate understanding by not being ablications. Details	Examination s by being able to identify the apprentity presenting correct logical read with some innovative approaches y being able to identify the apprentinor inadequacies in arguments, computational errors. eas by being able to correctly identify analysing problems leing able to correctly identify apprentity analysing problems with poor a et o identify appropriate theorems of the appropriate the appropriate the appropriate the appropriate the a	n Dec repriate theorems and their soning and argumentation s to solving problems. priate theorems and their identifying the appropriate ntify appropriate theorems, with poor argument and repriate theorems, but with rgument or presentation or or their applications, or not No. of Hours 36 12 100 Assessment Methods	
and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching & Learning Activities Assessment Methods	Not for stucourses. For BSc(A Y 1st: A B C D Fail Lecture-ba Activities Lectures Tutorials Reading / Methods	ctuarSc) students only sem Offer in 2020 - 2 Demonstrate an excellent applications through corre and being able to carry out Demonstrate a good und applications through corre theorems or their applicatio Demonstrate an acceptabl but with some inadequad presentation or a number of Demonstrate some unders substantial inadequacies in with substantial computatio Demonstrate poor and ina being able to complete the ased course Self study	understanding of key concepts and idea cityl analysing problems, clearly and elegal computations carefully and correctly, an erstanding of key concepts and ideas be city analysing problems, but with some ons and presentation or with some minor le understanding of key concepts and ideas in applying the theorems through of minor computational errors. standing of key concepts and ideas by be applying the theorems through incorrectional errors. dequate understanding by not being ablications. Details	Examination Is by being able to identify the approantly presenting correct logical red with some innovative approaches by being able to identify the approminor inadequacies in arguments, computational errors. eas by being able to correctly identify analysing problems are incorrectly analysing problems with poor a set to identify appropriate theorems are to identify appropriate	n Dec repriate theorems and their isoning and argumentation is to solving problems. priate theorems and their identifying the appropriate rify appropriate theorems, with poor argument and repriate theorems, but with rgument or presentation or or their applications, or not No. of Hours 36 12 100 Assessment Methods to CLO Mappping	
and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Not for stucourses. For BSc(A Y 1st: A B C D Fail Lecture-ba Activities Lectures Tutorials Reading / Methods Examinati Test George B edition)	ctuarSc) students only sem Offer in 2020 - 2 Demonstrate an excellent applications through correand being able to carry out Demonstrate a good under applications through corresponding theorems or their application. Demonstrate an acceptable but with some inadequation presentation or a number of Demonstrate some undersubstantial inadequacies in with substantial computation. Demonstrate poor and ina being able to complete the assed course. Self study Thomas; as revised	understanding of key concepts and idea city analysing problems, clearly and eleg computations carefully and correctly, an erstanding of key concepts and ideas bety analysing problems, but with some ons and presentation or with some minor le understanding of key concepts and ideas between it is applying the theorems through of minor computational errors. Standing of key concepts and ideas by the applying the theorems through incorrectional errors. dequate understanding by not being able solution. Details Details	Examination s by being able to identify the approantly presenting correct logical red with some innovative approaches by being able to identify the approminor inadequacies in arguments, computational errors. eas by being able to correctly identify approaches incorrectly analysing problems reing able to correctly identify appropriate theorems are to identify appropriate are to identify appropriate theorems are to i	n Dec repriate theorems and their isoning and argumentation is to solving problems. Spriate theorems and their identifying the appropriate theorems, with poor argument and repriate theorems, but with rgument or presentation or or their applications, or not their applications, or not their applications and the second of the	
and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended reading and	Not for stucourses. For BSc(A Y 1st: A B C D Fail Lecture-ba Activities Lectures Tutorials Reading / Methods Examinati Test George B edition)	ctuarSc) students only sem Offer in 2020 - 2 Demonstrate an excellent applications through corre and being able to carry out Demonstrate a good und applications through corre theorems or their applicatio Demonstrate an acceptabl but with some inadequad presentation or a number of Demonstrate some unders substantial inadequacies ir with substantial computatio Demonstrate poor and ina being able to complete the ased course Self study	understanding of key concepts and idea city analysing problems, clearly and eleg to computations carefully and correctly, an erstanding of key concepts and ideas toty analysing problems, but with some ons and presentation or with some minor le understanding of key concepts and ideas to in applying the theorems through of minor computational errors. Standing of key concepts and ideas by be applying the theorems through incorrect onal errors. Details Details Details	Examination s by being able to identify the approantly presenting correct logical red with some innovative approaches by being able to identify the approminor inadequacies in arguments, computational errors. eas by being able to correctly identify approaches incorrectly analysing problems reing able to correctly identify appropriate theorems are to identify appropriate are to identify appropriate theorems are to i	n Dec repriate theorems and their isoning and argumentation is to solving problems. Spriate theorems and their identifying the appropriate theorems, with poor argument and repriate theorems, but with rgument or presentation or or their applications, or not their applications, or not their applications and the second of the	
and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended reading and online materials	Not for stucourses. For BSc(A Y 1st: A B C D Fail Lecture-ba Activities Lectures Tutorials Reading / Methods Examinati Test George B edition)	ctuarSc) students only sem Offer in 2020 - 2 Demonstrate an excellent applications through correand being able to carry out Demonstrate a good und applications through corretheorems or their application bemonstrate an acceptable but with some inadequar presentation or a number of Demonstrate some unders substantial inadequacies in with substantial computation Demonstrate poor and ina being able to complete the assed course substantial computation. Self study Thomas; as revised dle.hku.hk/	understanding of key concepts and idea city analysing problems, clearly and eleg to computations carefully and correctly, an erstanding of key concepts and ideas toty analysing problems, but with some ons and presentation or with some minor le understanding of key concepts and ideas to in applying the theorems through of minor computational errors. Standing of key concepts and ideas by be applying the theorems through incorrect onal errors. Details Details Details	Examination s by being able to identify the approantly presenting correct logical red with some innovative approaches by being able to identify the approminor inadequacies in arguments, computational errors. eas by being able to correctly identify approaches incorrectly analysing problems reing able to correctly identify appropriate theorems are to identify appropriate are to identify appropriate theorems are to i	n Dec repriate theorems and their isoning and argumentation is to solving problems. Spriate theorems and their identifying the appropriate theorems, with poor argument and repriate theorems, but with rgument or presentation or or their applications, or not their applications, or not their applications and the second of the	

MATH1851	Calculus and ordinary differential equations (6 credits)	Academic Year	2019		
Offering Department	Mathematics	Quota	700		
Course Co-ordinator	Dr Y K Lau, Mathematics (yklau@maths.hku.hk)				
Teachers Involved	(Dr L Xu,Mechanical Engineering) (Dr X Zhang,Mathematics) (Dr Y Chen,Mechanical Engineering) (Dr Y K Lau,Mathematics) (Prof K W Chow,Mechanical Engineering)				
Course Objectives	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	 Differential and integral calculus (single variable) [limits and continuity, derivelementary functions, derivatives by implicit differentiation, the mean value the representation of curves, polar coordinates, indefinite integrals, integral decomposition, definite integrals, the fundamental theorem of calculus, and the Ordinary differential equations [first order equations, integrating factors and limits and continuity. 	orem, L'H\^{o}pital' ation by parts, p ir applications]	s rule, parametric partial fractions		

Course Website Additional Course	2008, 5th ed.) http://moodle.hku.hk/ There will be no 'make-up' for a missed test or assignment under normal circumstances. Students are advised not to take MATH1851 and MATH1853 together in the same semester.				
Required/recommended reading and online materials	G.B. Thor R.K. Nag	nas, et al.: Thomas' Cal le, et al.: Fundamental	us and Differential Equations culus (Pearson Education, 2		
	Examinat Test	ion	2 tests	70 20	CLO 1,2,3,4,5 CLO 1,2,3,4,5
	Assignme			10	CLO 1,2,3,4,5
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods
		/ Self study			100
∽ =carning Activities	Tutorials				12
& Learning Activities	Lectures	•	Derailo		No. of Hours
Course Type Course Teaching	Activities		Details		No. of Hours
Course Type	Fail	Demonstrate poor and ina		ing able to identify appropriate theorer	ns and methods or their
	 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. 				
(A+ to F)	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				
	В				
Grade Descriptors	Α			nd ideas by being able to identify the a	ppropriate theorems and
combinations) Offer in 2019 - 2020	Y 1st	sem 2nd sem Offer	in 2020 - 2021 : Y	Examination	Dec May
(and Co-requisites and Impermissible		ATH1011. se is exclusively for Eng	gineering students.)		
Pre-requisites	di	sciplines	Module 2 of HKDSE Mathem		
	e) vil	cample. Appreciate the brations and signal proc	e power of these technique essing	es in initial value problems an	nd applications like
	re	sonance where large ar	mplitude displacements can l	ations and electric circuits. Ident be expected orm, using the Laplace transfor	•
	us	sed, clearly give the mat	thematical formulation, and c		
	CLO 2 ap			asic physical/engineering problen	
	th de	eir relationship with soletails for the solution, a	me typical physical/enginee	ring applications: unerringly per e solution approach with the fu	form the calculation
Course Learning Outcomes			course, students should be a and understanding of basic o	able to: calculus and ordinary differential	equations as well as
	fractions,	solution of linear differen	ntial equations (initial value p	problems) using Laplace transfor	
				inctions, inverse Laplace transf est and second shifting theorems	
	of parameters, higher-order inhomogeneous linear ordinary differential equations, choice of particular solutions and physical implication of resonance, Cauchy-Euler equations, and their applications]				

MATH1853	Linear algebra, probability and statistics (6 credits)	Academic Year	2019		
Offering Department	Mathematics	Quota	700		
Course Co-ordinator	Dr G Han, Mathematics (ghan @maths.hku.hk)				
Teachers Involved	(Dr G Han,Mathematics) (Dr N Wong,Electrical & Electronic Engineering) (Prof S H Lo,Civil Engineering) (Prof Z Q Yue,Civil Engineering)				
Course Objectives	As the complementary course of MATH1851, students will be introduced to more topics of mathematics commonly applied in engineering so that students could be further enhanced with a concrete skill in mathematics underpinned for different engineering subjects. The course emphasizes mathematical concepts, principles, analysis, and their relationship to the modelling of engineering systems. Students could be furnished with the essential mathematical skills to analytically tackle some typical engineering problems to prepare for all the engineering subjects.				
Course Contents & Topics	 Linear algebra [vectors and scalars, inner product, vector projection, linear matrix, determinant, matrix inverse, system of linear equations, matrix equations, matrix rule, matrix rank, eigenvalue, eigenvector, matrix diagonalization, positive, netheir applications] Elementary complex variables [arithmetics of complex numbers, representations] 	on, Ġaussian elimi gative and semi-c	ination, Cramer's definiteness, and		

	Moivro's	theorem roots of unity	complex functions, and the	oir applications!			
	Moivre's theorem, roots of unity, complex functions, and their applications] - Basic probability theory [axioms of probability, conditional probability, Bayes' theorem, the total probability formula, random variable, (joint) probability distribution, expectation, variance, independence, and their						
	Normal d	only used distributions istribution, and their app statistics [point estimate or a population mean w	lications] es, sample mean, sample	ometric, Negative Binomial, Expon e variance with known or unknowl opulation variances, inference for p	n mean, confidence		
Course Learning		On successful completion of this course, students should be able to:					
Outcomes	CLO 1 d s p	emonstrate knowledge tatistics as well as the	and understanding of lin ir relationship with some details for the solution, a	ear algebra, complex numbers, pro- e typical physical/engineering applind accurately correlate the solution	lications: unerringly		
	p a	hysical/engineering appl	lications: analyze the give	olve certain practical problems then problem, identify the appropriate used, and clearly give the mathemat	mathematical skills,		
		e well prepared to cope isciplines	with a higher level of en	gineering mathematics required in o	different engineering		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in N	r above in Module 1, or I MATH1011. rse is exclusively for Eng	Module 2 of HKDSE Math gineering students.)	ematics or equivalent, or			
Offer in 2019 - 2020	Y 1s	t sem 2nd sem Offer	in 2020 - 2021 : 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.						
	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 Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems and methods or their applications, or not being able to complete the solution.						
Cource Type	Locturo		ble to complete the solution.				
Course Type Course Teaching	Activitie	pased course	Details		No. of Hours		
& Learning Activities	Lectures		Details		36		
	Tutorials				12		
		/ 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		
	Examina			80	CLO 1,2,3		
Required/recommended	D.C. Lay	Linear Algebra and its A	Applications (Addison-We	sley, 2012, 4th ed.)			
reading and online materials	S.J. Leor G. James C. Rorres	n: Linear Algebra with Ap s, et al.: Modern Enginee s and H. Anton: Applicati	plications (Pearson Educ	ation, 2006, 7th ed.) on Education, 2008, 4th ed.) lley, 1984, 3rd ed.)			
Course Website		g. Advanced Engineenn odle.hku.hk/	y manicinanos (vviicy, 20	00, 5til Gu.)			
Additional Course Information	There wil Students This cour Tutorial ti	I be no 'make-up' for a mare advised not to take see is offered by the Depimetable:	MATH1851 and MATH18 artment of Mathematics a	under normal circumstances. 53 together in the same semester. nd the Faculty of Engineering.			
			etable/timetable1920_S1. etable/timetable1920_S2.				

MATH2012	Fundamental concepts of mathematics (6 credits)	Academic Year	2019
Offering Department	Mathematics	Quota	
Course Co-ordinator	Dr Y M Chan, Mathematics (ymchan@maths.hku.hk)		
Teachers Involved	(Dr Y M Chan, Mathematics)		
Course Objectives	To provide students with solid background on fundamental concepts of m proofs. Such concepts and methods are important for subsequent mathematics. This course can be taken concurrently with other Level 2 or	studies in all higher I	
Course Contents & Topics	 Elementary set theory. 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 Outcomes	On successful completion of this course, students should be able to: CLO 1 understand the definition of a set and apply set theory in simple d CLO 2 construct the truth table of a given statement CLO 3 apply different proof strategies (e.g. proof by contradiction an mathematical statement	<u> </u>	on) in proving a

	CLO 4 de	4 demonstrate the basic properties of equivalence relations					
			on of limits of sequences of real nur	mbers			
	CLO 6 de	emonstrate the opera	tional properties of groups				
Pre-requisites (and Co-requisites and Impermissible combinations)	Students have stro	ass in MATH1013 or MATH1821 or (MATH1851 and MATH1853). udents with good grades in HKDSE Math Module 1 or Math Module 2 (or other equivalent qualifications) and ve strong interests in math may also apply for taking this course concurrently with its prerequisites courses ubject to the approval from Course Selection Advisors).					
Offer in 2019 - 2020	Y 1st	sem 2nd sem Of	fer in 2020 - 2021 : Y	Examination	Dec May		
Grade Descriptors (A+ to F)	A	applications through cor	nt understanding of key concepts and ideas rrectly analysing problems, clearly and elegi- out computations carefully and correctly, and	antly presenting correct logical reas	oning and argumentation		
	В	applications through co	nderstanding of key concepts and ideas by rrectly analysing problems, but with some rations and presentation or with some minor of	ninor inadequacies in arguments, ic			
	С	but with some inadequ	able understanding of key concepts and ide uacies in applying the theorems through er 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.						
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	Tutorials and Assignments	10	CLO 1,2,3,4,5,6		
	Examinat	tion	-	50	CLO 1,2,3,4,5,6		
	Test			40	CLO 1,2,3,4,5,6		
Required/recommended reading and online materials		artrand, Albert D. Po 2012, Third Edition)	limeni, Ping Zhang: Mathematical	Proofs: A Transition to Adv	anced Mathematics		
Course Website	http://mod	odle.hku.hk/					
Additional Course	Tutorial tir	metable:					
Information			imetable/timetable1920_S1.pdf imetable/timetable1920_S2.pdf				

MATH2014	Multiva	riable calculus and linear algebra (6 credits)	Academic Year	2019			
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		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 - Partial - Taylor's f - Multiple - Matrix A - Vector basis and - Eigenva - Numeri	Derivatives: Functions of several variables, partial derivatives, ext	treme values and Lag rals. ns as a matrix equation span of vectors, linea	range multipliers, n. ar independence,			
Course Learning Outcomes	On succe CLO 1 CLO 2 CLO 3 CLO 4 CLO 5	essful completion of this course, students should be able to: understand the geometric meaning of partial and directional deriv optimize multivariate objective functions (with/without constraints) evaluate integrals over curvilinear regions in space understand the concept of vector spaces, basis, dimension solve simple eigenvalue problems and apply the theory to practic					
Pre-requisites (and Co-requisites and Impermissible combinations)	Not for s	MATH1013 or (MATH1851 and MATH1853). students who have passed MATH2822 or [(MATH2101 or MATH2 in these courses.	102) and MATH2211]	, or have already			
Offer in 2019 - 2020	Y 1s	st sem 2nd sem Offer in 2020 - 2021 : Y	Examination	Dec May			
Grade Descriptors (A+ to F)	A B C	Demonstrate an excellent understanding of key concepts and ideas by being at applications through correctly analyzing problems, clearly and elegantly presen and being able to carry out computations carefully and correctly, and with some in Demonstrate a good understanding of key concepts and ideas by being able applications through correctly analyzing problems, but with some minor inadeq theorems or their applications and presentation or with some minor computation. Demonstrate an acceptable understanding of key concepts and ideas by being but with some inadequacies in applying the theorems through incorrectly	ting correct logical reasonir innovative approaches to so to identify the appropriate juacies in arguments, ident al errors. g able to correctly identify a	g and argumentation living problems. theorems and their fying the appropriate ppropriate theorems,			
	D	presentation or a number of minor computational errors. Demonstrate some understanding of key concepts and ideas by being able to substantial inadequacies in applying the theorems through incorrectly analyzing	correctly identify appropria	e theorems, but with			
	D Fail	presentation or a number of minor computational errors. Demonstrate some understanding of key concepts and ideas by being able to	correctly identify appropriation	e theorems, but with ent or presentation or			

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
	Test		50	CLO 1,2,3,4,5
Required/recommended reading and online materials	TBC			
Course Website	http://moodle.hku.hk/			
Additional Course Information		n/Timetable/timetable1920_S1 n/Timetable/timetable1920_S2		

MATH2101	Linear a	Igebra I (6 credi	its)	Academic Ye	ar 2019	
Offering Department	Mathemat	ics	•	Quota		
Course Co-ordinator	Dr K H La	w, Mathematics <i>(la</i>	wkaho@maths.hku.hk)			
Teachers Involved	(Dr K H La	aw,Mathematics)				
Course Objectives	linear stru	ıcture through mar to mathematical rig	course on linear algebra, which aims ny concrete examples in the Euclidea or and prepares them for studying mo	an spaces. The course also re advanced mathematical c	enriches students ourses.	
Course Contents & Topics	planes; ar - Matrix A equations - Systems elementar - Vector S vectors, lin - Linear T linear tran	nd applications to g lgebra: Matrix add as a matrix equations s of Linear Equations y matrices, matrix in Spaces: Coordinations near independence transformations: Designations.	ition and multiplication, determinant a on. tions: Gauss-Jordan elimination, ele	nd inverse of square matrice ementary row operations, in ces as vector spaces, its so commations in R^2 and R^3, so	es, system of linear row echelon form subspaces, span o tandard matrices of	
	application	•	3 , 3	,	,	
	- Inner Pro	oduct: Gram-Schmi	dt process, least square problems.			
Course Learning		•	this course, students should be able to			
Outcomes	CLO 2 so	olve systems of lin atrices	ons and use them in some practical p ear equations by Gauss-Jordan elim	nination and also compute i	·	
	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 minimization problems by the least squares method					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in M	ass in MATH1013 or MATH1821 or (MATH1851 and MATH1853)				
Offer in 2019 - 2020	Y 1st	sem 2nd sem (Offer in 2020 - 2021 : Y	Examination	Dec May	
Grade Descriptors (A+ to F)	A	applications through	llent understanding of key concepts and ideas correctly analysing problems, clearly and elega y out computations carefully and correctly, and	ntly presenting correct logical reason	ning 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.					
	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		d inadequate understanding by not being able	to identify appropriate theorems or	their applications, or no	
Course Type	Lecture ha	being able to complet ased course	e the solution.			
Course rype						
	Activities		Dotaile	Details		
Course Teaching		5	Details		No. of Hours	
Course Teaching	Lectures	3	Details		36	
Course Teaching	Lectures Tutorials		Details		36 12	
Course Teaching & Learning Activities Assessment Methods	Lectures Tutorials	/ Self study	Details Details	Weighting in final course grade (%)	36	
Course Teaching & Learning Activities Assessment Methods	Lectures Tutorials Reading /	/ Self study			36 12 100 Assessment Methods	
Course Teaching & Learning Activities Assessment Methods	Lectures Tutorials Reading / Methods	/ Self study	Details assignments, tutorials,	course grade (%)	36 12 100 Assessment Methods to CLO Mapping	
Course Teaching & Learning Activities Assessment Methods	Lectures Tutorials Reading / Methods Assignment	/ Self study	Details assignments, tutorials,	course grade (%)	36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5	
Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended reading and	Lectures Tutorials Reading / Methods Assignme Examinat Test	/ Self study ents ion	Details assignments, tutorials, participation, etc	10 50 40	36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5 CLO 1,2,3,4,5	
Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended reading and online materials	Lectures Tutorials Reading / Methods Assignme Examinat Test Spence, In	/ Self study ents ion nsel & Friedberg: E	Details assignments, tutorials, participation, etc 2 tests	10 50 40	36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5 CLO 1,2,3,4,5	
Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended reading and	Lectures Tutorials Reading / Methods Assignme Examinat Test Spence, In	/ Self study ents ion nsel & Friedberg: E	Details assignments, tutorials, participation, etc 2 tests	10 50 40	36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5 CLO 1,2,3,4,5	

MATH2102	Linear al	gebra II (6 credits)		Academic Ye	ar 2019	
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	subspaces students' f	his is a follow-up of the course Linear Algebra I. It aims at introducing the general concept of vector spaces ubspaces, dimensions, inner product spaces, etc. The course prepares the foundation on linear algebra for tudents' future study in mathematics and other disciplines. Many examples of applications will be drawn on ifferent subject areas.				
Course Contents & Topics	2. Linear determinar 3. Linear o diagonaliza 4. Inner pro 5. Linear o diagonaliza	Vector spaces: definition of field, subspaces/quotient spaces, direct sum, existence of basis, dual space Linear transformations: kernel and image, isomorphisms, matrix representations of linear transformations, sterminant Linear operator: eigenvalues and eigenspaces, algebraic/geometric multiplicity, agonalizability, Cayley-Hamilton theorem, canonical form (optional) Inner product space: Inner product, orthonormal basis, orthogonal complement and projection Linear operators on inner product space: adjoints of operators, orthogonal/unitary operators, orthogonal/unitary agonalization of self-adjoint/normal operators, symmetric bilinear form and quadratic form Additional selected topics up to the instructor				
Course Learning	On succes	sful completion of this o	course, students should be able to:			
Outcomes		· · · · · · · · · · · · · · · · · · ·	tures and apply relevant knowledge	to some practical probler	ns	
			ubspaces and compute basis, dime			
			nature of linear transformations/o		culations of linear	
			matrices by choosing particular basis	•		
	CLO 4 be	able to solve eigenvalu	e problem for linear operators and a	pply it to the problem of o	liagonalization	
	CLO 5 un		of inner product space and adjoin			
Pre-requisites		ATH2101 or (MATH182				
(and Co-requisites and Impermissible combinations)	1 430 111 111/	(1712-101-01 (1717-11-102	r und No (11) ZOZZ			
Offer in 2019 - 2020	Y 2nd	sem Offer in 2020 - 2	021 : 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 the 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					
	D					
	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.				their applications, or not	
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	Methods		Details	Weighting in final	Assessment	
and Weighting				course grade (%)	Methods to CLO Mapping	
and Weighting	Examinati	on		course grade (%)		
and Weighting	Examination Test	on			to CLO Mapping	
Required/recommended	Test		Linear algebra (Pearson, 4th edition	50 50	to CLO Mapping CLO 1,2,3,4,5	
Required/recommended reading and	Test		Linear algebra (Pearson, 4th edition	50 50	to CLO Mapping CLO 1,2,3,4,5	
Required/recommended reading and online materials	Test S. Friedbe	rg, A. Insel, L. Spence:	Linear algebra (Pearson, 4th edition	50 50	to CLO Mapping CLO 1,2,3,4,5	
Required/recommended reading and	Test	rg, A. Insel, L. Spence:	Linear algebra (Pearson, 4th edition	50 50	to CLO Mapping CLO 1,2,3,4,5	

MATH2211	Multivariable calculus (6 credits)	Academic Year	2019
Offering Department	Mathematics	Quota	
Course Co-ordinator	Dr T W Ching (1st sem); Dr Z Hua (2nd sem), Mathematics (Imtching@maths.hk	u.hk; huazheng@	maths.hku.hk)
Teachers Involved	(Dr T W Ching,Mathematics) (Dr Z Hua,Mathematics)		
Course Objectives	Students of this course will learn the theory of multivariable calculus and learn practical problems. This is a required course for Mathematics and Mathematics, all students in Science, Engineering, Economics and Finance, and other stucial calculus in their areas of study. This is also a required course for all Minc Mathematics, and is a pre-requisite of many advanced level mathematics course	Physics Majors, and the state of the state o	and is suitable for use multivariable
Course Contents & Topics	 Vectors: vectors in 2-, 3-, and n-dimensions; dot product and cross product; land spherical coordinates. Differentiation in several variables: limits and derivatives; the chain rule; direction vector-valued functions: parametrized curves; arc-length; vector fields; gradit operator. Maxima and minima: differentials and Taylor's Theorem of several variables multipliers; applications of extrema. Multiple integration: double and triple integrals; change of variables; application 	onal derivatives and ent, divergence, s; extrema of fun	nd gradients. curl, and the del

				neorem; conservative vector fields. ces; surface integrals; Stokes' and 0	Gauss' Theorems		
Course Learning			this course, students should b		Jaaco Tricoromic.		
Outcomes			·	alculus of functions in several real va	riables		
			•	compute line integrals and surface in			
				olems, such as constrained optimiz			
			ing differentiation and integral		ation problems and		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in M	ass in MATH1013 or MATH1821 or (MATH1851 and MATH1853)					
Offer in 2019 - 2020	Y 1st	sem 2nd sem C	Offer in 2020 - 2021 : Y	Examination	Dec May		
Grade Descriptors (A+ to F)	Α	applications through c and being able to carry	orrectly analysing problems, clearly a y out computations carefully and corre	and ideas by being able to identify the appro and elegantly presenting correct logical reas ectly, and with some innovative approaches	oning and argumentation to solving problems.		
	В	applications through of theorems or their appli	correctly analysing problems, but with ications and presentation or with som		dentifying the appropriate		
	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	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.						
Course Type	Lecture-ba	ased course					
Course Teaching	Activities		Details	Details			
& 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		10	CLO 1,2,3		
	Examinat	ion		50	CLO 1,2,3		
	Test			40	CLO 1,2,3		
Required/recommended reading and contine materials	Susan J. (Susan J. Colley: Vector Calculus (Pearson, 2011, 4th edition)					
Course Website	http://moo	dle.hku.hk/					
Additional Course Information	Students a Tutorial tir http://hkur	are assumed to hav netable: nath.hku.hk/~math/	e mastered calculus of one-va Timetable/timetable1920_S1. Timetable/timetable1920 S2.				

MATH2241	Introduc	tion to mathematical analysis	s (6 credits)	Academic Year	2019			
Offering Department	Mathemati	CS CS	•	Quota				
Course Co-ordinator	Dr Y M Ch	an (1st sem); Dr T W Ching (2nd se	em), Mathematics <i>(ymchan@mat</i>	hs.hku.hk; Imtching	@maths.hk	u.hk)		
Teachers Involved		ning,Mathematics) nan,Mathematics)						
Course Objectives	To introduce students to the basic ideas and techniques of mathematical analysis.							
Course Contents & Topics	denseness - Sequence sequences - Continui intermedia - Different application - Integratio	 The real number system: the real numbers as an ordered field, supremum and infimum, the completeness axiom, denseness of the rational numbers. 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. Continuity of real-valued functions: properties of continuous functions, the extreme value theorem, the intermediate value theorem, uniform continuity, limits of functions. Differentiation: properties of differentiable functions, the mean value theorem, Taylor's theorem and its applications. Integration: construction of the Riemann integral using Darboux sums and Riemann sums, the fundamental theorem of calculus. 						
Course Learning Outcomes	CLO 1 cor CLO 2 der sec CLO 3 elu intr CLO 4 elu un	theorem of calculus. On successful completion of this course, students should be able to: CLO 1 comprehend and use abstract mathematical arguments such as the epsilon-delta argument CLO 2 demonstrate convergence or non-convergence of a sequence/series using properties of convergent sequences/series CLO 3 elucidate important properties of continuous functions such as the extreme value theorem and the intermediate value theorem CLO 4 elucidate important properties of differentiable functions such as the mean value theorem, and to understand and apply Taylor's Theorem						
Pre-requisites (and Co-requisites and Impermissible combinations)		CLO 5 articulate the construction of the Riemann integral and its relation to differentiation Pass in MATH1013 or (MATH1851 and MATH1853) or MATH2822. Students are strongly recommended to have taken MATH2012 if they wish to take this course.						
Offer in 2019 - 2020	Y 1st s	sem 2nd sem Offer in 2020 - 20	21 : Y	Examination	Dec May	,		
Grade Descriptors (A+ to F)	В	Demonstrate a thorough mastery of the mabstract mathematical arguments, to apply situations. Ability to present solutions clear Demonstrate a substantial command of thandle abstract mathematical arguments, proof techniques in novel situations. Ability problems are expected.	appropriate theorems correctly, and to ly and logically, and the use of innovative ne mathematical notions and proof techn to apply appropriate theorems correctly	make use of those production ideas in solving problem ideas taught in the court, and, with guidance, to	f techniques in ns are expecte rse by being a nake use of	n nove d. able to f those		

	C D	handle abstract mathematical arguments and to apply appropriate theorems correctly. Ability to prese logically is expected.							
	Fail	able to apply the theor		adequate understanding by not being able to identify appropriate theorems for applications, or					
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 1,2,3,4,5				
	Examinat	ion		50	CLO 1,2,3,4,5				
	Test			40	CLO 1,2,3,4,5				
Required/recommended reading and online materials		cobert G. Bartle, Donald R. Sherbert: Introduction to Real Analysis (Wiley, 2011, Fourth Edition) enneth A. Ross: Elementary Analysis: The Theory of Calculus (Springer, 2013, Second Edition)							
Course Website	http://moo	dle.hku.hk/							
Additional Course Information	http://hkun	tp://moodle.hku.hk/ utorial timetable: tp://hkumath.hku.hk/~math/Timetable/timetable1920_S1.pdf tp://hkumath.hku.hk/~math/Timetable/timetable1920_S2.pdf							

MATH2822	Mathema	'ear 2019						
Offering Department	Mathemat							
Course Co-ordinator		Mathematics Quota Dr J T Chan, Mathematics (jtchan @hku.hk)						
Teachers Involved		an,Mathematics)	,					
Course Objectives	solid back on multiva	This course is the second of the two mathematics courses designed to provide actuarial science students with solid background of calculus of one and several variables and an introduction to linear algebra. The course focuse on multivariable calculus and linear algebra. It aims at students with MATH1821. It can be followed by other 200 or 3000 level mathematics courses.						
Course Contents & Topics	- Eigenvali - Quadrati - Vector sp - Function: - Gradient: - Taylor ap - Maxima	Matrices, systems of linear equations, determinants. Eigenvalues and eigenvectors, diagonalization of matrices. Quadratic functions and their standard forms. Vector spaces and subspaces. Functions of several variables; partial differentiation. Gradients and directional derivatives. Taylor approximation, Newton's method. Maxima and minima; Lagrange multipliers. Double and triple integrals, areas and volumes.						
Course Learning Outcomes	CLO 1 un de an CLO 2 un the	On successful completion of this course, students should be able to: 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, basi 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 and Impermissible combinations)	For BSc(A	Pass in MATH1821. For BSc(ActuarSc) students only.						
Offer in 2019 - 2020	Y 2nd	sem Offer in 2	020 - 2021 : Y	Examinatio	n May			
Grade Descriptors (A+ to F)	B C D	applications through and being able to compensate a good applications through theorems or their applications the solution with some in a presentation or a number of the substantial inadeque with substantial compensate poor a being able to complete compensate to compen	and inadequate understanding by not being able to	/ presenting correct logical reach some innovative approaches ining able to identify the approximate in adequacies in arguments, putational errors. by being able to correctly idenorrectly analysing problems able to correctly identify appinalysing problems with poor a	soning and argumentation to solving problems, priate theorems and their identifying the appropriate thiffy appropriate theorems with poor argument and opriate theorems, but with rgument or presentation of			
Course Type	Lecture-ba	ased course						
Course Teaching	Activities		Details		No. of Hours			
& Learning Activities	Lectures				36 12			
	Tutorials							
	Reading /	Self study			100			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Examinati	ion		50	CLO 1,2			
	Test		2 tests	50	CLO 1,2			
Paguirod/racommonded	George B	. Thomas; as re	vised by Maurice D. Weir and Joel Has	s: Thomas' Calculus (A	ddison Wesley, 12th			
reading and online materials	edition) Keith Matt	hews: Elementar	y Linear Algebra (Url: www.numbertheory	.org/book/)				

Additional Course Information Tutorial timetable: http://hkumath.hku.hk/~math/Timetable/timetable1920_S2.pdf

MATH3001	Develop	ment of mathematic	cal ideas (6 credits)	Academic Yea	r 2019		
Offering Department	Mathematics Quota						
Course Co-ordinator	TBC, Mathematics ()				'		
Teachers Involved		V					
Course Objectives	a deeper with an or	To acquaint the students with the origin and growth of basic mathematical concepts. To assist the students to gair 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 succe	ssful completion of this c	ourse, students should be able	to:			
Outcomes	CLO 1 ur	nderstand and describe t	he origin and development of b	asic mathematical concepts			
	m	athematics as both an ad	cademic discipline and a huma		, ,,		
	CLO 3 di	scuss, argue, and write a	about the development of vario	us mathematical concepts and i	deas		
	CLO 4 er	ngage in independent stu	ıdy on a topic about the history	or development of mathematics	S		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in M	Pass in MATH2101, MATH2102, MATH2211 and MATH2241					
Offer in 2019 - 2020	N Off	er in 2020 - 2021 : N		Examination			
Grade Descriptors (A+ to F)	A	A Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking, with evidence of original thought. Critical use of information from sources to draw appropriate and insightful conclusions. 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. Correct use information from sources to draw appropriate conclusions. Good participation in class discussions with generally goo 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. 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						
	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 information from sources and/or unable to draw appropriate conclusions. Make little or no meaningful contributions to class discussions. Organization and presentational skills are minimally effective or ineffective.						
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		
	Examinat	tion		50	• • •		
	Test			50			
Required/recommended eading and online materials	H. Eves a Reinhart a	and Winston, 1958; 1990	troduction to the Foundations	and Fundamental Concepts of	Mathematics (Hol		

MATH3002	Mathema	atics seminar (6 credits)		Academic Year	2019			
Offering Department	Mathemat	ics		Quota	12			
Course Co-ordinator	Prof W K (Ching, Mathematics (wching@hku.hk)						
Teachers Involved	(Prof W K	Ching,Mathematics)						
Course Objectives	mathemat make pres their prese	seminar style course intended for those who hics. Students will be given book chapters and elementations in front of the whole class. Individual meentations. Active participation in all the discussions is to initiate self/independent study in mathematics.	entary research a etings with the in	articles for private structors will be	e study and then arranged prior to			
Course Contents & Topics	Topics cho	Topics chosen by the instructors, including chapters from books and elementary research articles.						
Course Learning	On successful completion of this course, students should be able to:							
Outcomes	CLO 1	Initiate private independent study on some interesting	g mathematical to	pics				
Pre-requisites (and Co-requisites and Impermissible combinations)		ATH2012, MATH2101, MATH2211 and MATH2241 approval by the Department.						
Offer in 2019 - 2020	Y 2nd	sem Offer in 2020 - 2021 : Y		Examination	No Exam			
Grade Descriptors (A+ to F)	A	Demonstrate thorough grasp of the subject. Show strong analyt original thought. Actively engage in and contribute substantial organizational and presentational skills.						
	В	Demonstrate substantial grasp of the subject. Evidence of analyti	tical and critical abilit	es and logical thinkin	g. Good participation			

		in class discussions with	generally good contributions. Apply	y effective organizational and presentational	skills.
	С			Evidence of some analytical and critical abili class discussions. Apply moderately effect	
	D	logical thinking, but with		e relevant information, of the subject. Eviden ties. Contribute only in a limited way to fruit and presentational skills.	
	Fail	analytical and critical ab		dge and understanding of the subject. Evic ng. Make little or no meaningful contribution e or ineffective.	
Course Type	Project-k	pased course			
Course Teaching	Activities		Details	Details	
& Learning Activities	Meeting with supervisor		meeting of the whole class for up to three hours each teaching week		36
	Reading / Self study		individual meetings with the instructors		72
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Oral pre	esentation		50	CLO 1
	Research report			50	CLO 1
Course Website	http://mc	oodle.hku.hk/			
Additional Course Information		r students who are inter course is not a capstone		ourse are recommended to take MA	TH4910.

MATH3301	Algebra	a I (6 credits)		Academic Yea	r 2019		
Offering Department	Mathema	atics		Quota			
Course Co-ordinator	Dr Y K La	Dr Y K Lau, Mathematics (yklau@maths.hku.hk)					
Teachers Involved	(Dr Y K L	(Dr Y K Lau, Mathematics)					
Course Objectives	in mather	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	homomor - Rings: e domains. - Fields: o	 Groups: examples of groups, subgroups, cosets, Lagrange theorem, quotient groups, normal subgroups, group homomorphisms, direct product of groups, group actions. Rings: examples of rings, integral domains, ideals, fields of fractions, principal ideal domains, unique factorization domains. Fields: definition and examples of fields. Polynomials: polynomial rings in one variable over fields and over the integers. 					
Course Learning	On succe	essful completion of thi	is course, students should be able to:	•			
Outcomes	CLO 1 CLO 2	give examples for ea	se definitions of the basic concepts in ch of the concepts in the "Course Cor				
	CLO 3		perties of groups, rings, and fields				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in M	ЛАТH2101					
Offer in 2019 - 2020	Y 1st	t sem Offer in 2020 -	- 2021 : Y	Examination	Dec		
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.						
Course Type	Lecture-b	pased course					
Course Teaching	Activitie	es	Details		No. of Hours		
& Learning Activities	Lectures	;			36		
	Tutorials	3			12		
	Reading	/ Self study			100		
Assessment Methods and Weighting	Methods	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignm	ents	Take-home and/or in tutorials	10	CLO 1,2,3		
	Examination			50	CLO 1,2,3		
	Examina						
	Examina Test			40	CLO 1,2,3		
Required/recommended reading and online materials	Test I To be dee S. Lang: J.B. Frale I.N. Herst	cided by the course in: Undergraduate Algebr eigh: A First Course in tein: Abstract Algebra	a (Springer, 2004) Abstract Algebra (Addison-Wesley, 1 (Prentice-Hall, 1996)	989, 4th edition)			
reading and	Test I To be dec S. Lang: J.B. Frale I.N. Herst T.W. Hun	cided by the course in: Undergraduate Algebr eigh: A First Course in tein: Abstract Algebra	a (Springer, 2004) Abstract Algebra (Addison-Wesley, 1	989, 4th edition)			

MATH3303	Matrix theory and its applications (6 credits)	Academic Year	2019
Offering Department	Mathematics	Quota	

Course Co-ordinator	Dr Y M Cl	han. Mathematics (vmch	an @maths.hku.hk)			
Teachers Involved		Dr Y M Chan, Mathematics (<i>ymchan</i> @ <i>maths.hku.hk</i>) (Dr M Huang,Mathematics)				
Course Objectives	Matrix the and comb and socia to various	Matrix theory has a close connection with other mathematical subjects such as linear algebra, functional analysis and combinatorics. It also plays an important role in the development of many subjects in science, engineering and social sciences. In this course, students will be taught the fundamentals of matrix analysis and its applicatio to various kinds of practical problems. Mathematical software may be used in the course, so that students cal learn how to use the computer to solve matrix problems.				
Course Contents & Topics	- Orthogo application Schur's to eigenvalue - Singular	Eigenvalues and eigenvectors: similarities, applications on difference equations and differential equations. Orthogonality: inner products and the induced norms, orthogonality of null spaces and column spaces, pplications to over- or under-determined systems, least squares fit. Unitary, normal, and hermitian matrices: chur's triangularization theorem. Variational description of eigenvalues: applications in optimization and in igenvalue estimation. Singular value decomposition: polar decomposition, pseudo inverse, spectral norm of matrices, interlacing requalities for singular values. Jordan form and applications.				
Course Learning	On succe	ssful completion of this c	ourse, students should be able to:			
Outcomes	CLO 2 ur CLO 3 ur CLO 4 ur CLO 5 fir	CLO 1 have a good understanding on matrices, determinants, linear transformations, eigenvalues and 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 study polar 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 matrix				
Pre-requisites (and Co-requisites and Impermissible combinations)		IATH2101 and MATH210	_			
Offer in 2019 - 2020		d sem Offer in 2020 - 2	*= : : : :	Examination	May	
Grade Descriptors (A+ to F)	B C D	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 argumentation 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 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. 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 apresentation or a number of minor computational errors. Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but we substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation with substantial computational errors.				
	being able to complete the solution.					
		being able to complete the s	olution.		their applications, or not	
	Lecture-ba	ased course	olution.		their applications, or not	
Course Teaching	Lecture-bactivities	ased course	Details		No. of Hours	
Course Teaching		ased course				
Course Teaching	Activities	ased course			No. of Hours 36 12	
Course Teaching	Activities Lectures Tutorials	ased course			No. of Hours	
Course Teaching & Learning Activities Assessment Methods	Activities Lectures Tutorials	ased course s / Self study		Weighting in final course grade (%)	No. of Hours 36 12	
Course Teaching & Learning Activities Assessment Methods	Activities Lectures Tutorials Reading	ased course s / Self study	Details		No. of Hours 36 12 100 Assessment Methods	
Course Teaching & Learning Activities Assessment Methods	Activities Lectures Tutorials Reading Methods	ased course s / Self study	Details	course grade (%)	No. of Hours 36 12 100 Assessment Methods to CLO Mapping	
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended reading and online materials	Activities Lectures Tutorials Reading Methods Examinat Test Jack L. Gr Steven J. Chris Rorr Roger A.	ased course s / Self study tion oldberg: Matrix Theory w Leon: Linear Algebra wit res & Howard Anton: App Horn & Charles R. Johns	Details Details ith Applications (McGraw-Hill, 1991) th Applications (Macmillan, 1994, 4th Olications of Linear Algebra (Wiley, 1son: Matrix Analysis (Cambridge Univ.	course grade (%) 50 50 edition) 984, 3rd edition) versity Press, 1987)	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	
Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended reading and online materials	Activities Lectures Tutorials Reading Methods Examinat Test Jack L. Gr Steven J. Chris Rorr Roger A. The Matho	ased course s / Self study tion oldberg: Matrix Theory w Leon: Linear Algebra wit res & Howard Anton: App Horn & Charles R. Johns works, Inc.: The Student	Details Details ith Applications (McGraw-Hill, 1991) h Applications (Macmillan, 1994, 4th blications of Linear Algebra (Wiley, 1994)	course grade (%) 50 50 edition) 984, 3rd edition) versity Press, 1987)	No. of Hours 36 12 100 Assessment Methods to CLO 1,2,3,4,5,6 CLO 1,2,3,4,5,6	
Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended reading and	Activities Lectures Tutorials Reading Methods Examinat Test Jack L. Gr Steven J. Chris Rorr Roger A. The Matho	ased course s / Self study tion oldberg: Matrix Theory w Leon: Linear Algebra wit res & Howard Anton: App Horn & Charles R. Johns works, Inc.: The Student odle.hku.hk/	Details Details ith Applications (McGraw-Hill, 1991) th Applications (Macmillan, 1994, 4th Olications of Linear Algebra (Wiley, 1son: Matrix Analysis (Cambridge Univ.	course grade (%) 50 50 edition) 984, 3rd edition) versity Press, 1987)	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	

MATH3304	Introduction to number theory (6 credits)	Academic Year	2019
Offering Department	Mathematics	Quota	
Course Co-ordinator	Dr B Kane, Mathematics (bkane@maths.hku.hk)		
Teachers Involved	(Dr B Kane,Mathematics) (Dr S Banerjee,Mathematics)		
Course Objectives	To provide students with basic concepts about numbers, their properties congruences. The prime numbers are the building blocks of all the interplay between the multiplicative and additive properties of prime numbers are the distribution of the prime number problems concerning them. Important applications of number theo introduced.	natural numbers under m mbers is particularly intere ers, and some of the lo	ultiplication. The sting. The coursengstanding open
Course Contents & Topics	 -The course will begin with some basic notions in number theory, incleudidean algorithm, congruences, etc. It will then be followed by sever remainder theorem, solutions of linear and polynomial congruences, reciprocity law. - Many well-known open problems will be introduced. Application of nube explained. Some current research on the prime numbers will be disc. - Depending on the time available, the course will cover a selection of theorem, sum of squares, Dirichlet's theorem on diophantine approxima 	ral fundamental theorems, Fermat's Little theorem, a Imber theory to public key ussed. If further topics, such as the	such as Chinese and the quadratic cryptography will ne prime number
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 solve a system of linear congruences		

	Tutorial timetable: http://hkumath.hku.hk/~math/Timetable/timetable1920_S2.pdf							
Information	.							
Additional Course	MATH330	1 recommended b	ut not required.					
Course Website	http://mood	dle.hku.hk/						
eading and	David M. E	Burton: Elementary	ary number theory (6th edition, Pearso Number Theory (McGraw-Hill Higher troduction to number theory (Prentice	Education, International Edi	tion)			
	Test			40	CLO 1,2,3,4,5,6			
	Examinati	ion		50	CLO 1,2,3,4,5,6			
	Assignme		Tutorials and Assignments	10	CLO 1,2,3,4,5,6			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Reading /	Self study			100			
	Tutorials				12			
& Learning Activities	Lectures							
Course Teaching	Activities	,	Details		No. of Hours			
Course Type	Lecture-ba	ased course						
	presentation, or with substantial computational errors. Fail Demonstrate poor and inadequate understanding of the key concepts and ideas by not being able to identify appropriate theorems or their applications, or not being able to complete the solution.							
	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							
	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 weak and fragmentary argument and presentation, or with moderate computational errors.						
	В	applications through	understanding of key concepts and ideas by correctly analysing number theoretic problems, coherent logical reasoning and carry out compu	but with some minor errors/inadeq	uacies in arguments and			
Grade Descriptors (A+ to F)	A	theorems and their reasoning and argum	ough and coherent understanding of key conc applications through correctly analysing num entation and being able to carry out computation	ber theoretic problems, clearly pr ns carefully and correctly.	esenting correct logical			
Offer in 2019 - 2020			20 - 2021 : Y	Examination	May			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in M	ass in MATH2101 and MATH2211						
			e longstanding problems in number the	eory				
	CLO 5 ur	nderstand the prim	e number theorem		-			
			ence of primitive roots and use them in					
	ICLO 3 Ide	O 2 solve polynomial congruences O 3 determine the solubility of quadratic congruences by computation of the Legendre symbol						

MATH3401	Analysi	s I (6 credits)			A	cademic Year	2019	
Offering Department	Mathema	tics			Q	uota		
Course Co-ordinator	Prof W S	Cheung, Mathemat	ics (wscheung@hku.hk)				
Teachers Involved	(Prof W S	Cheung, Mathemat	ics)					
Course Objectives			e general situations so are essential for advance				introduces some	
Course Contents & Topics	complete		paces; openness; close onnectedness; pathwise					
Course Learning	On succe	ssful completion of	this course, students sh	ould be able to:				
Outcomes			dge and understanding identify objects that ar			nematical analys	sis and point set	
			I skills acquired in math to determine whether				el situations in a	
		,	laterally to generate in counterexamples to ina				andard problems	
		Pass in MATH2211						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in M	IATH2211						
(and Co-requisites and Impermissible combinations)		IATH2211 sem Offer in 202	0 - 2021 : Y		E	xamination	Dec	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020		sem Offer in 202 Demonstrate a thorou concepts and apply	0 - 2021 : Y igh understanding of all cond the theorems through corre entation, and with some innov	ectly analysing proble	eing able to dra ems, clearly an	aw complex connected and elegantly prese	ctions among various	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Y 1st	Demonstrate a thorouconcepts and apply reasoning and argum Demonstrate a good applications through of	ugh understanding of all cond the theorems through corre	ectly analysing proble rative approaches to so pts and ideas by being but with some minor	eing able to dra ems, clearly an olving problems ng able to iden	aw complex connected elegantly prese to the control of the control	ctions among various nting correct logical the theorems and their	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Y 1st	Sem Offer in 202 Demonstrate a thorou concepts and apply reasoning and argum Demonstrate a good applications through appropriate theorems Demonstrate an acce	ugh understanding of all cond the theorems through corre- entation, and with some innov- understanding of key conce- correctly analysing problems,	ectly analysing proble rative approaches to so pts and ideas by bein but with some minor concepts and ideas b	eing able to dra ems, clearly an olving problems ng able to iden inadequacies i	aw complex connected elegantly present it. tify the appropriate in arguments, reas correctly identify a	titions among various nting correct logical the theorems and their oning, identifying the appropriate theorems,	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Y 1st	Demonstrate a thorous concepts and apply reasoning and argum Demonstrate a good applications through appropriate theorems Demonstrate an accebut with some inadex presentation. Demonstrate some un	igh understanding of all cont the theorems through corre- entation, and with some innov understanding of key conce- correctly analysing problems, applications, or presentation ptable understanding of key	ectly analysing proble attive approaches to sip- pts and ideas by bein- but with some minor concepts and ideas b rems through incorrects and ideas by being a	eing able to dra ems, clearly an olving problems ing able to iden r inadequacies i being able to ctly analysing prable to correctly	aw complex connected elegantly present the appropriate in arguments, reass correctly identify a roblems with accept dentify appropriate in a connection of the accept and accept a dentify appropriate and accept accept and accept and accept and accept accept accept and accept accept accept accept accept accept accept and accept accept accept accept and accept	ctions among various nting correct logical to theorems and their oning, identifying the appropriate theorems, ptable argument and te theorems, but with	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Y 1st A B C	Demonstrate a drorous orders and apply reasoning and argum Demonstrate a good applications through appropriate theorems Demonstrate an accebut with some inadex presentation. Demonstrate some un substantial inadequactions	igh understanding of all concepts the theorems through correction, and with some innover understanding of key concepts and in the concepts in applying the theorems to dinadequate understanding the concepts in applying the theorems to dinadequate understanding the concepts and in the concepts in the concepts in applying the theorems to dinadequate understanding the concepts and in the concepts are concepts and in the concep	ectly analysing proble ative approaches to sipts and ideas by bein but with some minor. concepts and ideas b rems through incorrect and ideas by being a through incorrectly and	eing able to dra ems, clearly an olving problems ng able to iden r inadequacies i by being able to ctty analysing problems able to correctly alysing problems	aw complex connected delegantly presectifity the appropriate in arguments, reast correctly identify a roblems with accept identify appropriate s with poor arguments with properties of the control of th	ctions among various inting correct logical to theorems and their oning, identifying the ippropriate theorems, ptable argument and te theorems, but with int or presentation.	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	Y 1st A B C D Fail	sem Offer in 202 Demonstrate a thorou concepts and apply reasoning and argum Demonstrate a good applications through appropriate theorems Demonstrate an acce but with some inaded presentation. Demonstrate some un substantial inadequac Demonstrate poor an	igh understanding of all concepts the theorems through correction, and with some innover understanding of key concepts and in the concepts in applying the theorems to dinadequate understanding the concepts in applying the theorems to dinadequate understanding the concepts and in the concepts in the concepts in applying the theorems to dinadequate understanding the concepts and in the concepts are concepts and in the concep	ectly analysing proble ative approaches to sipts and ideas by bein but with some minor. concepts and ideas b rems through incorrect and ideas by being a through incorrectly and	eing able to dra ems, clearly an olving problems ng able to iden r inadequacies i by being able to ctty analysing problems able to correctly alysing problems	aw complex connected delegantly presectifity the appropriate in arguments, reast correctly identify a roblems with accept identify appropriate s with poor arguments with properties of the control of th	ctions among various inting correct logical to theorems and their oning, identifying the ippropriate theorems, ptable argument and te theorems, but with int or presentation.	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	Y 1st A B C D Fail	Demonstrate a thorou concepts and apply reasoning and argum Demonstrate a good applications through appropriate theorems Demonstrate an acce but with some inaded presentation. Demonstrate some us substantial inadequace Demonstrate poor anbeing able to complete assed course	igh understanding of all concepts the theorems through correction, and with some innover understanding of key concepts and in the concepts in applying the theorems to dinadequate understanding the concepts in applying the theorems to dinadequate understanding the concepts and in the concepts in the concepts in applying the theorems to dinadequate understanding the concepts and in the concepts are concepts and in the concep	ectly analysing proble ative approaches to sipts and ideas by bein but with some minor. concepts and ideas b rems through incorrect and ideas by being a through incorrectly and	eing able to dra ems, clearly an olving problems ng able to iden r inadequacies i by being able to ctty analysing problems able to correctly alysing problems	aw complex connected delegantly presectifity the appropriate in arguments, reast correctly identify a roblems with accept identify appropriate s with poor arguments with properties of the control of th	ctions among various inting correct logical to theorems and their oning, identifying the ippropriate theorems, ptable argument and te theorems, but with int or presentation.	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching	Y 1st A B C D Fail Lecture-b	Demonstrate a thorous concepts and apply reasoning and argum Demonstrate a good applications through appropriate theorems Demonstrate an accebut with some inadex presentation. Demonstrate some unsubstantial inadequace Demonstrate poor ambeing able to complete ased course	igh understanding of all concept the theorems through correction, and with some innov understanding of key concect yanalysing problems, applications, or presentation ptable understanding of key quacies in applying the theorems to the problems of the prob	ectly analysing proble ative approaches to sipts and ideas by bein but with some minor. concepts and ideas b rems through incorrect and ideas by being a through incorrectly and	eing able to dra ems, clearly an olving problems ng able to iden r inadequacies i by being able to ctty analysing problems able to correctly alysing problems	aw complex connected delegantly presectifity the appropriate in arguments, reast correctly identify a roblems with accept identify appropriate s with poor arguments with properties of the control of th	tions among various nting correct logical to theorems and their oning, identifying the appropriate theorems, ptable argument and te theorems, but with nt or presentation.	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Y 1st A B C D Fail Lecture-b Activities	Demonstrate a thorous concepts and apply reasoning and argum Demonstrate a good applications through appropriate theorems Demonstrate an accebut with some inadex presentation. Demonstrate some unsubstantial inadequace Demonstrate poor anbeing able to complete assed course	igh understanding of all concept the theorems through correction, and with some innov understanding of key concect yanalysing problems, applications, or presentation ptable understanding of key quacies in applying the theorems to the problems of the prob	ectly analysing proble ative approaches to sipts and ideas by bein but with some minor. concepts and ideas b rems through incorrect and ideas by being a through incorrectly and	eing able to dra ems, clearly an olving problems ng able to iden r inadequacies i by being able to ctty analysing problems able to correctly alysing problems	aw complex connected delegantly presectifity the appropriate in arguments, reast correctly identify a roblems with accept identify appropriate s with poor arguments with properties of the control of th	tions among various nting correct logical to theorems and their oning, identifying the appropriate theorems, ptable argument and te theorems, but with nt or presentation. ir applications, or not No. of Hours	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching	Y 1st A B C D Fail Lecture-b Activitie Lectures Tutorials	Demonstrate a thorous concepts and apply reasoning and argum Demonstrate a good applications through appropriate theorems Demonstrate an accebut with some inadex presentation. Demonstrate some unsubstantial inadequace Demonstrate poor anbeing able to complete assed course	igh understanding of all concept the theorems through correction, and with some innov understanding of key concect yanalysing problems, applications, or presentation ptable understanding of key quacies in applying the theorems to the problems of the prob	ectly analysing proble ative approaches to sipts and ideas by bein but with some minor. concepts and ideas b rems through incorrect and ideas by being a through incorrectly and	eing able to dra ems, clearly an olving problems ng able to iden r inadequacies i by being able to ctty analysing problems able to correctly alysing problems	aw complex connected delegantly presectifity the appropriate in arguments, reast correctly identify a roblems with accept identify appropriate s with poor arguments with properties of the control of th	tions among various nting correct logical to theorems and their oning, identifying the appropriate theorems, ptable argument and the theorems, but with nt or presentation. The propriet is applications, or not the theorems, but with nt or presentation. The presentation of the presentati	

and Weighting			course grade (%)	Methods to CLO Mapping
	Examination		50	CLO 1,2,3
	Test		50	CLO 1,2,3
Required/recommended reading and online materials	Apostol: Mathematical Analysis Rudin: Principles of Mathematical A	nalysis		
Course Website	http://moodle.hku.hk/			
Additional Course Information	Tutorial timetable: http://hkumath.hku.hk/~math/Timeta	able/timetable1920_S1.pdf		

MATH3403	Function	ns of a complex vari	iable (6 credits)	Academic Ye	ar 2019				
Offering Department	Mathemat			Quota					
Course Co-ordinator	Prof N Mo	k, Mathematics <i>(nmok</i> @	Dhku.hk)						
eachers Involved		ong,Mathematics)							
Course Objectives	physics. In functions a	n this course, the stud and are shown how to lo	studies in higher mathematical dents are introduced to the fun ook at analyticity from different po ght of the geometric picture are e	damental concepts and pro pints of view. At the same tim	operties of analytic				
Course Contents & Topics	- Analytic to The Cauchy's - Taylor's so Laurent's - Zeros, si	Complex number system. Analytic functions and elementary functions. The Cauchy-Riemann equations. Cauchy's theorem and its applications. Taylor's series. Laurent's series. Zeros, singularities and poles. The Residue Theorem and its applications.							
Course Learning Outcomes	On succes CLO 1 red ma CLO 2 gra	esful completion of this coognize the theory of athematics asp the techniques from	iourse, students should be able to functions of a complex variable m Cauchy-Riemann equations, functions from different perspecti	e as a rigorous and found power series expansion ar	,				
	CLO 3 co CLO 4 ap	mpute contour integrals ply such techniques to al line	by calculating residues determine improper integrals such		nal functions on the				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in M	ATH2211 and MATH224	1 1						
Offer in 2019 - 2020	Y 2nd	sem Offer in 2020 - 2	021 : 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 the applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning a and being able to carry out computations carefully and correctly, and with some innovative approaches to solving Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate the applications through correctly analysing problems, but with some minor computational errors. C Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate the solution of a number of minor computational errors. Demonstrate an excellent understanding of key concepts and ideas by being able to correctly identify appropriate the solution or a number of minor computational errors. Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate the substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument but substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument but applying the theorems through incorrectly analysing problems with poor argument but applying the theorems through incorrectly analysing problems with poor argument but applying the theorems through incorrectly analysing problems with poor argument but applying the theorems through incorrectly analysing problems with poor argument but applying the theorems through incorrectly analysing problems with poor argument but applying the defendance of the applying the defendance but applying the defendance but applying the defendance but applying the defendance but applying the applying the defendance but applying the defendance but applying the defendance but applying the applying the defendance but applying the defendance but applying the applying the defendance but applying the applying the applying the defendance but applying								
	Fail	with substantial computation Demonstrate poor and inade being able to complete the s	equate understanding by not being able	to identify appropriate theorems or	their applications, or not				
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				
	Examination			50	CLO 1,2,3,4				
	Test			50	CLO 1,2,3,4				
Required/recommended reading and online materials	J. Bak & D L.V. Ahlfor	R.B. Ash and W.P. Novinger: Complex Variables (Dover, 2nd edition) Bak & D.J. Newman: Complex Analysis, Undergraduate Texts in Mathematics (Springer-Verlag) V. Ahlfors: Complex Analysis (McGraw-Hill, 3rd edition) K. Kodaira: Introduction to Complex Analysis (Cambridge)							
				Gilman, I. Kra and R.E. Rodriguez: Complex Analysis: In the spirit of Lipman Bers (Springer-Verlag)					
Course Website	J.P. Gilma			pirit of Lipman Bers (Springe	er-Verlag)				

MATH3405	Differential equations (6 credits)	Academic Year	2019			
Offering Department	Mathematics	Quota				
Course Co-ordinator	Dr H Y Zhang, Mathematics (hyzhang@maths.hku.hk)					
Teachers Involved	(Dr H Y Zhang, Mathematics)					
Course Objectives	The standard topics in the wide field of ordinary differential equations (ODEs) included in this course are of importance to students of sciences and engineering. Our emphasis is on principles rather than routine calculations and our approach is a compromise between diversity and depth.					
Course Contents	- Review of elementary differential equations.					

0 T		internal conditions and the second					
& Topics		ce and uniqueness theo order differential equati	of parameters				
		Power series method, Legendre polynomials, Bessel functions. Linear systems, autonomous systems.					
		ive properties of solution					
	- Qualitative properties of solutions. - The Laplace transform.						
Course Learning			course, students should be	e able to:			
Outcomes				or nonlinear) ODEs by various t	echniques, including		
		•	`	e transform, and series method	1 , 3		
				tant coefficients, of which the num	ber of equations and		
	th	ne number of unknown f	functions are no more than	three			
	CLO 3 d	iscuss qualitatively the	solutions of nonlinear ODE	s or systems of nonlinear ODEs b	y studying their linear		
		pproximations or their p	•				
		pply the theory of different nd life sciences	ential equations to study qu	uantitatively/qualitatively problems	arising from physical		
Pre-requisites			2211) or MATH2014 or (MA	TH1821 and MATH2822)			
(and Co-requisites	(·····,			
and Impermissible							
combinations)							
Offer in 2019 - 2020	Y 2n	d sem Offer in 2020 -	2021 : Y	Examination	n May		
Grade Descriptors (A+ to F)	Α	applications through corre	ctly analysing problems, clearly a	nd ideas by being able to identify the appr and elegantly presenting correct logical rea	soning 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 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.				
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	3	Details	Weighting in final	Assessment		
and Weighting				course grade (%)	Methods		
					to CLO Mapping		
	Assignm			10	CLO 1,2,3,4		
	Examina	tion		50	CLO 1,2,3,4		
	Test			40	CLO 1,2,3,4		
Required/recommended				tial Equations with Boundary Value	Problems (2013) url		
reading and			oved-textbooks/trench-de/		5 /5		
online materials	R. Nagle, E. Saff and A. Snider: Fundamentals of Differential Equations and Boundary Value Problems (Pearson,						
	6th editio	,	Flomenton, Differential Eq.	ustions and Poundary Value Brok	lama / lahn Wilay 6th		
	edition)	ce and R.C. DiPrima: i	Elementary Dillerential Equ	uations and Boundary Value Prob	ems (John Wiley, ou		
		dinaton: An Introduction	n to Ordinary Differential Eq	quations (Prentice-Hall)			
Course Website		odle.hku.hk/	Staniary Dinoronial Lo	Tanada (i Torrado Fran)			
Additional Course	Tutorial ti						
Information			netable/timetable1920 S2.r	odf			
		.//nkumam.nku.nk/~mam/ nmetable/timetable 1920_52.pdf					

MATH3408	Computational methods and differential equations with applications (6 credits)	Academic Year	2019
Offering Department	Mathematics	Quota	
Course Co-ordinator	Prof W K Ching, Mathematics (wching@hku.hk)		
Teachers Involved	(Prof W K Ching, Mathematics)		
Course Objectives	This course covers topics in the fields of differential equations, mathemat which are of importance to sciences students. The emphasis is practical app		
Course Contents & Topics	 Solution of linear difference equations. Mathematical modelling and dynamical systems. Numerical differentiation and integration. LU factorization for solving linear system of equations. Matrix norms and iterative solutions of matrix equations. Solution of nonlinear systems of equations. Elementary differential equations and power series method. Numerical solutions of ordinary and partial differential equations. Numerical solutions of systems of first-order ordinary differential equations. 		
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 construct and implement numerical methods for numerical integration of linear and nonlinear system of equations CLO 2 explain mathematical ideas of numerical methods and mathematical equations, ordinary and partial differential equations CLO 3 construct one-step and linear multistep methods for the numerical ordinary differential equations and systems of such equations and properties CLO 4 construct finite difference methods for the numerical solution of particles their stability and accuracy properties	Il modelling in solving Il solution of initial-val Id analyze their stabili	linear difference lue problems for ty and accuracy

	CLO 5 implement numerical methods for solving initial and boundary value problems by software packages like					vare packages like
Pre-requisites (and Co-requisites and Impermissible combinations)	MATLAB Pass in (MATH2101 and MATH2211) or MATH2014 or (MATH1821 and MATH2822)					
Offer in 2019 - 2020	Y 2n	d sem Offer in 202	20 - 2021 : Y		Examination	May
Grade Descriptors (A+ to F)	A	computational method logical reasoning and approaches to solving		orrectly analysing problems, rry out computations careful	clearly and elegaly and correctly, ar	antly presenting corrected with some innovative
	В	computational method arguments, identifying minor computational e		correctly analysing problems outational methods or their a	s, but with some opplications and pr	minor inadequacies in esentation or with some
	С	and computational me	ptable understanding of key concept ethods, but with some inadequacies tation or a number of minor computati	s in applying them through		
	D Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems and computational methods, but with substantial inadequacies in applying them through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.					
	Fail	or their applications, o	d inadequate understanding by not be or not being able to complete the solut		iate theorems and	computational method
Course Type		ased course				No. of Hours
Course Teaching	Activitie		Details	Details		
& Learning Activities	Lectures					
	Tutorials					
	Reading	/ Self study				100
Assessment Methods and Weighting	Methods	5	Details		ing in final grade (%)	Assessment Methods to CLO Mapping
	Examina	tion			50	CLO 1,2,3,4,5
	Test				50	CLO 1,2,3,4,5
Required/recommended reading and online materials	E.A. Code	D.F. Parkhurst: Introduction to Applied Mathematics for Environmental Science (Springer) E.A. Coddington: An Introduction to Ordinary Differential Equations (Prentice-Hall)				
ommo materiale	A. Ralston and P. Rabinowitz: A First Course in Numerical Analysis (McGraw-Hill)					
Course Website	http://mod	ndle hku hk/			,	
Course Website Additional Course	http://mod	odle.hku.hk/ imetable:			,	

MATH3541	Introdu	Introduction to topology (6 credits) Academic Year 20					
Offering Department	Mathem	lathematics Quota					
Course Co-ordinator	Prof J H	Lu, Mathematics	(jhlu@maths.hku.hk)				
Teachers Involved	(Prof J F	Lu, Mathematics)					
Course Objectives	will emp	hasize more on b	ucing students to fundamen uilding geometric intuition a e advanced Mathematics a e and Biology.	nd links between topology	and other sub	jects. It can hel	
Course Contents & Topics	(i) Basic (ii) Topo (iii) Brou	Topics will be chosen among the following: (i) Basic point-set topology: topological spaces, product and quotient spaces. (ii) Topological groups and orbit spaces. (iii) Brouwer fixed point theorem, winding numbers. (iv) Fundamental groups, covering spaces.					
Course Learning	On succ	essful completion	of this course, students shou	ld be able to:			
Outcomes	CLO 1	understand basic	constructions in point-set top	ology			
	CLO 2	give examples and	d counter examples for conce	pts in the "course contents	3"		
	CLO 3	understand basic i	deas of fundamental groups	and its application to the s	urface classifica	tion problem	
Pre-requisites (and Co-requisites and Impermissible combinations)	Students	s are recommende	l2102 and MATH2241. d to have passed or already				
Offer in 2019 - 2020	Y 2r		2020 - 2021 : N		Examination	May	
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 thei 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	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						
Course Type	Lecture-	based course					
Course Teaching	Activiti	es	Details	Details		No. of Hours	
& Learning Activities	Lectures						
	Tutorials					12	
	Reading	g / Self study				100	
Assessment Methods and Weighting	Method	ls	Details		ng in final grade (%)	Assessment Methods to CLO Mappin	
	Assignn	nents			10	CLO 1,2,3	

	Examination		50	CLO 1,2,3				
	Test		40	CLO 1,2,3				
Required/recommended reading and online materials	Recommended reference: 1. James R. Munkres: Topology (P							
Course Website	http://moodle.hku.hk/	2. M A. Armstrong: Basic topology (UTM), Springer http://moodle.hku.hk/						
Additional Course Information	Tutorial timetable: http://hkumath.hku.hk/~math/Timet	table/timetable1920_S2.pdf						

MATH3600	Discrete	e mathematics (6 cre	edits)	Academic Y	ear 2019		
Offering Department	Mathema	tics		Quota			
Course Co-ordinator	Dr K H La	H Law, Mathematics (lawkaho@maths.hku.hk)					
Teachers Involved	(Dr K H L	r K H Law,Mathematics)					
Course Objectives	To introd	uce students to the basic	ideas and techniques of discre	te mathematics.			
Course Contents & Topics	generatin - Graph t	g functions.	utations, pigeonhole principle es, connectivity, planarity, etc. ues and graph theory.	inclusion-exclusion, recurr	ence relations, and		
Course Learning	On succe	essful completion of this of	course, students should be able	to:			
Outcomes	CLO 1 c	lemonstrate knowledge a	and understanding of the basic i	deas and techniques of discr	ete mathematics		
	CLO 2 s	olve various real-world p	roblems by using counting tech	niques and graph theory			
	CLO 3	levelop their ability to rea	id, comprehend, and create ma	hematical arguments			
Pre-requisites (and Co-requisites and Impermissible combinations)	,		of Level 2 MATH courses) or ((MATH1821 and MATH2822)	MATH1851 and MATH1853	and any 1 of level 2		
Offer in 2019 - 2020	Y 1s	t sem Offer in 2020 - 20	021 : Y	Examination	n Dec		
Grade Descriptors (A+ to F)	A	applications through correct	inderstanding of key concepts and idea tly analysing problems, clearly and elec computations carefully and correctly, ar	pantly presenting correct logical rea	soning and argumentation		
	В						
	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 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.					
		being able to complete the		e to identify appropriate theorems t	i their applications, or not		
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	3	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments		assignments, tutorials, 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 A	A. Brualdi: Introductory C	ombinatorics (Pearson)				
Course Website	http://mod	odle.hku.hk/					
Additional Course Information	Tutorial ti	metable:	etable/timetable1920 S1.pdf				

MATH3601	Numeri	cal analysis (6 credits)			Academic Year	2019
Offering Department	Mathema	tics			Quota	
Course Co-ordinator	Dr Z Zha	ng, Mathematics <i>(zhangzw</i> @	maths.hku.hk)			
Teachers Involved		ng,Mathematics)				
Course Objectives		se covers both the theoreti and numerical methods of s			alysis. Emphasis	will be on basic
Course Contents & Topics	- Polynor - Solutior - Direct a - Numerio	types of errors, condition nail interpolation and functior of equations of one variable not iterative methods for solval differentiation and integranitial value problems for Ord	n approximation. ring linear systems. tion.			
Course Learning Outcomes	CLO 1 c fi n CLO 2 a CLO 3 c CLO 4 u	ssful completion of this cours onstruct and implement algo- ked point iteration methods onlinear equations oply direct and iterative methonstruct interpolation polynon onderstand the basic numericoply Euler methods and Run	rithms to find the zeros ; and construct and i ods for solving linear e mials in Lagrange, New al integration and differ	of functions, apply implement Newton' quation systems ton, Hermite and spentiation methods	s method to sol	,

	CLO 6 u	se software package su	ch as Scilab or Matlab or	Python to solve numerical problems			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in (Pass in (MATH2101 and MATH2211) or MATH2014 or (MATH1821 and MATH2822)					
Offer in 2019 - 2020	Y 1s	t sem Offer in 2020 - 2	2021 : Y	Examination	Dec		
Grade Descriptors (A+ to F)	Α	theorems/algorithms and the	neir applications through correction and being able to carry out r	cepts and methods by being able to itly analysing problems, clearly and elegantly numerical procedures carefully and correctly,	presenting correct logical		
	В	and their applications thro		methods by being able to identify the approp ms, but with some minor inadequacies in a inor computational errors.			
	С	theorems/algorithms, but w		epts and methods by being able to corre- ing the theorems/methods through incorrectly computational errors.			
	D	. •					
	Fail						
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		
	Examina	tion		50	CLO 1,2,3,4,5,6		
	Test			50	CLO 1,2,3,4,5,6		
Required/recommended reading and online materials	A. Ralsto	structor's Lecture Notes Ralston and P. Rabinowitz: A First Course in Numerical Analysis (McGraw-Hill) E. Atkinson: An Introduction to Numerical Analysis (Wiley, 1989)					
Course Website	http://mo	odle.hku.hk/	j				
Additional Course Information	Tutorial ti http://hku		etable/timetable1920_S1	pdf			

MATH3603	Probab	ility theory (6 cr	edits)		Academic Year	2019	
Offering Department	Mathema		•		Quota		
Course Co-ordinator	Dr Z Qu,	Dr Z Qu, Mathematics (zhengqu@maths.hku.hk)					
Teachers Involved	(Dr Z Qu,Mathematics)						
Course Objectives	fundame	The emphasis of this course will be on probability models and their applications. The primary aim is to elucidate the fundamental principles of probability theory through examples and to develop the ability of the students to apply what they have learned from this course to widely divergent concrete problems.					
Course Contents & Topics	moment -Condition variance -Markov probabilit process, -Poisson	-Basic probability theory: random variable, discrete and continuous probability distributions, expectation, variance, moment generating function, strong law of large numbers, central limit theorem. -Conditional probability theory: conditional probability, Bayes theorem, conditional expectation, conditional variance, compound random variable, Polya's urn model, Bose-Einstein statistics. -Markov chain theory: concepts of states and transition probability, irreducibility, stationary distribution, limiting probabilities, reversibility, hidden Markov chain, applications in marketing and genetic problems, branching process, Markov decision process. -Poisson process and reliability theory: exponential distribution, memoryless property, Poisson process, concepts of reliability, applications to server queue problems.					
Course Learning			this course, students should be	e able to:			
Outcomes	CLO 1 L	understand and reco	gnize the fundamental princip	es of probability	theory		
	CLO 2 e	CLO 1 understand and recognize the fundamental principles of probability theory CLO 2 explain the typical proofs and computational techniques in probability theory and apply them to concuproblems CLO 3 demonstrate knowledge and understanding of various types of probability models					
(and Co-requisites and Impermissible combinations)	,	•	, , ,		,		
Offer in 2019 - 2020	Y 1s	st sem Offer in 202			Examination	Dec	
Grade Descriptors (A+ to F)	В	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. 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 being able to complete the solution.						
Course Type		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	W	eighting in final	Assessment	

			course grade (%)	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
Required/recommended reading and online materials	S.M. Ross: Introduction	to Probability Models (Academic Press, 20	07, 9th ed.)	
Course Website	http://moodle.hku.hk/			
Additional Course	Tutorial timetable:			
Information	http://hkumath.hku.hk/~n	nath/Timetable/timetable1920_S1.pdf		

MATH3901	Operation	ons research I (6	credits)	Academic Ye	ar 2019		
Offering Department	Mathematics			Quota			
Course Co-ordinator	Dr Z Qu, I	r Z Qu, Mathematics (zhengqu@maths.hku.hk)					
Teachers Involved	(Dr Z Qu,I	Dr Z Qu,Mathematics)					
Course Objectives	The objective is to provide a fundamental account of the basic results and techniques of Linear Programming (LP and its related topics in operations research. The topics include the simplex method, the dual simplex method parametric programming, decomposition method, cutting plane methods and branch and bound. There is an equal emphasis on all the three aspects of theories, algorithms and applications. The course serves together with the course MATH3943 Network Models in Operations Research, as essential concept and background for more advanced studies in operations research.						
Course Contents & Topics	- Linear pr - Duality the - Sensitivi	- Linear programming - Duality theory - Sensitivity analysis and parametric linear programming - Integer programming methods					
Course Learning			is course, students should be able	to:			
Outcomes	of CLO 2 de ex	CLO 1 understand the fundamental concept and approach of linear programming appropriate to the further study of operations research CLO 2 demonstrate knowledge and understanding of the underlying techniques of the simplex method and its extensions such as the dual simplex algorithm and the decomposition method CLO 3 understand and apply the theory of integer programming					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in M	ATH2014 or MATH2	101 or MATH2102				
Offer in 2019 - 2020	Y 1st	sem Offer in 2020	- 2021 : Y	Examination	Dec		
Grade Descriptors (A+ to F)	B C D Fail	Demonstrate an excellent understanding of key concepts and ideas by being able to identify basic principles, approp theorems, algorithms and their applications through correctly analysing problems, clearly and elegantly presenting correct lo reasoning and argumentation and being able to carry out computations carefully and correctly, and to solve problems with s innovative approaches. B Demonstrate a good understanding of key concepts and ideas by being able to identify basic principles, appropriate theore algorithms and their applications through correctly analysing problems, but with some minor inadequacies in argume 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 analy 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 identify basic principles, appropriate theorems algorithms and their applications but with substantial inadequacies in applying the theorems through incorrectly analy problems with poor argument or presentation or with substantial computational errors.					
Course Type	Lecture-ba	ased course	not being able to complete or compute the s				
Course Teaching	Activities		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 assessment	10	CLO 1,2,3		
	Examinat			50	CLO 1,2,3		
	Test		Two midterm tests	40	CLO 1,2,3		
reading and online materials	D. Bertsin W.L. Wins	nas and J.N. Tsitsiklis ston: Introduction to N	Linear Programming (Prentice-Hal s: Introduction to Linear Optimizatio //athematical Programming (Duxbu	on (Athena Scientific, 1997)			
Course Website		dle.hku.hk/					
Additional Course Information	Tutorial tir http://hkur		imetable/timetable1920_S1.pdf				

MATH3904	Introduction to optimization (6 credits)	Academic Year	2019
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 optimization, a studies in operations research, mathematical economics and related subject are		g them for further
Course Contents & Topics	 Unconstrained and constrained optimization. Necessary conditions and sufficient conditions for optimality, convexity, duality Algorithms and numerical examples. 		
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					
		nderstand the connec ehavior of algorithms f	tion between the purely a or solving it	analytical character of	an optimization	problem and the
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in (MATH2101 and MATH2211) or MATH2014 or (MATH1821 and MATH2822)					
Offer in 2019 - 2020	Y 1st	t sem Offer in 2020 -	2021 : Y		Examination	Dec
Grade Descriptors (A+ to F)	A	applications through corr	nt understanding of key concepts rectly analysing problems, clearly out computations carefully and cor	and elegantly presenting co	orrect logical reasor	ing and argumentation
	В	applications through corr	derstanding of key concepts and rectly analysing problems, but wi tions and presentation or with sor	th some minor inadequacies	s in arguments, ide	
	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.					
Course Type		ased course				
Course Teaching	Activitie	-	Details			No. of Hours
& Learning Activities	Lectures					36
	Tutorials					12
	Reading	/ Self study				100
Assessment Methods and Weighting	Methods	S	Details		ting in final e grade (%)	Assessment Methods to CLO Mapping
	Examina	tion			50	CLO 1,2,3
	Test				50	CLO 1,2,3
Required/recommended		's lecture notes				
reading and	Instructor	s lecture notes				
reading and online materials Course Website		odle.hku.hk/				

	Queue	ing theory and sim	ulation (6 credits)	Academic Y	'ear 2019		
Offering Department	Mathem	atics	•	Quota			
Course Co-ordinator	Dr G Ha	Dr G Han, Mathematics (ghan @maths.hku.hk)					
Teachers Involved							
Course Objectives	simulation	on as a practical tool of	analysis.	y of queueing system, as well	as the technique of		
Course Contents & Topics	- Markov - Simula	 - Markov, birth-and-death, and Poisson processes, exponential models. - Markovian queueing networks. Imbedded Markov-chain queueing models. - Simulation of queueing models and discrete-event systems. - Introduction of the Monte Carlo (MC) method and Markov Chain Monte Carlo (MCMC) method. 					
Course Learning		On successful completion of this course, students should be able to:					
Outcomes	CLO 1	understand the termino	logy and nomenclature appro	priate to queueing theory			
	CLO 2	demonstrate knowledge	e and understanding of variou	s queueing models			
	CLO 3	formulate concrete prol	olems using queueing theoreti	cal approaches			
	CLO 4	become familiar with fu	ndamental principles of simula	ation and compare different simu	lation techniques		
	CLO 5	use Monte Carlo metho	od and Markov Chain Monte C	arlo method to conduct numerica	al simulations		
Pre-requisites (and Co-requisites and Impermissible combinations)	r ass III	Pass in (MATH2101 and MATH2211) or MATH2014 or (MATH1821 and MATH2822)					
Offer in 2019 - 2020	N O	Offer in 2020 - 2021 : Y		Examination	n		
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						
	II K	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.					
	В		rectly analysing problems, but with s	ome minor inadequacies in arguments,			
	С	theorems or their applica Demonstrate an accepta but with some inadequ	rectly analysing problems, but with s tions and presentation or with some r able understanding of key concepts a acies in applying the theorems th	ome minor inadequacies in arguments,	identifying the appropriat ntify appropriate theorems		
		theorems or their applica Demonstrate an accepta but with some inadequ presentation or a numbe Demonstrate some unde	rectly analysing problems, but with settions and presentation or with some rible understanding of key concepts a lacies in applying the theorems the of minor computational errors. For the property of the problems.	ome minor inadequacies in arguments, minor computational errors. and ideas by being able to correctly ider	identifying the appropriat ntify appropriate theorems with poor argument and opriate theorems, but wit		
	С	theorems or their applica Demonstrate an accepte but with some inadequ presentation or a numbe Demonstrate some unde substantial inadequacies with substantial computa	rectly analysing problems, but with s tions and presentation or with some r bble understanding of key concepts a acies in applying the theorems the rof minor computational errors. erstanding of key concepts and ideas in applying the theorems through inceitional errors.	ome minor inadequacies in arguments, minor computational errors. and ideas by being able to correctly ider rough incorrectly analysing problems s by being able to correctly identify appr	identifying the appropriat ntify appropriate theorems with poor argument and opriate theorems, but wit rgument or presentation of		
Course Type	C D Fail	theorems or their applica Demonstrate an accepta but with some inadequ presentation or a numbe Demonstrate some unde substantial inadequacies with substantial computa Demonstrate poor and ir	rectly analysing problems, but with s tions and presentation or with some r bble understanding of key concepts a acies in applying the theorems the rof minor computational errors. erstanding of key concepts and ideas in applying the theorems through inceitional errors.	ome minor inadequacies in arguments, minor computational errors. and ideas by being able to correctly ider rough incorrectly analysing problems is by being able to correctly identify appropriectly analysing problems with poor a	identifying the appropriat ntify appropriate theorems with poor argument and opriate theorems, but wit rgument or presentation of		
Course Teaching	C D Fail	theorems or their applica Demonstrate an accepte but with some inadequ presentation or a numbe Demonstrate some unde substantial inadequacies with substantial computa Demonstrate poor and ir being able to complete the	rectly analysing problems, but with s tions and presentation or with some r bble understanding of key concepts a acies in applying the theorems the rof minor computational errors. erstanding of key concepts and ideas in applying the theorems through inceitional errors.	ome minor inadequacies in arguments, minor computational errors. and ideas by being able to correctly ider rough incorrectly analysing problems is by being able to correctly identify appropriectly analysing problems with poor a	identifying the appropriat ntify appropriate theorem with poor argument and opriate theorems, but with rgument or presentation of		
Course Teaching	C D Fail Lecture-	theorems or their applica Demonstrate an accepte but with some inadequ presentation or a numbe Demonstrate some unde substantial inadequacies with substantial computa Demonstrate poor and ir being able to complete the based course es	rectly analysing problems, but with s tions and presentation or with some r ible understanding of key concepts a acies in applying the theorems th r of minor computational errors. erstanding of key concepts and ideas in applying the theorems through incitional errors. nadequate understanding by not bein the solution.	ome minor inadequacies in arguments, minor computational errors. and ideas by being able to correctly ider rough incorrectly analysing problems is by being able to correctly identify appropriectly analysing problems with poor a	identifying the appropriat ntify appropriate theorem with poor argument an opriate theorems, but wit rgument or presentation or or their applications, or no No. of Hours 36		
Course Teaching	C D Fail Lecture- Activiti	theorems or their applica Demonstrate an accepte but with some inadequ presentation or a numbe Demonstrate some unde substantial inadequacies with substantial computa Demonstrate poor and ir being able to complete the based course es S	rectly analysing problems, but with s tions and presentation or with some r ible understanding of key concepts a acies in applying the theorems th r of minor computational errors. erstanding of key concepts and ideas in applying the theorems through incitional errors. nadequate understanding by not bein the solution.	ome minor inadequacies in arguments, minor computational errors. and ideas by being able to correctly ider rough incorrectly analysing problems is by being able to correctly identify appropriectly analysing problems with poor a	identifying the appropriat ntify appropriate theorems with poor argument and opriate theorems, but wit rgument or presentation of or their applications, or no No. of Hours		
Course Teaching	C D Fail Lecture- Activiti Lecture Tutorial	theorems or their applica Demonstrate an accepte but with some inadequ presentation or a numbe Demonstrate some unde substantial inadequacies with substantial computa Demonstrate poor and ir being able to complete the based course es S	rectly analysing problems, but with s tions and presentation or with some r ible understanding of key concepts a acies in applying the theorems th r of minor computational errors. erstanding of key concepts and ideas in applying the theorems through incitional errors. nadequate understanding by not bein the solution.	ome minor inadequacies in arguments, minor computational errors. and ideas by being able to correctly ider rough incorrectly analysing problems is by being able to correctly identify appropriectly analysing problems with poor a	identifying the appropriat tify appropriate theorems with poor argument and opriate theorems, but wit rgument or presentation of or their applications, or no No. of Hours 36		
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	C D Fail Lecture- Activiti Lecture Tutorial	theorems or their applica Demonstrate an accepte but with some inadequ presentation or a numbe Demonstrate some unde substantial inadequacies with substantial computa Demonstrate poor and ir being able to complete the based course es s g / Self study	rectly analysing problems, but with s tions and presentation or with some r ible understanding of key concepts a acies in applying the theorems th r of minor computational errors. erstanding of key concepts and ideas in applying the theorems through incitional errors. nadequate understanding by not bein the solution.	ome minor inadequacies in arguments, minor computational errors. and ideas by being able to correctly ider rough incorrectly analysing problems is by being able to correctly identify appropriectly analysing problems with poor a	identifying the appropriating appropriate theorems with poor argument and oppriate theorems, but wit regument or presentation or their applications, or not their applications, or not their applications and the second of the se		

	Test		50	CLO 1,2,3,4,5			
Required/recommended	R.B. Cooper: Introduction to Queueing Theory (Edward Arnold, 1981, 2nd ed.)						
reading and	S.M. Ross: Introduction to Probabil	ity Models (Academic Press, 1993,	7th ed., San Diego, Califo	ornia)			
online materials	S.M. Ross: A Course in Simulation	(Macmillan, 1991)	-	,			
	P. Glasserman: Monte Carlo Methods in Financial Engineering (Springer Science & Business Media, 2004)						
Course Website	http://moodle.hku.hk/	<u> </u>		,			

MATH3906	Financi	ial calculus (6 cred	dits)	Academic Yea	ır 2019		
Offering Department	Mathema	atics		Quota			
Course Co-ordinator	Dr S P Y	Dr S P Yung, Mathematics (spyung@hku.hk)					
Teachers Involved	(Dr S P Yung,Mathematics)						
Course Objectives	This course gives an elementary treatment for the modeling of financial derivatives, asset pricing and market risks from an applied mathematician's point of view. Stochastic calculus and solution methods will be introduced.						
Course Contents & Topics	 An introduction to financial instruments: stocks, bonds, options, forward and future contracts. Asset pricing: risk neutral relationship, no arbitrage principle. Brownian motion, stochastic calculus, Ito's Lemma, Black-Scholes model and its pricing partial differential equation. Variations on the Black-Scholes model, American options, path dependent options. Binomial tree Models. Discrete Martingale. 						
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	n	no-arbitrage-principle		erest rates, forwards, futures, stock			
			•	els to find option prices via the risk-r he Black-Scholes stock price mode			
	CLO 4 ir	mplement stochastic	calculus (such as Ito's Lemma	 a) to derive Black-Scholes pricing on to this partial differential equation 	partial differential		
Pre-requisites (and Co-requisites and Impermissible combinations)				H1821 and MATH2822) or STAT26			
Offer in 2019 - 2020	Y 1s	st sem Offer in 2020	- 2021 : Y	Examination	Dec		
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	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 visubstantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation with substantial computational errors.					
	Fail	Demonstrate poor and i being able to complete t		ng able to identify appropriate theorems or t	heir applications, or no		
Course Type	Lecture-b	based course					
	g Activities						
Course Teaching		**	Details		No. of Hours		
Course Teaching	Lectures	3	Details		36		
Course Teaching	Lectures	S	Details		36 12		
Course Teaching & Learning Activities	Lectures	3	Details		36		
Course Teaching & Learning Activities Assessment Methods	Lectures	s s ı / Self study	Details Details	Weighting in final course grade (%)	36 12		
Course Teaching & Learning Activities Assessment Methods	Lectures Tutorials Reading	s s J / Self study s		5 5	36 12 100 Assessment Methods		
Course Teaching & Learning Activities Assessment Methods	Lectures Tutorials Reading Methods	s s J / Self study s		course grade (%)	36 12 100 Assessment Methods to CLO Mapping		
Course Type Course Teaching Learning Activities Assessment Methods and Weighting Required/recommended reading and online materials	Lectures Tutorials Reading Methods Examina Test A. Etheri M. Baxte 1996) P. Wilmo	s s s s s s s s s s s s s s s s s s s	Details ncial Calculus (Cambridge Uniancial Calculus: An Introduction	course grade (%) 50 50 iversity Press) on to Derivative Pricing (Cambridge	36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 e University Press		
Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended reading and	Lectures Tutorials Reading Methods Examina Test A. Etherie M. Baxte 1996) P. Wilmo R. Jarrov	s s s s s s s s s s s s s s s s s s s	Details ncial Calculus (Cambridge Uniancial Calculus: An Introduction	course grade (%) 50 50 iversity Press) on to Derivative Pricing (Cambridge	36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 e University Press		

MATH3911	Game theory and strategy (6 credits)	Academic Year	2019			
Offering Department	Mathematics					
Course Co-ordinator	Dr K H Law, Mathematics (lawkaho@maths.hku.hk)					
Teachers Involved	(Dr K H Law, Mathematics)					
Course Objectives	Game theory is the logical analysis of situations of conflict and cooperation. This to the basic ideas and techniques of mathematical game theory in an interdiscipl		duce the students			
Course Contents & Topics	 Combinatorial games and Zermelo's Theorem; Prisonner's Dilemma; pure and mixed strategies, minimax theorem; mixed Nash equilibria. Application to biology: evolutionary stable strategies; games in coalition form; Shapley value. Application to politics: Shapley-Shubik power index; core and von Neumann-Morgenstern solution; bargaining set. 					
Course Learning Outcomes	On successful completion of this course, students should be able to: 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	Pass in (MATH2101 and MATH2211) or (MATH1821 and MATH2822)					

combinations)						
Offer in 2019 - 2020	Y 2nd	d sem Offer in 2020 - 2	021 : Y	Examinatio	n 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.					
	В	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.				
	С	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.				
	D		al inadequacies in applying the th	as of Game Theory by being able to co heorems through incorrectly analysing pr		
	Fail	Demonstrate poor and inade being able to complete the s		ng able to identify appropriate theorems	or their applications, or not	
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	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignments		assignments, tutorial participation etc	ls, 5	CLO 1,2,3	
	Examina	tion		50	CLO 1,2,3	
	Project re	eports		20	CLO 1,2,3	
	Test			25	CLO 1,2,3	
Required/recommended reading and online materials	Reference		Theory and Applications (E Illison M. Pacelli, Mathema	Dover Publications, 2003) atics and Politics: Strategy, Voti	ing, Power, and Proof	
Course Website	http://mod	odle.hku.hk/				
Additional Course Information	Tutorial ti http://hku		etable/timetable1920_S2.pd	df		

MATH3943	Netwo	rk models in ope	rations research (6 credits)	Academic Ye	ar 2019		
Offering Department	Mathem	atics	•	Quota			
Course Co-ordinator	Prof W Z	Prof W Zang, Mathematics (wzang@maths.hku.hk)					
Teachers Involved	(Prof W	(Prof W Zang,Mathematics)					
Course Objectives	operatio applicati	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	- Trees, - Networ - Ford-F - Applica	 Graphs and algorithms. Trees, matchings and paths. Network models of transportation and assignment problems. Ford-Fulkerson network flow theory and computation for maximum flow and minimum cost flow algorithms. Applications to combinatorial optimization problems such as allocation, location and sequencing. Project networks, if time permits. 					
Course Learning Outcomes	CLO 1 CLO 2	On successful completion of this course, students should be able to: CLO 1 understand the fundamental concept and approach of graphs and network models appropriate to the further study of operations research CLO 2 demonstrate knowledge and understanding of the underlying techniques of the various graph and network algorithms and their extensions					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in	CLO 3 understand the theory of network flows and the duality aspects in such methods of flow computations Pass in (MATH2101 and MATH2211) or MATH2014; and Pass in MATH3901, or already enrolled in this course.					
Offer in 2019 - 2020	Y 2r	nd sem Offer in 202	20 - 2021 : N	Examination	May		
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		nd inadequate understanding by not being abl or not being able to complete or compute the		ate theorems, algorithms		
Course Type	Lecture-	-based course	or the series and to complete or compute the				
Course Teaching	Activiti		Details		No. of Hours		
& Learning Activities	Lecture				36		
-	Tutorial	S			12		
	Reading	g / Self study			100		
Assessment Methods	Method	•	Details	Weighting in final			

	Examination		50	CLO 1,2,3			
	Test		50	CLO 1,2,3			
Required/recommended	M.S. Bazaraa, J.J. Jarvis and H.D.	M.S. Bazaraa, J.J. Jarvis and H.D. Sheral: Linear Programming and Network Flows. (2/e 1990)					
reading and		R.K. Ahuja, T.L. Magnanti and J.L. Orlin: Network Flows: Theory Algorithms, and Applications. (1993)					
online materials	H.A. Taha: Operations Research: a	an Introduction. (7/e 2003)					
Course Website	http://moodle.hku.hk/						
Additional Course	Tutorial timetable:						
Information	http://hkumath.hku.hk/~math/Time	table/timetable1920_S2.pdf					

MATH3999	Directed	d studies in mathema	atics (6 credits)	Academic Year	2019			
Offering Department	Mathema	tics		Quota				
Course Co-ordinator	Prof T W	Ng, Mathematics (ntw@/	maths.hku.hk)					
Teachers Involved	(All teach	ing staff,Mathematics)						
Course Objectives	This cour	se is designed for stude	nts who would like to have early	experiences on research rel	ated independent			
	studies.							
Course Contents & Topics	student n	. ,	will be determined by consultation ing and get the approval from be		•			
Course Learning	On succe	On successful completion of this course, students should be able to:						
Outcomes	CLO 1	study independently a to	pic that is not available in the reg	ular curriculum				
	CLO 2	understand how mathem	atical theories are applied and/or	extended in problem-solving				
	CLO 3	gain experience in project	ct writing and oral presentation					
(and Co-requisites and Impermissible combinations)	addition to Subject to This caps	o a pass in MATH2101, No approval by the Departr stone course is for Mathel	ne Mathematics/ Mathematics (I MATH2102, MATH2211 and MAT ment. matics/ Mathematics (Intensive), ed to take this capstone course is	H2241. and Mathematics/Physics Maj				
Offer in 2019 - 2020		sem 2nd sem Offer i	•	Examination	No Exam			
Grade Descriptors (A+ to F)	В	original thought. Insightful use and critical evaluation of information drawn from a broad range of high quality sor reference aptly. Critical use of data and results to draw appropriate and insightful conclusions. Apply high organizational and presentational skills.						
	C 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	analytical and critical abilitie	ttle or no grasp of the knowledge and es, logical and coherent thinking. Limited results and/or unable to draw appropria tive.	d use of secondary sources and no	critical comparison of			
Course Type	Project-ba	ased course						
Course Teaching	Activitie	S	Details		No. of Hours			
& Learning Activities	Reading	/ Self study	independent work & to attend m	eetings & seminars	120			
Assessment Methods and Weighting	Methods	·	Details	Weighting in final course grade (%)	Assessment Methods CLO Mapping			
	Dissertation		Written report plus oral presentation	100	CLO 1,2,3			

MATH4302	Algebra	II (6 cı	redits)					Academic Year	2019
Offering Department	Mathemati	Mathematics Quota							
Course Co-ordinator	Prof J H Lu	_u, Math	ematics <i>(jhl</i> u	u @maths.	hku.hk)				
Teachers Involved	(Prof J H L	Lu,Math	nematics)						
Course Objectives			extension of ATH7501 an			ntinues with	more advanced	topics in algebra.	The course may
Course Contents & Topics	- Structure abelian gro	e theore	omains and em for finitely nd canonical s; introductio	y generate forms of r	ed modules matrices;	,	ideal domains wi	th applications to	finitely generated
Course Learning Outcomes	CLO 1 und fac CLO 2 und for CLO 3 und	nderstar actorizati nderstar orms of n nderstar	nd basic extend basic extended the classiful the classiful matrices	amples of fication of oute splitting	f principal finitely ger		ins and why pri	ncipal ideal doma	·
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in MA	MATH210	02 and MAT	H3301					
Offer in 2019 - 2020	Y 2nd	d sem	Offer in 202	0 - 2021 :	Υ			Examination	May
Grade Descriptors (A+ to F)	Α							identify the appropriat	

		and being able t	o carrv out c	computations carefully	nd correctly.	and with some ir	novative approaches	to solving problems	3.
	В	Demonstrate a	good unders	standing of key conce	ots and ideas	s by being able	to identify the approp	oriate theorems and	d their
				ly analysing problems, as and presentation or w				dentifying the appro	opriate
	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		equacies in a	anding of key concepts applying the theorems all errors.					
	Fail	Demonstrate po being able to co		equate understanding l solution.	y not being a	able to identify a	ppropriate theorems of	r their applications,	or not
Course Type	Lecture-ba	ased course							
Course Teaching	Activities	;		Details				No. of Hou	ırs
& Learning Activities	Lectures							36	
	Tutorials				12				
	Reading /	Self study						100	
Assessment Methods and Weighting	Methods			Details			eighting in final urse grade (%)	Assessme Methods to CLO Map	S
	Assignme	nts					10	CLO 1,2,3	3,4
	Examinat	ion					50	CLO 1,2,3	3,4
	Test						40	CLO 1,2,3	3,4
Required/recommended	F.M.	Goodman:	Algebra	a Abstract	and	Concrete	(Online	book) url:	:
reading and				~goodman/algebra					
online materials				a: An Introduction (ed.)		
			rd M. Foot	te: Abstract Algebr	a (Wiley, 2	003, 3rd ed.)			
Course Website		dle.hku.hk/							
Additional Course	Tutorial tin								
Information	http://hkun	nath.hku.hk/~r	nath/Time	table/timetable192	0_S2.pdf				

MATH4402	Analysi	s II (6 credits)			Academic Year	2019		
Offering Department	Mathema	tics			Quota			
Course Co-ordinator	Dr Y M C	han, Mathematics ((ymchan @maths.hku.hk)			·		
Teachers Involved	(Dr Y M C	Chan, Mathematics)						
Course Objectives	treatment			eatment on calculus of s rential forms which is esser				
Course Contents & Topics	theorem, - Integrat partition of	implicit function the tion in R^n: Basic of unity, change of v ion on chains: ten	orem, submanifolds in R^i definitions, measure zer variables.	tial derivatives, differential n, method of Lagrange mul o and content zero sets, vector fields, differential f	tipliers. integrability, F	ubini's Theorem,		
Course Learning	On succe	ssful completion of	this course, students shou	ıld be able to:				
Outcomes	ge	eometry (e.g., able	to manipulate differential f	,				
	Cr	ritical way (e.g., abl	e to determine the differen	natical analysis to analyze tiability and integrability of	specific function	ıs)		
		nink creatively and l f specific functions	, 0	ative solutions to novel prol	blems (e.g., able	e to do integration		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in M	IATH3401						
Offer in 2019 - 2020	Y 2nd	d sem Offer in 20	20 - 2021 : Y	I	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. 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.							
Course Type	Lecture-b	ased course						
Course Teaching	Activitie		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		
	Test				50	CLO 1,2,3		
Required/recommended reading and online materials	Munkres: Rudin: Pr	Test 50 CLO 1,2,3 upostol: Mathematical Analysis funkres: Analysis on Manifolds tudin: Principles of Mathematical Analysis upivak: Calculus on Manifolds						

Course Website	http://moodle.hku.hk/
Additional Course	Tutorial timetable:
Information	http://hkumath.hku.hk/~math/Timetable/timetable1920_S2.pdf

MATH4404	Function	nal analysis (6 credi	its)	Academic Yea	ır 2019					
Offering Department	Mathemat	tics	•	Quota						
Course Co-ordinator	Dr Y Gao	Mathematics (gaoyu90	@hku.hk)							
Teachers Involved	(Dr Y Gao	,Mathematics)								
Course Objectives		is course introduces students to the basic knowledge of linear functional analysis, an important branch of odern analysis.								
Course Contents & Topics	dimension - Inner proseries rela Riesz's re - Fundam theorem,	lormed spaces, Banach spaces: Finite dimensional normed spaces and subspaces. Compactness and finit nension. Bounded linear operators. Normed spaces of operators, dual space. Inner product spaces, Hilbert spaces: Orthogonal complements, direct sums. Orthonormal sets and sequence ries related to orthonormal sets and sequences. Total orthonormal sets and sequences. Special polynomial sez's representation theorem. Adjoint operator, self-adjoint, normal and unitary operators. Since theorem, and Banach spaces: Hahn-Banach theorem. Reflexive spaces. Categoriorem, uniform boundedness principle. Open mapping theorem. Closed graph theorem. pectral theory of linear operators.								
Course Learning Outcomes	CLO 1 co sp ar	in successful completion of this course, students should be able to: CLO 1 compare and contrast (i) finite and infinite dimensional linear spaces, (ii) complete and incomplete linear space, and (iii) normed and inner product spaces; in particular, recognize the importance of completenes and discuss how vectors are represented in these spaces								
	th CLO 3 di	ese spaces scuss the dual spaces o	f some standard Banach spa	t Spaces. State and apply fundanaces pectra of special linear operators	nental theorems in					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in M	ass in MATH2101, MATH2102, MATH2211, MATH2241 and MATH3401								
Offer in 2019 - 2020	Y 2nd	d sem Offer in 2020 - 2	2021 : Y	Examination	May					
Grade Descriptors (A+ to F)	A B C	applications through correct and being able to carry out of 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 understate some understations.	tly analysing problems, clearly and computations carefully and correctly standing of key concepts and idea to the constant of	deas by being able to identify the appropried elegantly presenting correct logical reason, and with some innovative approaches to as by being able to identify the approprieme minor inadequacies in arguments, ide inor computational errors. Id ideas by being able to correctly identify bugh incorrectly analysing problems with by being able to correctly identify appropriectly analysing problems with poor arguments.	ning and argumentation solving problems. ate theorems and their ntifying the appropriate appropriate theorems, in poor argument and diate theorems, but with					
	Fail	with substantial computation	nal errors. equate understanding by not being	able to identify appropriate theorems or t						
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		10	CLO 1,2,3,4					
	Examination			50	CLO 1,2,3,4					
	⊏xamınaı				CLO 1,2,3,4					
	Test			st 40 CLO 1,2 rin Kreyszig: Introductory Functional Analysis with Applications (John-Wiley and Sons, 1978)						
reading and	Test		tional Analysis with Applicati	40 ons (John-Wiley and Sons, 1978)	CLO 1,2,3,4					
reading and online materials	Test Erwin Kre		tional Analysis with Applicati		CLO 1,2,3,4					
Required/recommended reading and online materials Course Website Additional Course	Test Erwin Kre	yszig: Introductory Func	tional Analysis with Applicati		CLO 1,2,3,4					

MATH4406	Introduction to partial differential equations (6 credits)	Academic Year	2019					
Offering Department	Mathematics							
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 d underlying theories.	ifferential equation	s as well as the					
Course Contents & Topics	 Laplace, heat and wave equations. Classification of partial differential equation eigenvalue problems. Separation of variables, Fourier series, linearity and scharacteristic method. Green's function, generalized functions and fundamental solutions. Maximum principle, existence, uniqueness and continuous dependence on da If time permits Cauchy-Kowalevski theorem, variational method, nonlinear par 	superposition, Duh ta.	iamel's principle,					
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 apply the tools of calculus, linear algebra, mathematical analysis in a coherent way to PDE problems CLO 2 understand the basic theory of partial differential equations and the methods to solve them CLO 3 apply the knowledge of partial differential equations to physical sciences and engineering							
Pre-requisites (and Co-requisites	Pass in MATH2101, MATH2102, MATH2241; and Pass in MATH3405, or already enrolled in this course.							

and Impermissible combinations)									
Offer in 2019 - 2020	Y 1s	st sem Offer in 2020 -	- 2021 : Y	Examination	Dec				
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 cor		nd ideas by being able to identify the approp with some minor inadequacies in arguments, ic ome minor computational errors.					
	С	but with some inadequ		epts and ideas by being able to correctly identines through incorrectly analysing problems w					
	D		s in applying the theorems through	ideas by being able to correctly identify approgh incorrectly analysing problems with poor arg					
	Fail	Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications being able to complete the solution.							
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				
	Assignn	nents		10	CLO 1,2,3				
	Examina	ation		50	CLO 1,2,3				
	Test			40	CLO 1,2,3				
Required/recommended reading and online materials	D. Bleed	ker & G. Scordas: Bas	al Equations: An Introducti ic Partial Differential Equa Equations (American Math	tions (International Press)	·				
Course Website	http://mc	oodle.hku.hk/		-,					
Additional Course Information		timetable: umath.hku.hk/~math/Ti	imetable/timetable1920_S	1.pdf					

MATH4501	Geomet	try (6 credits)			Academic Year	2019		
Offering Department	Mathema	tics			Quota			
Course Co-ordinator	Dr C W W	Vong, Mathematics	s (cwwongab@hku.hk)					
Teachers Involved	(Dr C W V	Nong,Mathematic	s)					
Course Objectives	which we thinking. I surfaces i	live. Moreover, go In this course we s in 3-space we exh	appear in nature, the study of eometry has much intrinsic be study the differential geometry ibit geometric notions that are ic geometry of surfaces.	eauty and the study of i	t is an excellent t s in 3-space. In th	raining in intuitive ne study of regula		
Course Contents & Topics		Plane and space curves, regular surfaces in three-dimensional Euclidean space. The Gauss map, Gaussian and mean curvatures, Gauss's Theorema Egregium, geodesics, Gauss-Bonne						
Course Learning	On succe	ssful completion of	of this course, students should	be able to:				
Outcomes	CLO 1	understand the fur	ndamental properties of curves	s and surfaces in space	:			
	CLO 2	compute and inter	pret the Frenet apparatus, fun	damental forms and the	eir derived quantit	ties		
	CLO 3	understand the ba	sics of intrinsic geometry of su	urfaces				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in (N	ass in (MATH2101 and MATH2211); and ass in (MATH3401 or MATH3403 or MATH3405). Sudents are strongly recommended to have taken MATH3401.						
Offer in 2019 - 2020	Y 1st	sem Offer in 20	20 - 2021 : Y		Examination	Dec		
Grade Descriptors (A+ to F)	A Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and thei 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 thei 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 theore but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument a presentation or a number of minor computational errors.							
	D	Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate there substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or with substantial computational errors.						
	Fail	Demonstrate poor a being able to compl	and inadequate understanding by not ete the solution.	being able to identify approp	oriate theorems or the	eir applications, or no		
Course Type		ased course						
Course Teaching	Activitie	-	Details			No. of Hours		
& Learning Activities	Lectures					36		
	Tutorials					12		
	Reading	/ Self study				100		
Assessment Methods and Weighting	Methods	•	Details		ting in final e grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents			10	CLO 1,2,3		
	Examination				50	CLO 1,2,3		
	Test				40	CLO 1,2,3		
Required/recommended reading and online materials	M P Do C	Carmo: Differential	Geometry of Curves and Surf	aces (Prentice-Hall, 19	76)			

Course Website	http://moodle.hku.hk/
Additional Course	Tutorial timetable:
Information	http://hkumath.hku.hk/~math/Timetable/timetable1920_S1.pdf

MATH4511	Introduc	ction to differentiab	le manifolds (6 credits)	Academic Yea	r 2019			
Offering Department	Mathema	tics		Quota				
Course Co-ordinator	TBC, Mat	hematics ()						
Teachers Involved								
Course Objectives			students to the notion of different at presenting concrete example					
Course Contents & Topics	DifferentMaps beIntegratiThe tang	Review on functions of several variables, inverse mapping theorem, implicit function theorem. Differentiable manifolds: definitions and examples. Maps between manifolds, submanifolds. Differential forms and exterior differentiation. Integration on manifolds. The tangent bundle, distributions and Frobenius Theorem. Further topics.						
Course Learning	On succe	ssful completion of this	course, students should be able	to:				
Outcomes	bi	undles, and integration	differentiable manifolds such as on manifolds amples of differentiable manifo	,	, 			
		kamples	•	, ,				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in MATH440	, ,	en MATH4501 would be helpful;	the course can also be taker	concurrently with			
Offer in 2019 - 2020	N Off	er in 2020 - 2021 : Y		Examination				
Grade Descriptors (A+ to F)	A	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.						
	В	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 appropria 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 substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation with substantial computational errors.						
	Fail	being able to complete the	dequate understanding by not being able solution.	e to identify appropriate theorems or the	eir applications, or not			
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		10	CLO 1,2			
	Examinat			50	CLO 1,2			
	Test			40	CLO 1,2			
Required/recommended	W. Booth	by: An introduction to di	fferential manifolds and Riemanr	nian Geometry (Academic Pres				
reading and online materials		•	oth manifolds (Springer, 2002)	\$12 , (1.000	,,			
Course Website	http://moc	odle.hku.hk/						

MATH4602	Scientif	Scientific computing (6 credits) Academic Year 2019							2019
Offering Department	Mathema	Mathematics Quota							
Course Co-ordinator	Prof X Yu	/uan, Ma	thematics (xm	yuan @hki	u.hk)				
Teachers Involved	(Prof X Y	Yuan,Ma	thematics)						
Course Objectives	To learn	some b	asic theoretica	I and com	putational te	chniques for	solving scienti	fic computing prob	olems.
Course Contents & Topics								optimization provary from year to	
Course Learning	On succe	cessful c	ompletion of th	is course,	students sh	ould be able t	to:		
Outcomes	CLO 1	apply o	direct methods	to solve li	near systen	ıs			
	CLO 2	CLO 2 apply iterative methods to solve linear systems							
	CLO 3 apply basic numerical methods to compute eigenvalues and eigenvectors of a matrix								
	CLO 4 implement singular value decomposition and understand its applications								
	CLO 5 understand basic theory and numerical methods for least squares problems								
	CLO 6 understand basic theory and numerical methods for optimization problems								
	CLO 7	apply r	numerical meth	nods to sol	ve simple o	rdinary differe	ntial equations	3	
	CLO 8	apply r	numerical meth	nods to sol	ve one-dim	ensional partia	al differential e	quations	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in M	Pass in MATH3601							
Offer in 2019 - 2020	Y 2nd	nd sem	Offer in 2020	- 2021 : Y	'			Examination	May
Grade Descriptors (A+ to F)	A	nume	rical algorithms an	d their applion	cations through	correctly analys	ing problems, clea	to identify the appro arly and elegantly pres and correctly, and w	enting correct logical

	В	algorithms and their applications through correctly analysing problems, but with some minor inadequacies identifying the appropriate theorems and numerical algorithms or their applications and presentation or wit computational errors.					
	С						
	D	numerical algorithms, but v	tanding of key concepts and ideas be with substantial inadequacies in apple with substantial computational errors.				
	Fail		equate understanding by not being abl ng able to complete the solution.	e to identify appropriate theorems an	d numerical algorithms or		
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	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments		Two assignments	20	CLO 1,2,3,4,5,6,7,8		
	Essay		Summary of the study	10	CLO 1,2,3,4,5,6,7,8		
	Examination Test		Final exam	50	CLO 1,2,3,4,5,6,7,8		
				20	CLO 1,2,3,4,5		
Required/recommended reading and online materials	Charles James V Paul Gla Peter E. K.W. M Publishe Walter C	lichael T. Heath: Scientific Computing (McGraw Hill, 1997) harles F. Van Loan: Introduction to Scientific Computing, Matlab Curriculum Series (Prentice Hall, 1997) ames W. Demmel: Applied Numerical Linear Algebra, SIAM, 1 Aug 1997 aul Glasserman: Monte Carlo Methods in Financial Engineering, Springer New York, 19 Nov 2010 eter E. Kloeden and Eckhard Platen: Numerical Solution of Stochastic Differential Equations .W. Morton, D.F. Mayers, Bill Morton, Numerical Solution of Partial Differential Equations: An Introduction, ublished April 1st 2005 by Cambridge University Press /alter Gander, Martin J. Gander and Felix Kwok: Scientific Computing: An introduction using Maple and MATLAB Springer, 2013)					
Course Website		oodle.hku.hk/					
Additional Course		timetable:					
Information			etable/timetable1920 S2.pdf				

MATH4902	Operati	ons research II (6 c	redits)	Academic Year	2019		
Offering Department	Mathema		•	Quota			
Course Co-ordinator	Dr G Har	Dr G Han, Mathematics (ghan@maths.hku.hk)					
Teachers Involved							
Course Objectives	The objective is to provide a fundamental account of the basic results and techniques of dynamic programming (DP), Markov decision processes (MDP), Queueing Theory (QT) and simulation in operations research. There is emphasis on aspects of algorithms as well as applications. The course serves, together with courses on linea programming and network models, to provide essential optimization concept and algorithms for more advanced studies in operations research.						
Course Contents & Topics	- Markov - Queuei	- Dynamic programming (deterministic/stochastic) - Markov decision process (discounted/average costs) - Queueing Theory - Simulation					
Course Learning	On succe	essful completion of this	course, students should be able to:				
Outcomes	p	rocess, queueing theory		, , ,			
	ti	neory and simulation	iques employed in dynamic progra				
	CLO 3 demonstrate the knowledge on algorithms for a variety of problems in operations research						
Pre-requisites		/ATH2101 MATH2211	and MATH3603				
(and Co-requisites and Impermissible combinations)	Pass in M	MATH2101, MATH2211	and MATH3603.				
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020	Pass in M	fer in 2020 - 2021 : N		Examination			
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020	Pass in M	fer in 2020 - 2021 : N Demonstrate an excellent theorems, algorithms and reasoning and argumentat innovative approaches. Demonstrate a good unde	understanding of key concepts and ideas heir applications through correctly analysing on and being able to carry out computations rstanding of key concepts and ideas by being	by being able to identify basic pr problems, clearly and elegantly pres carefully and correctly, and to solve ag able to identify basic principles, a	enting correct logical problems with some ppropriate theorems,		
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Pass in M N Of	fer in 2020 - 2021 : N Demonstrate an excellent theorems, algorithms and reasoning and argumentat innovative approaches. Demonstrate a good unde algorithms and their appl	understanding of key concepts and ideas heir applications through correctly analysing on and being able to carry out computations restanding of key concepts and ideas by bein cations through correctly analysing proble	by being able to identify basic pr problems, clearly and elegantly pres carefully and correctly, and to solve any able to identify basic principles, a ms, but with some minor inadequ	enting correct logical problems with some ppropriate theorems, acies in arguments,		
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Pass in M N Of	fer in 2020 - 2021 : N Demonstrate an excellent theorems, algorithms and reasoning and argumentat innovative approaches. Demonstrate a good unde algorithms and their applidentifying the appropriate Demonstrate an acceptab theorems, algorithms and	understanding of key concepts and ideas heir applications through correctly analysing on and being able to carry out computations restanding of key concepts and ideas by bein cations through correctly analysing proble theorems or their applications and presentatile understanding of key concepts and idea their applications but with some inadequacie	by being able to identify basic pr problems, clearly and elegantly pres carefully and correctly, and to solve any able to identify basic principles, a ms, but with some minor inadequ on or with some minor computationa s by being able to identify basic pri pes in applying the theorems through	senting correct logicals problems with some ppropriate theorems, acies in arguments, I errors.		
Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	Pass in M N Of A B	fer in 2020 - 2021 : N Demonstrate an excellent theorems, algorithms and treasoning and argumentat innovative approaches. Demonstrate a good unde algorithms and their applidentifying the appropriate Demonstrate an acceptab theorems, algorithms and problems with poor argumental personal pomentations and problems and their applications.	understanding of key concepts and ideas heir applications through correctly analysing on and being able to carry out computations restanding of key concepts and ideas by bein cations through correctly analysing proble theorems or their applications and presentative understanding of key concepts and ideas	by being able to identify basic pr problems, clearly and elegantly pres- carefully and correctly, and to solve and able to identify basic principles, a ms, but with some minor inadequ on or with some minor computationa s by being able to identify basic pres- in applying the theorems through in applying the theorems through in applying the theorems through	senting correct logica problems with some ppropriate theorems, acies in arguments, l errors. inciples, appropriate incorrectly analysing ppropriate theorems,		
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	Pass in M N Of A B C D	fer in 2020 - 2021 : N Demonstrate an excellent theorems, algorithms and treasoning and argumentat innovative approaches. Demonstrate a good unde algorithms and their applidentifying the appropriate Demonstrate an acceptab theorems, algorithms and problems with poor argument Demonstrate some undersalgorithms and their appliproblems with poor argument Demonstrate poor and inaior their applications, or not	understanding of key concepts and ideas heir applications through correctly analysing on and being able to carry out computations restanding of key concepts and ideas by bein cations through correctly analysing proble theorems or their applications and presentative understanding of key concepts and ideas their applications but with some inadequacient and presentation or a number of minor costanding of key concepts and ideas by being cations but with substantial inadequacies.	by being able to identify basic pr problems, clearly and elegantly pres carefully and correctly, and to solve and able to identify basic principles, a ms, but with some minor computationa s by being able to identify basic press in applying the theorems through imputational errors. g able to identify basic principles, a in applying the theorems through it attoinal errors. identify basic principles, appropriate	senting correct logical problems with some ppropriate theorems, acies in arguments, lerrors. iniciples, appropriate incorrectly analysing ppropriate theorems, incorrectly analysing analysing analysing senting correctly analysing propriate theorems, incorrectly analysing		
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	Pass in M N Of A B C D	fer in 2020 - 2021 : N Demonstrate an excellent theorems, algorithms and treasoning and argumentat innovative approaches. Demonstrate a good unde algorithms and their applidentifying the appropriate Demonstrate an acceptab theorems, algorithms and problems with poor argume Demonstrate some undersalgorithms and their appliproblems with poor argume Demonstrate poor and inare the problems wi	understanding of key concepts and ideas heir applications through correctly analysing on and being able to carry out computations restanding of key concepts and ideas by bein cations through correctly analysing proble theorems or their applications and presentative understanding of key concepts and idea their applications but with some inadequacient and presentation or a number of minor costanding of key concepts and ideas by being cations but with substantial inadequacies into representation or with substantial comput tequate understanding by not being able to i	by being able to identify basic pr problems, clearly and elegantly pres carefully and correctly, and to solve and able to identify basic principles, a ms, but with some minor computationa s by being able to identify basic press in applying the theorems through imputational errors. g able to identify basic principles, a in applying the theorems through it attoinal errors. identify basic principles, appropriate	senting correct logical problems with some ppropriate theorems, acies in arguments, I errors. inciples, appropriate incorrectly analysing ppropriate theorems, incorrectly analysing theorems, algorithms		
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching	Pass in M N Of A B C D	fer in 2020 - 2021 : N Demonstrate an excellent theorems, algorithms and treasoning and argumentat innovative approaches. Demonstrate a good unde algorithms and their applidentifying the appropriate Demonstrate an acceptab theorems, algorithms and problems with poor argume Demonstrate some undersalgorithms and their appliproblems with poor argume Demonstrate poor and ina or their applications, or not passed course	understanding of key concepts and ideas heir applications through correctly analysing on and being able to carry out computations restanding of key concepts and ideas by bein cations through correctly analysing proble theorems or their applications and presentative understanding of key concepts and idea their applications but with some inadequacient and presentation or a number of minor costanding of key concepts and ideas by being cations but with substantial inadequacies into representation or with substantial comput tequate understanding by not being able to i	by being able to identify basic pr problems, clearly and elegantly pres carefully and correctly, and to solve and able to identify basic principles, a ms, but with some minor computationa s by being able to identify basic press in applying the theorems through imputational errors. g able to identify basic principles, a in applying the theorems through it attoinal errors. identify basic principles, appropriate	penting correct logical problems with some propriate theorems, acies in arguments, I errors. Inciples, appropriate incorrectly analysing propriate theorems, incorrectly analysing theorems, algorithms. No. of Hours		
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Pass in M N Of A B C D Fail Lecture-b	fer in 2020 - 2021 : N Demonstrate an excellent theorems, algorithms and treasoning and argumentat innovative approaches. Demonstrate a good unde algorithms and their applidentifying the appropriate Demonstrate an acceptab theorems, algorithms and problems with poor argume Demonstrate some unders algorithms and their appliproblems with poor argume Demonstrate poor and inar or their applications, or not passed course	understanding of key concepts and ideas heir applications through correctly analysing on and being able to carry out computations restanding of key concepts and ideas by bein cations through correctly analysing proble theorems or their applications and presentatile understanding of key concepts and ideas their applications but with some inadequacient and presentation or a number of minor costanding of key concepts and ideas by being cations but with substantial inadequacies into representation or with substantial comput dequate understanding by not being able to inbeing able to complete or compute the solutions.	by being able to identify basic pr problems, clearly and elegantly pres carefully and correctly, and to solve and able to identify basic principles, a ms, but with some minor computationa s by being able to identify basic press in applying the theorems through imputational errors. g able to identify basic principles, a in applying the theorems through it attoinal errors. identify basic principles, appropriate	penting correct logical problems with some propriate theorems, acies in arguments, I errors. Inciples, appropriate incorrectly analysing propriate theorems, incorrectly analysing theorems, algorithms No. of Hours 36		
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching	Pass in M N Of A B C D Fail Lecture-t Activitie Lectures Tutorials	fer in 2020 - 2021 : N Demonstrate an excellent theorems, algorithms and treasoning and argumentat innovative approaches. Demonstrate a good unde algorithms and their applidentifying the appropriate Demonstrate an acceptab theorems, algorithms and problems with poor argumental pomonstrate some undersalgorithms and their appliproblems with poor argumental personal personal problems and their applications, or not or their applications, or not passed course	understanding of key concepts and ideas heir applications through correctly analysing on and being able to carry out computations restanding of key concepts and ideas by bein cations through correctly analysing proble theorems or their applications and presentatile understanding of key concepts and ideas their applications but with some inadequacient and presentation or a number of minor costanding of key concepts and ideas by being cations but with substantial inadequacies into representation or with substantial comput dequate understanding by not being able to inbeing able to complete or compute the solutions.	by being able to identify basic pr problems, clearly and elegantly pres carefully and correctly, and to solve and able to identify basic principles, a ms, but with some minor computationa s by being able to identify basic press in applying the theorems through imputational errors. g able to identify basic principles, a in applying the theorems through it attoinal errors. identify basic principles, appropriate	penting correct logical problems with some propriate theorems, acies in arguments, I errors. Inciples, appropriate incorrectly analysing propriate theorems, incorrectly analysing theorems, algorithms. No. of Hours		

Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping				
	Examination		50	CLO 1,2,3				
	Test		50	CLO 1,2,3				
Required/recommended	S. Dreyfus and A. Law: The Art and	d Theory of Dynamic Programming	(Academic Press, 1977)					
reading and	P. Thie: Markov Decision Processe	P. Thie: Markov Decision Processes (COMAP, Inc. 1983)						
online materials	S. M. Ross: Introduction to Probab	. M. Ross: Introduction to Probability Models (Academic Press, 2007, 9th ed.)						
Course Website	http://moodle.hku.hk/							

MATH4907	Numerio	cal methods for	financial calculus (6 credits)	Academic Ye	ar 2019	
Offering Department	Mathema	tics		Quota		
Course Co-ordinator	Dr C W W	ong, Mathematics	(cwwongab@hku.hk)			
Teachers Involved	(Dr C W V	Vong,Mathematics)				
Course Objectives	This cours	se aims at providing	g effective numerical methods as wel	I as their theoretical aspects	for solving problems	
			es and asset pricing.			
Course Contents	- Introduc	tion to the mathema	atical theory of vanilla and exotic option	ons, both the PDE and the Ma	artingale approach.	
& Topics			k-Scholes pricing differential equation		lyses.	
			lo simulations and their performance			
Course Learning		•	this course, students should be able			
Outcomes		emonstrate knowled nancial derivatives	dge and understanding of the martin	gale theory in option pricings	s as well as related	
	CLO 2 in	plement and analy	se various numerical methods on the	Black-Scholes pricing differe	ntial equation	
		nderstand the conne choles pricing differ	ection between the binomial tree met ential equation	hod and the finite difference r	method of the Black	
	CLO 4 in	plement and analy	se Monte Carlo simulation methods o	on the martingale pricing form	ula	
Pre-requisites	Pass in M	IATH3906 or equiva	alent.			
(and Co-requisites						
and Impermissible						
combinations)						
Offer in 2019 - 2020	-		20 - 2021 : Y	Examination	May	
Grade Descriptors	Α		llent understanding of key concepts and ideas			
(A+ to F)	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 correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate				
	С	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 being able to complete the solution.					
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	Methods		Details	Weighting in final	Assessment	
and Weighting				course grade (%)	Methods to CLO Mapping	
	Assignme	ents		10	CLO 1,2,3,4	
	Examination			50	CLO 1,2,3,4	
	Test 40 CLO 1,2					
Required/recommended	J. Strikwe	rda: Finite Differend	ce Schemes and PDEs (Wadsworth &	& Brooks, 1989)		
reading and			n Financial Calculus (Cambridge Univ			
online materials			son: Option Pricing: Mathematical M		est Edition) (Oxford	
	Financial	Press)				
	P. Glasse	rman: Monte Carlo	Methods in Financial Engineering (La	atest Edition) (Springer-Verla	g)	
Course Website		odle.hku.hk/				
Additional Course	Tutorial til					
Information	http://hku	math.hku.hk/~math/	/Timetable/timetable1920 S2.pdf			

MATH4910	Senior mathematics seminar (6 credits)	Academic Year	2019			
Offering Department	Mathematics	Quota	12			
Course Co-ordinator	Prof T W Ng, Mathematics (ntw@maths.hku.hk)					
Teachers Involved	(Prof Michael KP Ng,Mathematics)					
Course Objectives	This seminar style capstone course aims to provide students with the experience of intense reading of journal articles and book chapters, followed by group discussions through which knowledge acquisition and synthesis will be attained. Students will look at particular mathematical topics in depth, and will master the topics through reading, listening, discussing and writing.					
Course Contents & Topics	reading, listening, discussing and writing. 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 brought about by the readings, and the difficulties they encounter in the research process. Reading seminar involves 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					

& Learning Activities Assessment Methods and Weighting Required/recommended reading and online materials	Reading Methods Dissertati Oral pres	ion entation	Reading material and preparation for discussions; writing of reports/research Details Based on class participation and group discussions. Seminar presentations. Written report / research paper: Individual and/or group reports/research papers totally no more than 10,000 words.		Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2,3 CLO 1,2,3		
Assessment Methods and Weighting	Reading Methods Dissertati Oral pres	ion	discussions; writing of reports/research Details Based on class participation and group discussions. Seminar presentations. Written report / research paper: Individual and/or group reports/research papers totally no	weighting in final course grade (%) 20 30	Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2,3		
Assessment Methods	Reading Methods Dissertati	ion	discussions; writing of reports/research Details Based on class participation and group discussions.	weighting in final course grade (%)	Assessment Methods to CLO Mapping CLO 1,2,3		
Assessment Methods	Reading Methods	, i	discussions; writing of reports/research Details Based on class participation and	weighting in final course grade (%)	Assessment Methods to CLO Mapping		
Assessment Methods	Reading		discussions; writing of reports/research Details	papers. Weighting in final	Assessment Methods to CLO		
& Learning Activities		/ Self study			100		
& Learning Activities	.viceting t						
& Learning Activities	Meeting with supervisor		Seminars: Students take turns to give whole class; group discussions.				
Course Teaching	Activities	S	Details		No. of Hours		
Course Type	Project-ba	ased course					
	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.						
	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						
	С	clear and effective a mathematical language Demonstrate a genera	nalysis, synthesis, and application of the knowled e. I understanding of the material by moderately effective	ge through writing and ora e presentation. Engage in gro	al presentation using		
· ·	В	Demonstrate a good	rledge through writing and oral presentation using math understanding of the material by mostly clear and time by providing helpful points and asking questions	effective presentation. Enga			
Grade Descriptors (A+ to F)	A	Demonstrate an excellanalyses and raising co	llent understanding of the material by lucid expositi ritical points in group discussion. Demonstrate clear an	on. Engage constructively b d critical analysis, coherent s	y providing insightful		
Offer in 2019 - 2020		d sem Offer in 202		Examination	No Exam		
and Impermissible combinations)	This caps	Subject to approval by the Department. 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.					
(and Co-requisites	MATH4XX	MATH4XXX, or MATH7XXX) in the Mathematics/ Mathematics (Intensive), and Mathematics/Physics Majors.					
Pre-requisites		mathematical language Pass in at least 24 credits of advanced level disciplinary core/elective mathematics courses (MATH3XXX,					
			esize the material they have learned, a	nd report orally and	in writing using		
	CLO 2 cr		but the ideas and theories of the work they s	tudied			
		•	CLO 1 explain and discuss the contents of the topics they studied				
Course Learning Outcomes	CLO 1 ex		chapters. On successful completion of this course, students should be able to:				

MATH4911	Mathema	atics capstone project (6 credits) Academic Year	2019				
Offering Department	Mathemati	ics Quota					
Course Co-ordinator	Dr S P Yur	ng, Mathematics (spyung@hku.hk)					
Teachers Involved	(Dr S P Yu	ung,Mathematics)					
Course Objectives	This course aims to provide students an experience of engaging in a project which requires integration and/o application of the mathematical knowledge they have acquired.						
Course Contents & Topics	of this cap students. corporate analysis, c problem un 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	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 integrate and apply mathematical knowledge they have previously acquired						
	CLO 2 work collaboratively with others						
	CLO 3 communicate their project topic to experts and/or lay audiences through suitable media using appropriate mathematical terms and language						
Pre-requisites (and Co-requisites and Impermissible combinations)	MATH4XX Subject to This capsto (This cours	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. Subject to approval by the Department. 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.)					
Offer in 2019 - 2020	N Offe	er in 2020 - 2021 : N Examination					
Grade Descriptors (A+ to F)	A	Demonstrate excellent and creative integration and/or application of the mathematical knowledge previous initiative in, and collaborate highly effectively on, the project. Communicate effectively through suitable memathematical terms and language.					
	B Demonstrate good integration and/or application of the mathematical knowledge previously acquired. Participate actively collaborate mostly effectively on, the project. Communicate mostly effectively through suitable media using appromathematical terms and language.						
	С	Demonstrate a general level of integration and/or application of the mathematical knowledge previously a moderately effective collaboration on the project. Moderately effective communication using mathematical te					

	D	effective collaboration on the project. Show limited ability to effectively communicate using mathematical terms and language.						
	Fail	participation in, and ine	Demonstrate weak or poor integration and/or application of the mathematical knowledge previously acquired. Show participation in, and ineffective collaboration on, the project. Communicate ineffectively using mathematical terms and la					
Course Type	Project-b	ased course						
Course Teaching	Activitie	S	Details		No. of Hours			
& Learning Activities	Meeting	with supervisor	Students meet with their supervisor(s or to discuss their progress.) to present results	20			
	Assessm	nent	Project work: Students work on their p	roject	130			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Dissertation		Coursework assessment: Based on participation and collaboration throughout the whole project.	20	CLO 1,2,3			
	Oral pres	sentation	Oral presentation components of the project may include seminars, lectures, oral reports, audio recordings, etc.	30	CLO 1,2,3			
	Research report		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://mod	odle.hku.hk/						

MATH4966	Mathema	atics internship (6	credits)	Academic Yea	r 2019	
Offering Department	Mathemat	ics	·	Quota		
Course Co-ordinator	Dr C W W	ong, Mathematics (inte	rnship @maths.hku.hk)			
Teachers Involved	(All teaching staff,Mathematics)					
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 department.					
Course Contents & Topics	Within the university: each student will be supervised by a staff member (supervisor), working on a project or various tasks as instructed by the supervisor. Outside the university: each student will carry out approved work under the guidance and supervision of an external supervisor.					
Course Learning			course, students should be able to:			
Outcomes			n an industry related to mathematical	sciences		
			of how mathematics is used to solve			
Pre-requisites (and Co-requisites and Impermissible combinations)	MATH4XX This capst The earlie	(X, or MATH7XXX) in the cone course is for Mathe st that a student is allow	advanced level disciplinary core/e ne Mathematics/ Mathematics (Intensive), an ematics/ Mathematics (Intensive), an wed to take this capstone course is the	sive), and Mathematics/Ph d Mathematics/Physics Ma neir year 3 study.	ysics Majors. ajors students only.	
Offer in 2019 - 2020	Y 1st		mer Offer in 2020 - 2021 : Y	Examination	No Exam	
Grade Descriptors (Pass /Pass with distinction /Fail)	Pass Fail	assigned by supervisor(s). the job. Successfully fulfills and evaluation by supervisor of "Distinction". Very limited or no ability to by supervisor(s). Fails to each	solve problems in the workplace. Successfull Establishes effective collaboration and comr is the requirements set out in the Course Desc sor(s), etc. Students demonstrating excellent solve problems in the workplace. Fails to har stablish effective collaboration or communicat quirements set out in the Course Description etc.	nunication with supervisor(s), co- cription regarding working hours, performance in the above woundle or carry out the work require tion with supervisor(s), other colle	lleagues, and clients in written and oral report, do be awarded a grade do in the job or assigned eagues, or clients in the	
Course Type	Internship	ovalidation by supervisor(s)	, 0.0.			
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Internship		1 = 0 100	is expected that students are to work at least 160 hours		
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 Enrolment					

MATH4999	Mathematics project (12 credits)	Academic Year	2019			
Offering Department	Mathematics	Quota				
Course Co-ordinator	Prof T W Ng, Mathematics (ntw@maths.hku.hk)					
Teachers Involved	(All teaching staff,Mathematics)					
Course Objectives	The aim of the course is to provide students with the opportunity to formulate an	d to investigate, ir	depth, problems			

	of practical interest and/or to have a foretaste of mathematical research. The work, to be done on an indivibasis, is considered a highly desirable part of the training of a mathematician.					
Course Contents & Topics	The subject matter of the project will be determined by consultation between the student and his/her supervisor. The projects will be selected from areas of pure and applied mathematics. Students must achieve good standing and get the approval from both the prospective supervisor and the course co-ordinator to take this course.					
Course Learning	On succe	essful completion of this o	course, students should be able to	o:		
Outcomes	CLO 1 study independently and in depth an advanced topic that is not available in the regular curriculum					
	CLO 2	analyze and synthesize ir	nformation gathered from differen	t sources		
		articulate their findings ar				
		give an exposition of thei	•			
Pre-requisites (and Co-requisites and Impermissible combinations)	MATH4X Subject t This cap	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. Subject to approval by the Department. 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.				
Offer in 2019 - 2020		ear long Offer in 2020 -	•	Examination	n No Exam	
Grade Descriptors (A+ to F)	Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and logical thinki original thought. Insightful use and critical evaluation of information drawn from a broad range of high queference aptly. Critical use of data and results to draw appropriate and insightful conclusions. Appropriate and insightful conclusions. Appropriate and insightful conclusions.					
	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 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.					
Course Type	Project-b	ased course				
Course Teaching	Activitie	es	Details		No. of Hours	
& Learning Activities	Reading	/ Self study	independent work & to attend m	neetings & seminars	240	
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Disserta	tion	Written report plus oral presentation	100	CLO 1,2,3,4	

MATH7101	Intermed	diate complex analysis (6 credits) Academic Yea	ar 2019				
Offering Department	Mathemati	ics Quota					
Course Co-ordinator	Prof N Mok, Mathematics (nmok@hku.hk)						
Teachers Involved		ng,Mathematics) ok,Mathematics)					
Course Objectives		tive is to familiarize students with analytic, algebraic and geometric concepts and tecl ox Analysis in a single variable beyond an introductory course on functions of a comple					
Course Contents & Topics	using ana meromorp Problem a - In the co differential - A choice Mapping T	 In the course we study meromorphic functions on compact Riemann surfaces and on open Riemann surfaces using analytic and algebraic techniques. Topics on meromorphic functions include the constructions of meromorphic functions on compact Riemann surfaces, elliptic functions, Poincare series, the Mittag-Leffler Problem and the Weierstrass Problem on compact Riemann surfaces and on open Riemann surfaces. In the course of study of meromorphic functions, sheaf cohomology theory and cohomology theories in terms of differential forms will be introduced. A choice of other topics may be included. Examples of possible topics include normal families, the Riemann Mapping Theorem, geometric theory of holomorphic mappings, potential theory in one complex variable, complex dynamics, and special functions. 					
Course Learning		ssful completion of this course, students should be able to:					
Outcomes	CLO 1 analyze rational functions on the Riemann Sphere and analyze elliptic functions, equivalently meromorphic functions, on elliptic curves						
	CLO 2 formulate various classical existence problems on meromorphic functions and reduce them to analytic or cohomological problems, being able to solve them in certain typical cases						
	CLO 3 identify the key arguments in the proofs of various mathematical results concerning meromorphic functions on compact Riemann surfaces or on plain domains and apply them in solving problems						
	CLO 4 identify the key elements in the theoretic foundation of various additional topics covered in the course and apply them in solving problems						
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 2019 - 2020	Y 1st	sem Offer in 2020 - 2021 : Y Examination	No Exam				
Grade Descriptors (A+ to F)	Α	Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropapplications through correctly analysing problems, clearly and elegantly presenting correct logical reasonand being able to carry out computations carefully and correctly, and with some innovative approaches to	ning and argumentation solving problems.				
	В	Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriapplications through correctly analysing problems, but with some minor inadequacies in arguments, identifications 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 but with some inadequacies in applying the theorems through incorrectly analysing problems with presentation or a number of minor computational errors.					
	D	Demonstrate some understanding of key concepts and ideas by being able to correctly identify approp					

		substantial inadequacies with substantial computar	analysing problems with poor arg	ument or presentation or			
	Fail		Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or theil being able to complete the solution.				
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		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Test		Written midterm test and written/oral end-of-term assessment	100	CLO 1,2,3,4		
Required/recommended reading and online materials	O. Forste	R. Narasimhan: Complex Analysis in One Variable (Birkhauser, 2001, 2nd edition) D. Forster: Lectures on Riemann Surfaces (Springer-Verlag, 1981) B. Conway: Functions of One Complex Variable I (Springer-Verlag, 1995) C. Chandrasekharan: Elliptic Functions (Springer-Verlag, 1985)					

MATH7201	Topics i	n geometry (6 cred	its)		Academic Year	2019	
Offering Department	Mathemat	tics			Quota		
Course Co-ordinator	TBC, Matl	TBC, Mathematics ()					
Teachers Involved							
Course Objectives	calculus o	f differential forms and p	nts a main area of different prepares them to study furth	ner and to do researd	ch in geometry.		
Course Contents & Topics	- The topic varies according to the year and the instructor. For example, it can be one of (but not restricted to) the following: (i) Riemannian geometry: affine and Levi-Civita connection, Riemann curvature tensor, spinor bundles, Laplace and Dirac operators, harmonic forms and spinors, applications in relativity; (ii) Symplectic geometry: symplectic vector spaces, symplectic manifolds, Lagrangian submanifolds, Hamiltonian group actions, moment maps, symplectic quotients, convexity theorems, localization; (iii) Vector bundles: vector bundles, connection and curvature, characteristic forms and classes, superconnections, transgression, topological K-theory, introduction to index theory.						
Course Learning Outcomes	CLO 1 ha	ave a working knowledg	course, students should be te of the calculus of different ts of the particular subject c	tial forms beyond the			
Pre-requisites (and Co-requisites and Impermissible combinations)	CLO 2 understand the keys points of the particular subject chosen and be ready to learn other topics in Geometry Pass in (MATH4402 or MATH4501) and (MATH4511 or the approval of the course coordinator)						
Offer in 2019 - 2020	N Off	er in 2020 - 2021 : 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						
	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.						
Course Type		ased course	.				
Course Teaching & Learning Activities	Activities	3	Details			No. of Hours	
& Learning Activities	Lectures	/ O If I				36	
		/ Self study				100	
Assessment Methods and Weighting	Methods		Details		ing in final grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents			50	CLO 1,2	
	Examinat	ion			50	CLO 1,2	
Required/recommended reading and online materials	TBC						

MATH7202	Complex manifolds (6 credits)	Academic Year	2019				
Offering Department	Mathematics	Quota					
Course Co-ordinator	TBC, Mathematics ()						
Teachers Involved							
Course Objectives	This course aims to present the foundation of the theory of complex manifolds and to introduce students to a variety of research topics, focusing on compact complex manifolds.						
Course Contents & Topics	 variety of research topics, focusing on compact complex manifolds. 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. 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. The course concludes with a choice of topics on analytic and geometric aspects of the theory of complex 						

	(i) Siegel's (ii) geomet (iii) an intro (iv) an intro	try of compact quotients oduction to the deformated oduction to the deformated oduction to the deformated of the deforma	meromorphic functions on a comp of bounded symmetric domains a ion theory of compact complex sultion theory of complex structures o	nd Hermitian symmetric ma omanifolds in a complex m n a compact complex man	anifold;	
Course Learning Outcomes	CLO 1 gra	asp the notion of holom	ourse, students should be able to: corphic line bundles, understand v ns of line bundles, and to relate	arious ways for establishi		
	ma		tween sheaf cohomology, de Rha ship to solve various existence pr			
	ma	anifolds and on Hermitia	ex differential geometry such as no in holomorphic vector bundles, and in to vanishing and embedding the	d be able to relate various		
		entify the key elements i make use of them in sol	n the theoretic foundation of vario ving problems	us additional topics covere	ed in the course and	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in a first course in Complex Analysis such as MATH3403, a first course in Differential Geometry such a MATH4501, and approval by the course coordinator.					
Offer in 2019 - 2020	N Offe	er in 2020 - 2021 : N		Examination		
Grade Descriptors (A+ to F)	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	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.					
Course Type	Lecture-ba	sed course	olution.			
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures				36	
		Self study			100	
Assessment Methods	Methods	,	Details	Weighting in final	Assessment	
and Weighting				course grade (%)	Methods to CLO Mapping	
	Examination			50	CLO 1,2,3,4	
	Test			50	CLO 1,2,3,4	
Required/recommended reading and online materials	Publishers K. Kodaira	, New York 1978) a: Complex Manifolds	s of Algebraic Geometry, Pure and Deformation of Complex Stag. Berlin-Heidelberg 1986)	.,	` ,	
	Wissenschaften 283, Springer-Verlag, Berlin-Heidelberg 1986) N. Mok: Metric Rigidity Theorems on Hermitian Locally Symmetric Manifolds (World Scientific, Singapore-New Jersey 1989)					

MATH7217	Topics	s in financial mathematics (6 credits) Academic Year	2019				
Offering Department	Mathem						
Course Co-ordinator	TBC, Ma	athematics ()					
Teachers Involved							
Course Objectives		ourse aims at introducing students to fundamental knowledge in financial mather ement. It can help preparing students to research or take more advanced courses in those					
Course Contents & Topics	InteresMatherEstima	 Investment models and portfolio theory. Interest rate modeling. Mathematics of financial derivatives, pricing and hedging. Estimation and modeling of volatilities. Risk measures and risk management. 					
Course Learning Outcomes	CLO 1 CLO 2 CLO 3	cessful completion of this course, students should be able to: understand and be able to utilize various models and results in investment and interest rat grasp the methodology in derivative pricings and the modeling of volatilities understand and be able to utilize the concept of risk measures and risk management, sub chosen that year	-				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in	Pass in an advanced level mathematics courses (MATH3XXX, MATH4XXX, or MATH7XXX) and subject to the approval of the course coordinator.					
Offer in 2019 - 2020	N O	Offer in 2020 - 2021 : N Examination					
Grade Descriptors (A+ to F)	Α	Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropria applications through correctly analysing problems, clearly and elegantly presenting correct logical reasonir and being able to carry out computations carefully and correctly, and with some innovative approaches to so	ng and argumentation plving problems.				
	В	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	Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify a but with some inadequacies in applying the theorems through incorrectly analysing problems with presentation or a number of minor computational errors.					
	D	Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropria substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argum					

		with substantial com	nputational 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.				
Course Type	Lecture-	-based course					
Course Teaching	Activiti	es	Details		No. of Hours		
& Learning Activities	Lectures				36		
	Reading	g / Self study			100		
Assessment Methods and Weighting	Method	is	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignr	ments		50	CLO 1,2,3		
	Examination			50	CLO 1,2,3		
Required/recommended reading and	TBC						

MATH7219	Topics i	n applied functiona	ıl analysis (6 credits)	Academic	Year 2019	
Offering Department	Mathemat	tics		Quota		
Course Co-ordinator	TBC, Mat	hematics ()				
Teachers Involved						
Course Objectives	introducin	g to students the ba	asic knowledge of using f	course on applied functional unctional analysis on vario in studying more advanced m	us applied topics in	
Course Contents & Topics	 Generalized functions (also called distributions), delta function, generalized Fourier Transform. Applications to differential equations, Fundamental solution, Green's function. Sobolev spaces, Sobolev Embedding Theorem, Trace. Hilbert space linear operator theory (bounded operators, compact operators, closed unbounded operators), spectral theory. Applications to differential equations (infinitesimal generator, semigroup of linear operators). Applications to optimization problems. Wherever needed, we shall also review techniques for Metric spaces (Category Theorem), Banach spaces (Hahn-Banach Theorem, Opening Mapping Theorem, Closed Graph Theorem and Uniform Boundedness Principle) and Hilbert spaces (Orthogonality and best approximation, Fourier isometry). 					
Course Learning			course, students should be a			
Outcomes	CLO 1 a	pply generalized functio	ons and their Fourier transform	n to practical problems		
	CLO 2 u	nderstand Sobolev spac	ces and how to apply them in	the process of solving differe	ntial equations	
	CLO 3 u	nderstand Hilbert space	linear operator theory and a	pply it in solving differential ed	uations	
		pply these results to opt		· · · ·		
Pre-requisites (and Co-requisites and Impermissible combinations)			04, or approval of the course			
Offer in 2019 - 2020	N Off	er in 2020 - 2021 : N		Examination	on	
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 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 inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.				
	D	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.					
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 (%)		
	Assignme	ents		50	CLO 1,2,3,4	
	Examinat			50	CLO 1,2,3,4	
Required/recommended reading and online materials	TBC		<u> </u>	·		

MATH7224	Topics in advanced probability theory (6 credits)	Academic Year	2019		
Offering Department	Mathematics	Quota			
Course Co-ordinator	TBC, Mathematics ()				
Teachers Involved					
Course Objectives	This course aims at introducing fundamental knowledge in probability theory undergraduate students. It can help preparing these students for advanced re wide-range applications.				
Course Contents & Topics	Measure theory, law of large numbers, central limit theorems, random walks, n theorems, Brownian motion.	nartingales, Marko	v chains, ergodic		
Course Learning	On successful completion of this course, students should be able to:				
Outcomes	CLO 1 demonstrate in-depth understanding of basic concepts and terminologies in probability theory				

reading and online materials Course Website		odle.hku.hk/	2010, 401 Caldon)				
Required/recommended	Rick Durrett: Probability: Theory and Examples, Cambridge Series in Statistical and Probabilistic Mathematics (Cambridge University Press, 2010, 4th edition)						
	Examina	CLO 1,2					
	Assignments			50 50	CLO 1,2		
Assessment Methods and Weighting	Methods		Details	Weighting in fi course grade			
	Reading	/ Self study			100		
& Learning Activities	Lectures				36		
Course Teaching	Activitie	S	Details	Details			
Course Type	Lecture-b	ased course					
	Fail	substantial inadequacie with substantial compu	es in applying the theorems through tational errors. d inadequate understanding by not	h incorrectly analysing problems with p being able to identify appropriate theo	poor argument or presentation or		
	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						
	С	but with some inade	quacies in applying the theorems	ots and ideas by being able to correctly through incorrectly analysing problems.			
	В	applications through co	prrectly analysing problems, but wi cations and presentation or with sor		ents, identifying the appropriate		
Grade Descriptors (A+ to F)	A	applications through co and being able to carry	prrectly analysing problems, clearly out computations carefully and cor	and ideas by being able to identify the and elegantly presenting correct logic rectly, and with some innovative appro	al reasoning and argumentation aches to solving problems.		
Offer in 2019 - 2020		fer in 2020 - 2021 : N		Examin			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in MATH3603 and MATH4402, and approval of the course coordinator.						
Dro roquicitos			, ,	,			
		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					

MATH7501	Topics	in algebra (6 credits	s)	Academic Yea	r 2019			
Offering Department	Mathema	atics	•	Quota				
Course Co-ordinator	Dr Z Hua	a, Mathematics (huazher	ng @maths.hku.hk)					
Teachers Involved	(Dr Z Hu	a,Mathematics)						
Course Objectives	To providepth.	de students specializing	in mathematics with the opportunity	to study some topics in	algebra in greate			
Course Contents & Topics	forms; m	 - A selection of advanced topics in algebra such as group theory; rings and modules; Galois theory; quadratic forms; multilinear algebra; algebraic number theory; group representations; commutative algebra; Grobner basis theory; introduction to algebraic geometry. Topics may vary from year to year. 						
Course Learning	On succe	On successful completion of this course, students should be able to:						
Outcomes	CLO 1	acquire knowledge in	the covered topics to considerable de	pth				
	CLO 2	if he/she wishes, purs	sue more advanced studies in areas o	f algebra				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in N	ass in MATH4302						
Offer in 2019 - 2020	Y 1s	st sem Offer in 2020 - 2	2021 : N	Examination	Dec			
Grade Descriptors (A+ to F)	A	applications through correct	understanding of key concepts and ideas by be city analysing problems, clearly and elegantly p computations carefully and correctly, and with	presenting correct logical reason	ning and argumentation			
	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	·						
Course Type	Lecture-l	based course						
Course Teaching	Activitie	es	Details		No. of Hours			
& Learning Activities	Lectures	3			36			
	Reading / Self study				100			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods			
and Weighting					to CLO Mapping			
and Weighting	Assignm	nents	coursework assessments (may include presentations)	50	CLO 1,2			
and Weighting	Assignm			50 50				
and Weighting Required/recommended reading and online materials	Examina		include presentations) One 1.5-hour written examination		,			

MATH7502	Topics in applied discrete mathematics (6 credits)	Academic Year	2019
Offering Department	Mathematics	Quota	

Course Co-ordinator	Prof W Zang, Mathematics (wzang@maths.hku.hk)							
Teachers Involved								
Course Objectives	and proba	ibilistic methods that ha	MATH2600/MATH3600. It introduce we been used with striking success i ul results obtained by these methods	n discrete mathematics, a				
Course Contents & Topics	 Linear algebra method: rank argument, eigenvalue technique, polynomial technique, general position method. Probabilistic method: basic method, linearity of expectation, deletion method, Lov\'asz local lemma, second moment method. Additional techniques if time permits. 							
Course Learning	On succes	ssful completion of this	course, students should be able to:					
Outcomes	CLO 1 de	emonstrate knowledge a	and understanding of some research	areas of applied discrete	mathematics			
			thematics problems using linear alge					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in (M	Pass in (MATH3301 or MATH3600), and approval of the course coordinator.						
Offer in 2019 - 2020	N Offe	er in 2020 - 2021 : 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.							
	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.						
	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.							
Course Type	Lecture-ba	ased course						
Course Teaching	Activities	3	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			
	Assignments		coursework assessment	50	CLO 1,2			
	Examinat	ion	One 2.5-hour written examination	50	CLO 1,2			
Required/recommended reading and online materials	Instructor	s lecture notes.						
Course Website	http://moo	dle.hku.hk/						

MATH7503	Topics credits)		programming and optimization (6	Academic Year	2019		
Offering Department	Mathema	tics		Quota			
Course Co-ordinator	Prof X Yu	Prof X Yuan, Mathematics (xmyuan@hku.hk)					
Teachers Involved	(Prof X Y	uan,Mathematics)	•				
Course Objectives			nced and up-to-date topics in mathematical pro Ilgorithms and applications.	gramming and continu	ious optimization		
Course Contents & Topics	variationa various a	Topics may include convex programming, nonconvex programming, stochastic programing, saddle point problems, variational inequalities, maximal monotone operator, optimization theory and algorithms suitable for applications in various areas such as machine learning, artificial intelligence, imaging and computer vision. The selection may vary from year to year.					
Course Learning	On succe	ssful completion of	this course, students should be able to:				
Outcomes			ranced concept and approach of the mathe thes as appropriate in Scientific Computing, Op				
		CLO 2 demonstrate knowledge and understanding of the underlying theory and techniques of the various formulations and algorithms plus their extensions					
	Pass in MATH3901, MATH3904 and (MATH4902 or the approval of the course coordinator)						
(and Co-requisites and Impermissible	Pass in M	1ATH3901, MATH39	•	ırse coordinator)			
(and Co-requisites and Impermissible combinations)		,	•	rse coordinator) Examination	No Exam		
Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)		d sem Offer in 202 Demonstrate an exce	904 and (MATH4902 or the approval of the cou	Examination able to identify appropriate titing correct logical reasonin	e theorems and their ng and argumentation		
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Y 2n	d sem Offer in 202 Demonstrate an exceapplications through and being able to carr Demonstrate a good applications through	904 and (MATH4902 or the approval of the cou 20 - 2021 : Y ellent understanding of key concepts and ideas by being correctly analysing problems, clearly and elegantly presen	Examination able to identify appropriate titing correct logical reasonin oblems with some innovative ble to identify appropriate quacies in arguments, identi	e theorems and their ng and argumentation e approaches. theorems and their		
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Y 2n	Demonstrate an exceapplications through of and being able to carn Demonstrate a good applications through theorems or their app Demonstrate an accebut with some inade	904 and (MATH4902 or the approval of the country of	Examination able to identify appropriate titing correct logical reasonin oblems with some innovative title to identify appropriate quacies in arguments, idential errors. g able to correctly identify a	e theorems and their ig and argumentation e approaches. theorems and their ifying the appropriate appropriate theorems,		
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Y 2n	Demonstrate an exce applications through of and being able to care Demonstrate a good applications through theorems or their app Demonstrate an acceptut with some inade presentation or a num Demonstrate some un	904 and (MATH4902 or the approval of the country of the understanding of key concepts and ideas by being correctly analysing problems, clearly and elegantly present out computations carefully and correctly, and to solve produced to the computation of key concepts and ideas by being a correctly analysing problems, but with some minor inadecellications and presentation or with some minor computation epitable understanding of key concepts and ideas by being equacies in applying the theorems through incorrectly other of minor computational errors. Inderstanding of key concepts and ideas by being able to cles in applying the theorems through incorrectly analysing th	Examination able to identify appropriate titing correct logical reasonin oblems with some innovative lible to identify appropriate quacies in arguments, idential errors. g able to correctly identify a analysing problems with correctly identify appropriate	e theorems and their ing and argumentation e approaches. theorems and their iffying the appropriate ippropriate theorems, poor argument and te theorems, but with		
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	Y 2n A B C D	d sem Offer in 202 Demonstrate an exce applications through 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 inadequace with substantial comp Demonstrate poor an being able to complet	904 and (MATH4902 or the approval of the country of	Examination able to identify appropriate titing correct logical reasonir oblems with some innovative ble to identify appropriate quacies in arguments, identify al errors. g able to correctly identify a analysing problems with correctly identify appropriat g problems with poor argume	e theorems and their ing and argumentation e approaches. theorems and their ifying the appropriate appropriate theorems, poor argument and te theorems, but with ent or presentation or		
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	Y 2n A B C D	d sem Offer in 202 Demonstrate an exce applications through and being able to can Demonstrate a good applications through theorems or their app Demonstrate an accebut with some inade presentation or a num Demonstrate some ul substantial inadequac with substantial comp Demonstrate poor an	904 and (MATH4902 or the approval of the country of	Examination able to identify appropriate titing correct logical reasonir oblems with some innovative ble to identify appropriate quacies in arguments, identify al errors. g able to correctly identify a analysing problems with correctly identify appropriat g problems with poor argume	e theorems and their ig and argumentation e approaches. theorems and their ifying the appropriate appropriate theorems, poor argument and te theorems, but with ent or presentation or		
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching	Y 2n A B C D	d sem Offer in 202 Demonstrate an exce applications through 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 Demonstrate poor an being able to complet trased course	904 and (MATH4902 or the approval of the country of	Examination able to identify appropriate titing correct logical reasonir oblems with some innovative ble to identify appropriate quacies in arguments, identify al errors. g able to correctly identify a analysing problems with correctly identify appropriat g problems with poor argume	e theorems and their ig and argumentation e approaches. theorems and their ifying the appropriate appropriate theorems, poor argument and te theorems, but with ent or presentation or		
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Y 2n A B C D Fail Lecture-b	d sem Offer in 202 Demonstrate an exce applications through of and being able to care Demonstrate a good applications through of theorems or their app Demonstrate an acceptate with some inade presentation or a num Demonstrate some unsubstantial inadequace with substantial comp Demonstrate poor an being able to complet the seed course	20 - 2021 : Y ellent understanding of key concepts and ideas by being correctly analysing problems, clearly and elegantly presently out computations carefully and correctly, and to solve producer to analysing problems, but with some minor inadeconcepts and ideas by being a correctly analysing problems, but with some minor inadeconcepts and ideas by being a correctly analysing problems, but with some minor computation eptable understanding of key concepts and ideas by being equacies in applying the theorems through incorrectly inderstanding of key concepts and ideas by being able to cies in applying the theorems through incorrectly analysing outstonal errors. Individual control in applying the theorems through incorrectly analysing outstonal errors. Individual control in a polying the theorems through incorrectly analysing outstonal errors. In inadequate understanding by not being able to identify the the solution.	Examination able to identify appropriate titing correct logical reasonir oblems with some innovative ble to identify appropriate quacies in arguments, identify al errors. g able to correctly identify a analysing problems with correctly identify appropriat g problems with poor argume	e theorems and their ing and argumentation e approaches. theorems and their ifying the appropriate appropriate theorems, poor argument and the theorems, but with ent or presentation or iir applications, or not		

Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	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 reading and online materials	Jorge Nocedal and Stephen J. Wr Dimitri P. Bertsekas, Angelia No Scientific, 2003) M.S. Bazaraa and C.M. Shetty: No R. Tyrrell Rockafellar: Convex Ana H.H. Bauschke and P.L. Combette New York, 2nd edition, 2017)	aberghe: Convex Optimization (Camight: Numerical Optimization (Spring edic and Asuman E. Ozdaglar: Conlinear Programming (John Wiley & alysis (Princeton University Press, 1 es: Convex Analysis and Monotone ptimization (SIAM, Philadelphia, 20	ger, Ž010) Convex Analysis and O & Sons, 1993, 2nd edition 997) Operator Theory in Hilbe	otimization (Athena
Course Website	http://moodle.hku.hk/			
Additional Course Information	Tutorial timetable: http://hkumath.hku.hk/~math/Time	etable/timetable1920_S2.pdf		

MATH7504	Geometi	ric topology (6 cred	lits)	Academic Ye	ar 2019		
Offering Department	Mathemat	ics		Quota			
Course Co-ordinator	TBC, Math	nematics ()					
Teachers Involved							
Course Objectives			roduction to some of the methods of a ons and applications of the theory.	algebraic topology. The e	mphasis throughou		
Course Contents & Topics			ectedness. The fundamental group. cial homology. Theory of covering spa				
Course Learning			course, students should be able to:				
Outcomes	as	in many applications in			•		
		derstand the ideas of anifolds	attaching space, complexes, lifting	and extension propertie	s, and surgery on		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in M	ATH3301 and MATH34	01				
Offer in 2019 - 2020	N Offe	er in 2020 - 2021 : 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.						
	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 inaction being able to complete the	dequate understanding by not being able to idesolution.	entify appropriate theorems or	their applications, or no		
Course Type		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	coursework assessment	50	CLO 1,2		
	Examinat		One 2.5-hour written examination	50	CLO 1,2		
Required/recommended reading and online materials		strong: Basic Topology : An Introduction to Alg	(Springer-Verlag UTM) ebraic Topology (Springer-Verlag GT	M)			

MATH7505	Real analysis (6 credits) Academic Year 2019			
Offering Department	Mathematics	Quota		
Course Co-ordinator	Prof W S Cheung, Mathematics (wscheung@hku.hk)			
Teachers Involved	(Prof W S Cheung, Mathematics)			
Course Objectives	The aim of the course is to introduce the basic ideas and techniques of measure	e theory and the Le	ebesgue integral.	
Course Contents & Topics	 Lebesgue Measure on R: Measurable Sets and Lebesgue Measure, Measural The Lebesgue Integral: The Lebesgue Integral, Modes of Convergence, Conv Differentiation and Integration: Functions of Bounded Variation, Differentiation The L^p Spaces: The L^p spaces, Convergence and Completeness, Bounded General Theory: Measurable Spaces, Measurable Functions, Integration Nikodym Theorem. 	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 fur various convergence theorems	nctions and under	stand and apply	

	CLO 2 construct the Lebesgue integral, elucidate its basic properties and appreciate the existence of o integration theories besides Riemann's				tence of other useful
	CLO 3 understand the basic properties of L^p spaces				
Dro roguioitos			• • • • • • • • • • • • • • • • • • • •	vordinator	
Pre-requisites (and Co-requisites and Impermissible combinations)	A good grade in MATH3401 and approval by the course coordinator				
Offer in 2019 - 2020	Y 2n	d sem Offer in 2020) - 2021 : Y	Examination	n May
Grade Descriptors (A+ to F)	A	concepts and apply the		nd ideas by being able to draw complex or alysing problems, clearly and elegantly p proaches to solving problems.	
	В	applications through co		ideas by being able to identify the appro h some minor inadequacies in arguments,	
	С			s and ideas by being able to correctly ider rough incorrectly analysing problems with	
	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, and not being able to complete the solution.				
Course Type	Lecture-b	ased course			
Course Teaching	Activities		Details		No. of Hours
& Learning Activities	Lectures				36
	Tutorials				12
	Reading	/ Self study			72
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignm	ents		20	CLO 1,2,3
	Examina	tion		50	CLO 1,2,3
	Test			30	CLO 1,2,3
Required/recommended reading and contine materials		den: Real Analysis (P : Real and Complex <i>i</i>	earson) Analysis (McGraw Hill)		
Course Website	http://mod	odle.hku.hk/			
Additional Course Information	Tutorial ti		imetable/timetable1920 S2.	pdf	

PHYS1000	Introdu	ction to astronomy	y (6 credits)	Academic Yea	r 2019	
Offering Department	Physics		•	Quota		
Course Co-ordinator	DrJCS	Dr J C S Pun, Physics (jcspun@hku.hk)				
Teachers Involved		Pun,Physics)	,			
Course Objectives	survey of planets,	This is an introductory course on astronomy, including both the observational aspect of the field and a descriptive survey of the solar system, the Sun, stars, galaxies and the universe. Selected special topics such as extrasolar planets, neutron stars, black holes and dark matter will also be included. The course will include observing sessions with telescopes (subject to weather conditions).				
Course Contents & Topics	our solar provides nature we	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	On succe	essful completion of thi	s course, students should be able	to:		
Outcomes	CLO 1 ic	dentify and describe alaxies), and explain the	the major objects in our Solar 🤄	System and our universe (inc	cluding stars and	
	CLO 3 re	eview the evolution o	f the world-view from the geoce	ntric model to the heliocentri	ic model and the	
	CLO 4 a	pply quantitative phys	sical laws, including Kepler's thro oppler shift formula and Hubble's	ee laws of planetary motion,		
			stars and the evolution of the univ	erse		
	CLO 6 c	•	ical problems and solutions using		ninology and good	
Pre-requisites (and Co-requisites and Impermissible combinations)	Nil					
Offer in 2019 - 2020	N Of	fer in 2020 - 2021 : 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					
	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 observation skills and techniques. Correct use of data of results to draw appropriate conclusions.				
	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. 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.				
	l					
	Fail	of analytical and critical problems. Organization observation skills and tec	l abilities, logical and coherent thinking. and presentational skills are minimally eff chniques. Misuse of data and results and/or	Show very little or no ability to apple ective or ineffective. Apply minimally	ly knowledge to solve effective or ineffective	
7.	Lecture v	of analytical and critical problems. Organization observation skills and ted vith laboratory compon	I abilities, logical and coherent thinking. and presentational skills are minimally eff chniques. Misuse of data and results and/or lent course	Show very little or no ability to apple ective or ineffective. Apply minimally	ly knowledge to solve effective or ineffective ns.	
Course Teaching	Lecture w	of analytical and critical problems. Organization observation skills and tec vith laboratory compon	l abilities, logical and coherent thinking. and presentational skills are minimally eff chniques. Misuse of data and results and/or	Show very little or no ability to apple ective or ineffective. Apply minimally	ly knowledge to solve effective or ineffective ns. No. of Hours	
Course Teaching	Lecture w	of analytical and critical problems. Organization observation skills and tec vith laboratory compon	I abilities, logical and coherent thinking. and presentational skills are minimally eff chniques. Misuse of data and results and/or lent course	Show very little or no ability to apple ective or ineffective. Apply minimally	ly knowledge to solve effective or ineffective ns. No. of Hours 32	
Course Teaching	Lecture w Activitie Lectures Laborato	of analytical and critical problems. Organization observation skills and tec vith laboratory compon	I abilities, logical and coherent thinking. and presentational skills are minimally eff chniques. Misuse of data and results and/or lent course	Show very little or no ability to apple ective or ineffective. Apply minimally	ly knowledge to solve effective or ineffective ns. No. of Hours 32 6	
Course Teaching & Learning Activities	Lecture w Activitie Lectures Laborato	of analytical and critical problems. Organization observation skills and tec vith laboratory compon	I abilities, logical and coherent thinking. and presentational skills are minimally eff chniques. Misuse of data and results and/or lent course	Show very little or no ability to applective or ineffective. Apply minimally runable to draw appropriate conclusion	ly knowledge to solve effective or ineffective ons. No. of Hours 32	
Course Teaching & Learning Activities Assessment Methods	Lecture w Activitie Lectures Laborato	of analytical and critical problems. Organization observation skills and tec with laboratory compon s s ory / Self study	I abilities, logical and coherent thinking. and presentational skills are minimally eff chniques. Misuse of data and results and/or lent course	Show very little or no ability to apple ective or ineffective. Apply minimally	ly knowledge to solve effective or ineffective ns. No. of Hours 32 6	
Course Teaching & Learning Activities Assessment Methods	Lecture w Activitie Lectures Laborato Reading	of analytical and critical problems. Organization observation skills and ted with laboratory compones	l abilities, logical and coherent thinking. and presentational skills are minimally eff. chiniques. Misuse of data and results and/or lent course Details	Show very little or no ability to applective or ineffective. Apply minimally runable to draw appropriate conclusion Weighting in final	y knowledge to solve effective or ineffective ns. No. of Hours 32 6 82 Assessment Methods	
Course Teaching & Learning Activities Assessment Methods	Lecture w Activitie Lectures Laborato Reading Methods	of analytical and critical problems. Organization observation skills and ted with laboratory compones y / Self study ents	l abilities, logical and coherent thinking. and presentational skills are minimally eff. chiniques. Misuse of data and results and/or lent course Details	Show very little or no ability to applective or ineffective. Apply minimally runable to draw appropriate conclusion Weighting in final course grade (%)	y knowledge to solve effective or ineffective ns. No. of Hours 32 6 82 Assessment Methods to CLO Mapping	
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	Lecture w Activitie Lectures Laborato Reading Methods Assignm Examina	of analytical and critical problems. Organization observation skills and ted with laboratory compones y / Self study ents	l abilities, logical and coherent thinking. and presentational skills are minimally eff chniques. Misuse of data and results and/or ent course Details Details	Show very little or no ability to applective or ineffective. Apply minimally runable to draw appropriate conclusion Weighting in final course grade (%)	y knowledge to solve effective or ineffective ns. No. of Hours 32 6 82 Assessment Methods to CLO Mapping CLO 1,2,3,4,5,6 CLO 1,2,3,4,5,6	
Course Teaching & Learning Activities Assessment Methods	Lecture w Activitie Lectures Laborato Reading Methods Assignm Examina Laborato	of analytical and critical problems. Organization observation skills and ted with laboratory compones. Sory / Self study ents tion ory reports	l abilities, logical and coherent thinking. and presentational skills are minimally eff chniques. Misuse of data and results and/or ent course Details Details 2-hour written exam	Show very little or no ability to applective or ineffective. Apply minimally runable to draw appropriate conclusion Weighting in final course grade (%) 40 50	y knowledge to solve effective or ineffective ns. No. of Hours 32 6 82 Assessment Methods to CLO Mapping CLO 1,2,3,4,5,6	

PHYS1001	University physics (6 credits)	Academic Year	2019			
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 wan the university level.	t to have an over	view in physics at			
Course Contents & Topics	It covers mechanics, gravitation, oscillations, waves and sound, heat and magnetism, and physical optics. Conceptual ideas in physics are emphasized a 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	NIL					

and Impermissible combinations)					
Offer in 2019 - 2020	N Off				
Grade Descriptors (A+ to F)	Α	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 nd logical thinking, with evidence of or unfamiliar situations. Apply highly effe ques. Critical use of data and results	ginal thought, and ability ctive organizational and
	В	learning outcomes. Show e and some unfamiliar situation	vidence of analytical and critical abiliti	dge and skills required for attaining at es and logical thinking, and ability to ap d presentational skills. Apply effective	ply knowledge to familiar
	С	outcomes. Show evidence familiar situations. Apply m	of some analytical and critical abilition of some analytical an	and skills required for attaining most es and logical thinking, and ability to a d presentational skills. Apply moderate esults to draw appropriate conclusions.	apply knowledge to most
	D	Show evidence of some column knowledge to solve probler	herent and logical thinking, but with li	Is required for attaining some of the comited analytical and critical abilities. Shorganizational and presentational skills of draw appropriate conclusions.	ow limited ability to apply
	Fail	of analytical and critical a problems. Organization and	bilities, logical and coherent thinking	I 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.	ply knowledge to solve
Course Type	Lecture w	ith laboratory componer	nt course		
Course Teaching	Activities		Details		No. of Hours
& Learning Activities	Lectures				36
	Laborator	γ			3
	Tutorials	•			9
	Reading	Self study			72
Assessment Methods and Weighting	Methods	,	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignme	ents		35	CLO 1,2,3,4
	Examination		2-hour written exam	50	CLO 1,2,3
	Laborator	y reports		15	CLO 1,4
Required/recommended reading and online materials	Lecture no Raymond	otes provided by Course A. Serway and John W		and Engineers (Thomson, 201	1, 8th edition)
		dle.hku.hk			

PHYS1050	Physics	for engineering stu	dents (6 credits)		Academic Year	2019
Offering Department	Physics				Quota	
Course Co-ordinator	Dr C C L	Dr C C Ling, Physics (ccling@hku.hk)				
Teachers Involved	(Dr C C L	ing,Physics)				
Course Objectives		rse offers a comprehens s, electricity and magneti			overs the major p	ohysical laws on
Course Contents & Topics	Units and Friction, System of Electrost Moving O	se will introduce and disc d Dimensional Analysis, Circular Motion, Force, Im of Particles, Moment of li- atic Fields and Potential, tharge in Magnetic Field, AC circuits, Phases in Ci	Motion of a Particle in Capulse and Momentum, Fonertia and Rotation of a Gauss's Law, DC circuit Biot-Savart law, Ampere'	orce Polygon and Si Rigid Body, Simple s, Magnetic field du s law, Electromagne	tatic Equilibrium, V Harmonic Motior ue to Moving Cha etic Induction, Fara	Nork and Energy n and Pendulum; rges, Force on a aday's Law, Eddy
Course Learning	On succe	ssful completion of this co	ourse, students should be	able to:		
Outcomes	CLO 1	describe and explain the	physical principles of me	chanics, electricity a	nd magnetism	
	CLO 2	apply these principles to			rld	
	CLO 3	analyze and solve basic				
	CLO 4	acquire and interpret exp				
Pre-requisites (and Co-requisites and Impermissible combinations)	(Level 2 of This cou	r above in HKDSE Physic or above in Module 1, or M rse is exclusive for Engin	Module 2 of HKDSE Math			
Offer in 2019 - 2020	N Of					
Oliei III 2013 - 2020	IN OI	fer in 2020 - 2021 : N			Examination	
Grade Descriptors (A+ to F)	A	Demonstrate thorough mast learning outcomes. Show str to apply knowledge to a wi presentational skills. Apply h	ery at an advanced level of exong analytical and critical abilitide range of complex, familiar anighly effective lab skills and te	es and logical thinking, v and unfamiliar situations	skills required for atta vith evidence of origina . Apply highly effective	al thought, and ability e organizational and
Grade Descriptors		Demonstrate thorough mast learning outcomes. Show str to apply knowledge to a wire presentational skills. Apply hinsightful conclusions. Demonstrate substantial cor learning outcomes. Show evi and some unfamiliar situation	ong analytical and critical abiliti de range of complex, familiar	es and logical thinking, vand unfamiliar situations ichniques. Critical use of welded and skills require abilities and logical thinking and presentational skills.	skills required for atta vith evidence of origina. Apply highly effective data and results to deed for attaining at leasing, and ability to apply	al thought, and ability e organizational and draw appropriate and st most of the course knowledge to familiar
Grade Descriptors	A	Demonstrate thorough mast learning outcomes. Show str to apply knowledge to a win presentational skills. Apply hinsightful conclusions. Demonstrate substantial cor learning outcomes. Show evile and some unfamiliar situation Correct use of data of results Demonstrate general but in outcomes. Show evidence of familiar situations.	ong analytical and critical abiliti de range of complex, familiar a nighly effective lab skills and te mmand of a broad range of kno dence of analytical and critical a ns. Apply effective organization.	es and logical thinking, vand unfamiliar situations ichniques. Critical use of welde and skills requirabilities and logical thinkinal and presentational skills. dge and skills required bilities and logical thinkinal and presentational skill and presentational skill	skills required for atta- with evidence of origina. Apply highly effective data and results to de- add for attaining at leasing, and ability to apply is. Apply effective lab so for attaining most of ng, and ability to apply s. Apply moderately et	al thought, and ability e organizational and fraw appropriate and st most of the course knowledge to familiar skills and techniques. the course learning y knowledge to most
Grade Descriptors	В	Demonstrate thorough mast learning outcomes. Show str to apply knowledge to a wipresentational skills. Apply insightful conclusions. Demonstrate substantial cor learning outcomes. Show evi and some unfamiliar situation. Correct use of data of results. Demonstrate general but in outcomes. Show evidence of amiliar situations. Apply mo techniques. Mostly correct but Demonstrate partial but limit Show evidence of some cohknowledge to solve problem lab skills and techniques. Limit	ong analytical and critical abilitide range of complex, familiar anighly effective lab skills and te mand of a broad range of known and complex of analytical and critical ans. Apply effective organizations to draw appropriate conclusion complete command of knowled some analytical and critical a derately effective organizationa ut some erroneous use of data are ded command of knowledge and crent and logical thinking, but we shapply limited or barely effective ability to use data and resu	es and logical thinking, vand unfamiliar situations ichniques. Critical use of weledge and skills requirabilities and logical thinkinal and presentational skills. dge and skills required bilities and logical thinkin I and presentational skill ind results to draw appropris skills required for attain ith limited analytical and rive organizational and putter to draw appropriate or	skills required for attavith evidence of origina. Apply highly effective data and results to dead for attaining at leasing, and ability to apply is. Apply effective labs for attaining most of ng, and ability to apply so apply moderately eight originate conclusions. In gome of the courscritical abilities. Show I resentational skills. Approclusions.	al thought, and ability e organizational and fraw appropriate and st most of the course knowledge to familiar skills and techniques. the course learning y knowledge to most ffective lab skills and e learning outcomes. limited ability to apply pply partially effective
Grade Descriptors	A B	Demonstrate thorough mast learning outcomes. Show str to apply knowledge to a wipresentational skills. Apply hinsightful conclusions. Demonstrate substantial cor learning outcomes. Show evi and some unfamiliar situation. Correct use of data of results Demonstrate general but in outcomes. Show evidence of familiar situations. Apply mo techniques. Mostly correct bu Demonstrate partial but limit Show evidence of some coh knowledge to solve problem lab skills and techniques. Limit Demonstrate little or no evid of analytical and critical ab problems. Organization and	ong analytical and critical abilitide range of complex, familiar anighly effective lab skills and te mand of a broad range of known and the state of an alytical and critical ans. Apply effective organizations to draw appropriate conclusion complete command of knowled for some analytical and critical aderately effective organizationaut some erroneous use of data are de command of knowledge and erent and logical thinking, but ws. Apply limited or barely effective.	es and logical thinking, vand unfamiliar situations ichniques. Critical use of weledge and skills requirabilities and logical thinkinal and presentational skills. dge and skills required bilities and logical thinkin I and presentational skills and presentational skills and presentational skill ind results to draw appropriate of a skills required for attain ith limited analytical and inve organizational and pults to draw appropriate of a and skills required for at mixing. Show very little of the skills required for attain thing. Show very little of the skills required for attain thing. Show very little of the skills required for attain thing. Show very little of the skills required for attain the skills r	skills required for atta- with evidence of origina. Apply highly effective data and results to de ed for attaining at leas- ag, and ability to apply is. Apply effective labes for attaining most of ng, and ability to apply s. Apply moderately eigeniate conclusions. ing some of the course critical abilities. Show I resentational skills. Ap- pneclusions. taining the course leaf or no ability to apply. Apply minimally effect.	al thought, and ability e organizational and iraw appropriate and st most of the course knowledge to familiar skills and techniques. the course learning y knowledge to most ffective lab skills and e learning outcomes. limited ability to apply poly partially effective ming outcomes. Lack knowledge to solve
Grade Descriptors	A B C D	Demonstrate thorough mast learning outcomes. Show str to apply knowledge to a wipresentational skills. Apply hinsightful conclusions. Demonstrate substantial cor learning outcomes. Show evi and some unfamiliar situation. Correct use of data of results Demonstrate general but in outcomes. Show evidence of familiar situations. Apply mo techniques. Mostly correct bu Demonstrate partial but limit Show evidence of some coh knowledge to solve problem lab skills and techniques. Limit Demonstrate little or no evid of analytical and critical ab problems. Organization and	rong analytical and critical abilition de range of complex, familiar anighly effective lab skills and te mand of a broad range of known dence of analytical and critical ans. Apply effective organizations to draw appropriate conclusion complete command of knowled some analytical and critical aderately effective organizationa ut some erroneous use of data a ed command of knowledge and crent and logical thinking, but we shall be a shall be	es and logical thinking, vand unfamiliar situations ichniques. Critical use of weledge and skills requirabilities and logical thinkinal and presentational skills. dge and skills required bilities and logical thinkin I and presentational skills and presentational skills and presentational skill ind results to draw appropriate of a skills required for attain ith limited analytical and inve organizational and pults to draw appropriate of a and skills required for at mixing. Show very little of the skills required for attain thing. Show very little of the skills required for attain thing. Show very little of the skills required for attain thing. Show very little of the skills required for attain the skills r	skills required for atta- with evidence of origina. Apply highly effective data and results to de ed for attaining at leas- ag, and ability to apply is. Apply effective labes for attaining most of ng, and ability to apply s. Apply moderately eigeniate conclusions. ing some of the course critical abilities. Show I resentational skills. Ap- pneclusions. taining the course leaf or no ability to apply. Apply minimally effect.	al thought, and ability e organizational and lraw appropriate and st most of the course knowledge to familiar skills and techniques. the course learning y knowledge to most ffective lab skills and e learning outcomes. limited ability to apply poly partially effective ming outcomes. Lack knowledge to solve

	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	Lecture notes provided by Course Coordinator R. Serway and J.W. Jewett: Physics for Scientists and Engineers (Thomson, 2009, 8th edition) R. D. Knight: Physics for Scientists and Engineers (Pearson, 2008, 2nd edition)					
Course Website	http://moodle.hku.hk					

PHYS1055	How thir	ngs work (6 credits	s)	Academic Yea	r 2019		
Offering Department	Physics			Quota			
Course Co-ordinator	Dr M K Yi	Dr M K Yip, Physics <i>(mankit @hku.hk)</i>					
Teachers Involved	(Dr M K Yip, Physics)						
Course Objectives				ars who are curious about scien			
		0 1	•	hings and phenomena around ι			
				kept at a minimum. Students are			
Carrage Cambanda				in everyday life can be predictab			
Course Contents & Topics				f driving, sports and amusement in optical recording, medical im			
ατορισ				ntroduced as examples of the n			
		•	•	ances in modern science and te	0,		
Course Learning			course, students should be abl				
Outcomes			•	ehind the household appliances	and the scientific		
		sues in daily life	. ,				
	CLO 2 de	emonstrate their knowle	edge to related topics qualitative	ely			
	CLO 3 cri	iticize and express view	ws in logical and effective ways				
	CLO 4 re	cognize the significand	ce of science and technology				
Pre-requisites	NIL						
(and Co-requisites							
and Impermissible							
combinations)	V 0m d	J Offer in 2020	2021 · V	Eveninetien	May		
Offer in 2019 - 2020		d sem Offer in 2020 -		Examination sive knowledge and skills required for a	May		
Grade Descriptors (A+ to F)	Α			nd logical thinking, with evidence of orig			
(A. 101)		to apply knowledge to a		unfamiliar situations. Apply highly effec			
	В	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 familia					
	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						
				g. Show very little or no ability to app	ly knowledge to solve		
Course Type	Lecture_h:	ased course	nd presentational skills are minimally eff	ective of inellective.			
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures	•	Details		36		
3	Tutorials				12		
		/ Self study			80		
Assessment Methods	Methods	•	Details	Weighting in final	Assessment		
and Weighting	Mictilous		Dottalis	course grade (%)	Methods		
3 3 3				grant (10)	to CLO Mapping		
	Assignme	ents		25	CLO 1,2,3,4		
	Examinat	ion	2-hour written exam	50	CLO 1,2,3,4		
	Presentat	tion		25	CLO 1,2,3,4		
Required/recommended		otes provided by Cours					
reading and	L. A. Bloo	mfield: How Things Wo	ork: The Physics of Everyday Li	fe (John Wiley & Sons, Inc, 2008	s, 3rd edition)		
online materials							
Course Website	latter. //www.	v.physics.hku.hk/~phys	10551				

PHYS1056	Weather, climate and climate change (6 credits)	Academic Year	2019
Offering Department	Physics	Quota	
Course Co-ordinator	Dr K M Lee, Physics (kmlee@lily.physics.hku.hk)		
Teachers Involved	(Dr K M Lee,Physics) (Dr P W Li,Hong Kong Observatory) (Mr H W Tong,Hong Kong Observatory) (Mr W K Wong,Hong Kong Observatory)		
Course Objectives	Weather and climate play an important role in human activities and history. In students the fundamentals of weather, climate and climate changes, to arouse technological advancements.		

Course Contents & Topics	The course will encompass topics on: basic physical principles on weather phenomena like: wind, temperature, humidity, cold/warm fronts, thunderstorms and tropical cyclones; introductory weather analysis, forecast and climate. Through real life examples, students will get familiarized with the weather/climate science and interpretation of meteorological information, climatology and climate change. Experts from the Hong Kong Observatory (HKO) will participate in the course to cover aspects on daily weather forecasts, public weather services, local severe weather phenomena, tropical cyclones, climatology of Hong Kong, and climate change. Tentatively, there will be visit to the HKO to study the meteorological facilities and understand the operational activities on weather and climate.						
Course Learning		On successful completion of this course, students should be able to:					
Outcomes	CLO 2 ap	call the basic principles opply the principles to inte	of weather and climate erpret weather / climate informat	tion, for example from the HK	O web site, internet		
	CLO 3 id		ferences of weather and climate	e in Hong Kong as compared	to other parts of the		
	CLO 4 ex	plain the basic causes o	of climate change and its potenti	al impacts			
			daily operational activities in the				
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL						
Offer in 2019 - 2020	Y 1st	sem Offer in 2020 - 20	021 : 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						
	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.						
Course Type	Lecture-b	ased course					
Course Teaching	Activities	3	Details		No. of Hours		
& Learning Activities	Lectures				36		
	Tutorials				8		
		/ Self study			80		
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		
	Examinat	ion	2-hour written exam	50	CLO 1,3,4,5		
	Test			25	CLO 1,3,4,5		
Required/recommended reading and online materials		otes provided by Course Lutgens and Edward Ta	Coordinator rbuck: The Atmosphere (Pearso	on Prentice Hall, 2013)			
Course Website	http://moc	dle.hku.hk					

PHYS1057	Kitchen science (6 credits)	Academic Year	2019				
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 common daily activities related to food and cooking and to develop their critical thinking skills.						
Course Contents & Topics	The course will introduce basic scientific concepts and principles necessary to understand different methods food preparation, as well as kitchen tools. The introduced concepts will be illustrated in recipes and practic demonstrations. The topics include: basic food molecules (water, carbohydrates, fats, protein); foams and bubbles (various examples, beer, sodas, ice-cream); colloids, emulsions, gelation (various sauce jelly); crystallization (sugar, sugar syrups, honey, chocolate); taste and flavor (herbs, spices); cooking process and chemical reactions (Maillard reactions, caramelization, etc.); chemical reactions for rising dough wi application to cakes, bread and cookies; fermentation (alcoholic beverages, fermented dairy products, tofu); process in cooking, natural and artificial food colorings, culinary curiosities; molecular gastronomy (novel flavors a textures); principles of operation of kitchen tools, such as non-stick cookware, pressure cookers, induction heatir ranges, microwave ovens, etc.						
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 CLO 2 explain basic physical and chemical processes involved in food prep CLO 3 illustrate how preparation method affects the flavor and texture of food CLO 4 analyze common methods of food preparation and understandard procedures in certain ways	aration od	for performing				
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL						
Offer in 2019 - 2020	N Offer in 2020 - 2021 : N	Examination					
Grade Descriptors	A Demonstrate thorough mastery at an advanced level of extensive knowledge learning outcomes. Show strong analytical and critical abilities and logical thinki						

(A+ to F)	to apply kno	owledge to a wide range of complex, familiar an all skills.	nd unfamiliar situations. Apply highly effort	ective 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.				
	outcomes. S	e general but incomplete command of knowled Show evidence of some analytical and critical ab tions. Apply moderately effective organizational a	pilities and logical thinking, and ability to		
	Show eviden	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.			
	of analytical	e little or no evidence of command of knowledge and critical abilities, logical and coherent thin rganization and presentational skills are minimally	king. Show very little or no ability to a		
Course Type	Lecture-based course	•			
Course Teaching	Activities	Details	Details		
& Learning Activities	Lectures				
	Tutorials	inlcuding demonstration (inlcuding demonstration (12 hours)		
	Reading / Self study				
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignments	essay & student presenta	tions 70	CLO 1,2,3,4	
	Examination		30	CLO 1,2,3,4	
Required/recommended reading and online materials	T. Lister and H. Blume S. T. Beckett: The Sci R. L. Wolke: What Eir Peter Barham: The S Cook (Exploratorium,	examination ecture notes provided by Course Coordinator . Lister and H. Blumenthal: Kitchen Chemistry (Royal Society of Chemistry, 2005) . T. Beckett: The Science of Chocolate (Royal Society of Chemistry, 2005) .t. L. Wolke: What Einstein Told His Cook (W.W. Norton & Company Inc., New York, 2002 eter Barham: The Science of Cooking (Springer-Verlag, Berlin, 2001) A. Gardiner and S. Wilson: The Introduced Cooking (Springer-Verlag, Berlin, 2001) Look (Exploratorium, Henry Holt and Company, LLC, New York, 1998) L. McGee: On food and cooking: The Science and Lore of the Kitchen (HarperCollins Publishers, London,			

	Problem s	solving in physic	s (6 credits)		Academic Y	'ear 2019	
Offering Department	Physics		•		Quota		
Course Co-ordinator	Dr M K Yip,	Physics (mankit@hk	ku.hk)				
Teachers Involved	(Dr M K Yip	,Physics)					
Course Objectives	This is the first course in our course series that introduces problem solving, mathematical and computational skill sets that are commonly used in the study of university-level physics. Instead of adopting a cookbook approach, we focus on training students how to think and work as physicists through tackling simple physics problems by both analytical and numerical means. After completion, interested students may take the second level courses in this series, namely, PHYS2150 and/or PHYS2155 and/or PHYS2160. (Knowledge of Module 1 or Module 2 in HKDSE Mathematics, or MATH1011, or equivalent is advantageous, though not required.)						
Course Contents & Topics	This course trains students to think and act as physicists by introducing basic problem solving, mathematical and computational skills that are commonly used in the study of university-level physics. Topics include: the use of vectors and their operations, differentiation, integration, differential equations, several variables differentiation, matrix operation, complex numbers, and rudiment of numerical methods in tackling simple physics problems. Basic MATLAB commands will be introduced and used in this course.						
Course Learning	On success	ful completion of this	course, students should	d be able to:			
Outcomes	read	d physics	by the language of math	nematics and empl	oy mathematical lo	ogic and reasoning	
		ly calculus to solve p		hyeice ac well ac	nlan and coloct an	proprieto toolo who	
	CLO 3 review the features of various solving tools in physics as well as plan and select appropriate tools when solving physical problems						
	CLO 4 describe the connections between mathematical equations and physical problems						
	CLO 5 formulate and operate physical problems both qualitatively and quantitatively						
	CLO 6 interpret and judge the physical meaning of result after calculations						
Pre-requisites			• •		3		
(and Co-requisites and Impermissible combinations)	Level 3 or a	bove in HKDSE Phys	sics or equivalent, or Pa				
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020	Level 3 or a	bove in HKDSE Physe em 2nd sem Offe	sics or equivalent, or Pa r in 2020 - 2021 : Y	ss in PHYS1240	Examinatio	,	
Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	Y 1st se	bove in HKDSE Physem 2nd sem Offe Demonstrate thorough malearning outcomes. Show	sics or equivalent, or Pa	ss in PHYS1240 of extensive knowledg	Examinatio Judge and skills required for the skills required for the skills required to the skills are the sk	or attaining all the cour	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Y 1st sc A	em 2nd sem Offe Demonstrate thorough me learning outcomes. Show to apply knowledge to a presentational skills. Demonstrate substantial of learning outcomes. Show	sics or equivalent, or Pa r in 2020 - 2021 : Y astery at an advanced level strong analytical and critical	ss in PHYS1240 of extensive knowledg abilities and logical thin illiar and unfamiliar situ f knowledge and skills ical abilities and logical	Examination be and skills required fount in the skills required for attaining a thinking, and ability to a skills in the skills	or attaining all the coun- original thought, and abil ffective organizational and at least most of the cour	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Y 1st sc A B C	em 2nd sem Offe Demonstrate thorough ma learning outcomes. Show to apply knowledge to a presentational skills. Demonstrate substantial of learning outcomes. Show and some unfamiliar situat Demonstrate general but outcomes. Show evidence	sics or equivalent, or Pa r in 2020 - 2021 : Y astery at an advanced level strong analytical and critical wide range of complex, fam command of a broad range o evidence of analytical and crit	of extensive knowledge abilities and logical thin liliar and unfamiliar situ f knowledge and skills ical abilities and logical tional and presentation owledge and skills recal abilities and logical total abilities and logical abilitie	Examination le and skills required fount in the skills required for attaining at thinking, and ability to all skills. The skills required for attaining mothinking, and ability to all skills.	or attaining all the counoriginal thought, and abilifective organizational at tleast most of the courapply knowledge to families of the course learning the course learning or the cour	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Y 1st sc A B C D	em 2nd sem Offe Demonstrate thorough ma learning outcomes. Show to apply knowledge to a presentational skills. Demonstrate substantial of learning outcomes. Show and some unfamiliar situat Demonstrate general but outcomes. Show evidence familiar situations. Apply n Demonstrate partial but lin Show evidence of some or	r in 2020 - 2021 : Y astery at an advanced level strong analytical and critical and critical wide range of complex, fam command of a broad range of evidence of analytical and criticons. Apply effective organiza incomplete command of kn e of some analytical and critical and crit	of extensive knowledg abilities and logical thin iliar and unfamiliar situ f knowledge and skills ical abilities and logical tional and presentation owledge and skills recal abilities and logical onal and presentational e and skills required for but with limited analytics ut with limited analytics the skills required for but with limited analytics.	Examination The and skills required for attaining at thinking, and ability to a la skills. The attaining some of the attaining some of the attaining some of the attaining some of the attaining and critical abilities. See The attaining some of the attaining some	or attaining all the cour- original thought, and abilifective organizational at at least most of the cour- apply knowledge to familial or the course learning apply knowledge to mo- course learning outcomes thow limited ability to apply	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Y 1st sc A B C D Fail	em 2nd sem Offe Demonstrate thorough ma learning outcomes. Show to apply knowledge to a presentational skills. Demonstrate substantial of learning outcomes. Show and some unfamiliar situat Demonstrate general but outcomes. Show evidence familiar situations. Apply in Demonstrate partial but lif Show evidence of some of knowledge to solve proble Demonstrate little or no ev of analytical and critical	ir in 2020 - 2021 : Y astery at an advanced level strong analytical and critical wide range of complex, fam command of a broad range o evidence of analytical and crit tions. Apply effective organizat incomplete command of kn e of some analytical and crit noderately effective organizat mited command of knowledge oherent and logical thinking, b	of extensive knowledg abilities and logical thin liliar and unfamiliar situ f knowledge and skills ical abilities and logical tional and presentation owledge and skills recal abilities and logical onal and presentational e and skills required for out with limited analytica ective organizational ar edge and skills required thinking. Show very	Examination the and skills required foliations. Apply highly effectively required for attaining at thinking, and ability to a laskills. quired for attaining monothinking, and ability to laskills. attaining some of the all and critical abilities. Sond presentational skills. d for attaining the cours little or no ability to a	or attaining all the counoriginal thought, and abilifective organizational at least most of the courapply knowledge to familiate of the course learning apply knowledge to moccourse learning outcomes the learning outcomes. Last of the course learning outcomes the learning outcomes.	
and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	Y 1st sc A B C D Fail	em 2nd sem Offe Demonstrate thorough ma learning outcomes. Show to apply knowledge to a presentational skills. Demonstrate substantial of learning outcomes. Show and some unfamiliar situat Demonstrate general but outcomes. Show evidence familiar situations. Apply n Demonstrate partial but lin Show evidence of some oc knowledge to solve proble Demonstrate little or no eo of analytical and critical problems. Organization an	ir in 2020 - 2021 : Y astery at an advanced level strong analytical and critical wide range of complex, fam command of a broad range o evidence of analytical and criti tions. Apply effective organizat incomplete command of kn e of some analytical and criti noderately effective organizat mited command of knowledge oherent and logical thinking, b ms. Apply limited or barely eff vidence of command of knowl abilities, logical and coherer	of extensive knowledg abilities and logical thin liliar and unfamiliar situ f knowledge and skills ical abilities and logical tional and presentation owledge and skills recal abilities and logical onal and presentational e and skills required for out with limited analytica ective organizational ar edge and skills required thinking. Show very	Examination the and skills required foliations. Apply highly effectively required for attaining at thinking, and ability to a laskills. quired for attaining monothinking, and ability to laskills. attaining some of the all and critical abilities. Sond presentational skills. d for attaining the cours little or no ability to a	or attaining all the counoriginal thought, and abilifective organizational at least most of the courapply knowledge to familiate of the course learning apply knowledge to moccourse learning outcomes the learning outcomes. Last of the course learning outcomes the learning outcomes.	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching	Y 1st sc A B C D Fail	em 2nd sem Offe Demonstrate thorough ma learning outcomes. Show to apply knowledge to a presentational skills. Demonstrate substantial of learning outcomes. Show and some unfamiliar situat Demonstrate general but outcomes. Show evidence familiar situations. Apply n Demonstrate partial but lin Show evidence of some oc knowledge to solve proble Demonstrate little or no eo of analytical and critical problems. Organization an	ir in 2020 - 2021 : Y astery at an advanced level strong analytical and critical wide range of complex, fam command of a broad range o evidence of analytical and criti tions. Apply effective organizat incomplete command of kn e of some analytical and criti noderately effective organizat mited command of knowledge oherent and logical thinking, b ms. Apply limited or barely eff vidence of command of knowl abilities, logical and coherer	of extensive knowledg abilities and logical thin liliar and unfamiliar situ f knowledge and skills ical abilities and logical tional and presentation owledge and skills recal abilities and logical onal and presentational e and skills required for out with limited analytica ective organizational ar edge and skills required thinking. Show very	Examination the and skills required foliations. Apply highly effectively required for attaining at thinking, and ability to a laskills. quired for attaining monothinking, and ability to laskills. attaining some of the all and critical abilities. Sond presentational skills. d for attaining the cours little or no ability to a	or attaining all the counoriginal thought, and abilifective organizational at least most of the courapply knowledge to familiate of the course learning apply knowledge to moccourse learning outcomes the learning outcomes. Last of the course learning outcomes the learning outcomes.	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching	Y 1st sc A B C D Fail Lecture-base	em 2nd sem Offe Demonstrate thorough ma learning outcomes. Show to apply knowledge to a presentational skills. Demonstrate substantial of learning outcomes. Show and some unfamiliar situat Demonstrate general but outcomes. Show evidence familiar situations. Apply n Demonstrate partial but lin Show evidence of some oc knowledge to solve proble Demonstrate little or no eo of analytical and critical problems. Organization an	r in 2020 - 2021 : Y astery at an advanced level strong analytical and critical wide range of complex, fam command of a broad range o evidence of analytical and criti tions. Apply effective organizat incomplete command of kn e of some analytical and criti noderately effective organizat mited command of knowledge oherent and logical thinking, t ims. Apply limited or barely eff vidence of command of knowl abilities, logical and coheren d presentational skills are min	of extensive knowledg abilities and logical thin liliar and unfamiliar situ f knowledge and skills ical abilities and logical tional and presentation owledge and skills recal abilities and logical onal and presentational e and skills required for out with limited analytica ective organizational ar edge and skills required thinking. Show very	Examination the and skills required foliations. Apply highly effectively required for attaining at thinking, and ability to a laskills. quired for attaining monothinking, and ability to laskills. attaining some of the all and critical abilities. Sond presentational skills. d for attaining the cours little or no ability to a	or attaining all the cour- original thought, and abil ffective organizational al at least most of the cour- apply knowledge to famil ast of the course learning apply knowledge to mo course learning outcome show limited ability to api se learning outcomes. La apply knowledge to solve	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching	Y 1st so A B C D Fail Lecture-bas Activities	em 2nd sem Offe Demonstrate thorough ma learning outcomes. Show to apply knowledge to a presentational skills. Demonstrate substantial of learning outcomes. Show and some unfamiliar situat Demonstrate general but outcomes. Show evidence familiar situations. Apply n Demonstrate partial but lin Show evidence of some oc knowledge to solve proble Demonstrate little or no eo of analytical and critical problems. Organization an	r in 2020 - 2021 : Y astery at an advanced level strong analytical and critical wide range of complex, fam command of a broad range o evidence of analytical and criti tions. Apply effective organizat incomplete command of kn e of some analytical and criti noderately effective organizat mited command of knowledge oherent and logical thinking, t ims. Apply limited or barely eff vidence of command of knowl abilities, logical and coheren d presentational skills are min	of extensive knowledg abilities and logical thin liliar and unfamiliar situ f knowledge and skills ical abilities and logical tional and presentation owledge and skills recal abilities and logical onal and presentational e and skills required for out with limited analytica ective organizational ar edge and skills required thinking. Show very	Examination the and skills required foliations. Apply highly effectively required for attaining at thinking, and ability to a laskills. quired for attaining monothinking, and ability to laskills. attaining some of the all and critical abilities. Sond presentational skills. d for attaining the cours little or no ability to a	or attaining all the cour- original thought, and abil ffective organizational al at least most of the cour- apply knowledge to famil ast of the course learning apply knowledge to mo course learning outcome show limited ability to apply the learning outcomes. La apply knowledge to solve	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Y 1st sc A B C D Fail Lecture-bas Activities Lectures	em 2nd sem Offe Demonstrate thorough me learning outcomes. Show to apply knowledge to a presentational skills. Demonstrate substantial of learning outcomes. Show and some unfamiliar situat Demonstrate general but outcomes. Show evidence familiar situations. Apply n Demonstrate partial but lir Show evidence of some o knowledge to solve proble Demonstrate little or no ev of analytical and critical problems. Organization an	r in 2020 - 2021 : Y astery at an advanced level strong analytical and critical wide range of complex, fam command of a broad range o evidence of analytical and criti tions. Apply effective organizat incomplete command of kn e of some analytical and criti noderately effective organizat mited command of knowledge oherent and logical thinking, t ims. Apply limited or barely eff vidence of command of knowl abilities, logical and coheren d presentational skills are min	of extensive knowledg abilities and logical thin liliar and unfamiliar situ f knowledge and skills ical abilities and logical tional and presentation owledge and skills recal abilities and logical onal and presentational e and skills required for out with limited analytica ective organizational ar edge and skills required thinking. Show very	Examination the and skills required foliations. Apply highly effectively required for attaining at thinking, and ability to a laskills. quired for attaining monothinking, and ability to laskills. attaining some of the all and critical abilities. Sond presentational skills. d for attaining the cours little or no ability to a	or attaining all the councidinal thought, and abilifective organizational at least most of the councidinal theorem is apply knowledge to families apply knowledge to mocourse learning outcomes thow limited ability to apply knowledge to software the course learning outcomes. Lapply knowledge to software the course learning outcomes are the course learning outcomes. Lapply knowledge to software the course learning the course learni	

	Assignments	Including computational assignments	20	CLO 1,2,3,4,5,6
	Examination	2-hour written exam	50	CLO 1,2,3,4,5
	Test		30	CLO 1,2,3,4,5
Required/recommended reading and online materials	Lecture notes provided by Course R. Shankar: Basic Training in Matt Steven C. Chapra: Applied Numer 2017, 4th edition) Joel R. Hass, Maurice D. Weir, at 2015, 3rd edition)	nematics - A Fitness Program for ical Methods with MATLAB for E	ngineers and Scientists (Mo	,
Course Website	http://moodle.hku.hk			

PHYS1240	Physics	by inquiry (6 credi	ts)	Academic Year	2019		
Offering Department	Physics			Quota			
Course Co-ordinator	Dr M Su, Physics (mengsu84@hku.hk)						
Teachers Involved	(Dr M Su,Physics)						
Course Objectives	This course aims at providing students a solid background and knowledge in physics as well as its connection with our daily life phenomena and activities. It is targeted to those with little physics background and is conducted with no descriptions in differential and integral calculus. After completing this course, interested students may move or to take PHYS1150 or PHYS1250.						
Course Contents & Topics	The course has a general coverage in most physics topics and is conducted with no descriptions in differential and integral calculus. Emphasis will be stressed on the understanding of various physical phenomena in daily life through qualitative and simple quantitative analysis. The course contents cover: Mechanics, Heat, Optics, Waves, Electricity and Magnetism.						
Course Learning	On succes	ssful completion of this	course, students should be able to:				
Outcomes	CLO 1	lescribe and distinguish	the concepts and principles in introd	luctory study of physics			
	CLO 2 r	ecognize the underlying	g physical principles behind various o	laily life phenomena			
	CLO 3 e	explain physical phenon	nena using proper physical laws and	theories			
	CLO 4	apply simple mathemati	cal techniques for quantitative analys	sis in solving physics proble	ms		
Pre-requisites (and Co-requisites and Impermissible combinations)	Not for stu Not for stu and						
Offer in 2019 - 2020		I sem Offer in 2020 - 2	d in any level 2 PHYS course or abo [,] 2021 · 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 abilities						
	В	to apply knowledge to 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.					
	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 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.						
Course Type	Lecture-ba	ased course	a procentiational office and minimally encourse				
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures	•			36		
y	Tutorials				12		
		Self study			80		
Assessment Methods and Weighting	Methods	cociacy	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		2-hour written exam	50	CLO 1,2,3,4		
	Test			25	CLO 1,2,3,4		
Required/recommended	Lecture no	otes provided by Course	Coordinator				
reading and online materials	Paul G. H	ewitt: Conceptual Physi	Johnson: Introduction to Physics (Jolics (Addison Wesley, 2009, 11th edit	ion))		
	Raymond	A. Serway and Chris v	uille: College Physics (Brooks Cole, :	2011. 9th edition)			

PHYS1250	Fundamental physics (6 credits)	Academic Year	2019			
Offering Department	Physics Quota -					
Course Co-ordinator	Dr J H C Lee, Physics (jleehc@hku.hk)					
Teachers Involved	(Dr F C C Ling,Physics) (Dr J H C Lee,Physics)					
Course Objectives	This is the first physics course for those who want to minor in physics or astrono to have an overview in physics. It covers the fundamental blocks in physics in or physics are emphasized and the mathematical treatment is moderate. Those was take this course as one of their astronomy, math/physics or physics major reconstruction.	ne semester. Co vho enter HKU b	nceptual ideas in			
Course Contents & Topics	Topics include: Mechanics, Wave Motions, Geometric and Physical Optics, Thermodynamics, Electromagnetism, and Modern Physics.					
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, to situations of the physical world					

Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	Activitie Lectures Laborate Tutorials Reading Method Assignm Examina Laborate Test	skills and techniques. with laboratory composes scory s g / Self study ls ments ation ory reports	Details Details 2-hour written exam	effective or ineffective. Apply minimally			
Course Teaching & Learning Activities Assessment Methods	Activitie Lectures Laborate Tutorials Reading Method Assignm Examina Laborate	skills and techniques. with laboratory composes s cory g / Self study ls ments ation	Misuse of data and results and/or unable to prent course Details	Weighting in final course grade (%) 10 50 15	No. of Hours 36 6 8 80 Assessment Methods to CLO Mappin: CLO 1,2,3,4 CLO 1,2,3 CLO 1,4		
Course Teaching & Learning Activities Assessment Methods	Activitie Lectures Laborate Tutorials Reading Method Assignm Examina	skills and techniques. with laboratory composes s cory g / Self study ls ments ation	Misuse of data and results and/or unable to prent course Details	Weighting in final course grade (%)	No. of Hours 36 6 8 80 Assessment Methods to CLO Mappin: CLO 1,2,3,4 CLO 1,2,3		
Course Teaching & Learning Activities Assessment Methods	Activitie Lectures Laborate Tutorials Reading Method	skills and techniques. with laboratory composes s cory g / Self study ls	Misuse of data and results and/or unable to prent course Details	Weighting in final course grade (%)	No. of Hours 36 6 8 80 Assessment Methods to CLO Mappin		
Course Teaching & Learning Activities Assessment Methods	Activitie Lectures Laborate Tutorials Reading Method	skills and techniques. with laboratory composes s ory s g / Self study	Misuse of data and results and/or unable to conent course Details	effective or ineffective. Apply minimally on the draw appropriate conclusions. Weighting in final course grade (%)	No. of Hours 36 6 8 80 Assessment Methods to CLO Mapping		
Course Teaching & Learning Activities	Activitie Lectures Laborate Tutorials Reading	skills and techniques. with laboratory composes s ory s g / Self study	Misuse of data and results and/or unable to conent course Details	offective or ineffective. Apply minimally on the diffective or ineffective	No. of Hours 36 6 8 80		
Course Teaching	Activities Lectures Laborate Tutorials	skills and techniques. with laboratory composes s ory s	Misuse of data and results and/or unable tonent course	effective or ineffective. Apply minimally	No. of Hours 36 6 8		
Course Teaching	Activitie Lectures Laborate	skills and techniques. with laboratory composes s ory	Misuse of data and results and/or unable tonent course	effective or ineffective. Apply minimally	No. of Hours 36 6		
Course Teaching	Activitie Lectures	skills and techniques. with laboratory composes s	Misuse of data and results and/or unable tonent course	effective or ineffective. Apply minimally	No. of Hours		
Course Teaching		skills and techniques. with laboratory compo	Misuse of data and results and/or unable tonent course	effective or ineffective. Apply minimally	No. of Hours		
	Lecture	skills and techniques.	Misuse of data and results and/or unable t	effective or ineffective. Apply minimally			
				effective or ineffective. Apply minimally			
	Fail	knowledge to solve pr lab skills and techniqu Demonstrate little or n of analytical and criti	ne coherent and logical thinking, but with li oblems. Apply limited or barely effective es. Limited ability to use data and results t o evidence of command of knowledge and cal abilities, logical and coherent thinkin	organizational and presentational skills to draw appropriate conclusions. d skills required for attaining the course	s. Apply partially effective learning outcomes. Lac		
	D	familiar situations. App techniques. Mostly cor Demonstrate partial by	oly moderately effective organizational an rect but some erroneous use of data and i ut limited command of knowledge and ski	nd presentational skills. Apply moderate results to draw appropriate conclusions. ills required for attaining some of the co	ely effective lab skills an ourse learning outcome		
	С	Correct use of data of Demonstrate general	ituations. Apply effective organizational ar results to draw appropriate conclusions. but incomplete command of knowledge ence of some analytical and critical abiliti	and skills required for attaining most	t of the course learnin		
	В	learning outcomes. Sh	ial command of a broad range of knowle ow evidence of analytical and critical abilit	ties and logical thinking, and ability to ap	pply knowledge to familia		
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						
Offer in 2019 - 2020	Y 1s	. Ist som End som Silver in 2020 2021.1.					
and Impermissible combinations)	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.						
(and Co-requisites	Level 3 or above in HKDSE Physics or equivalent, or Pass in PHYS1240; and						
Pre-requisites	Level 3 c	CLO 4 acquire and interpret experimental data to examine the physical laws					

PHYS1650	Nature o	f the universe (6 credits		Academic Year	2019		
Offering Department	Physics	Physics Quota					
Course Co-ordinator	Dr K M Lee, Physics (kmlee @lily.physics.hku.hk)						
Teachers Involved	(Dr K M Lee, Physics)						
Course Objectives	in our seri for astron	This is an introductory course in astronomy for students in all disciplines and all years. This is also the first course in our series of two compulsory courses to introduce basic astronomy knowledge, methods and recent advances for astronomy minor. No prior knowledge in astronomy, physics, and higher mathematics is required, but will help. After completing this course, interested students may take the second course in this series, namely,					
Course Contents & Topics	our solar provides s	system, and our own Sun, udents with a basic understa	stars and their evolution	ncluding constellations and plane on, galaxies, blackholes, and or of astronomy to life and how ou yely in the night sky observations	osmology. It also ir nature works o		
Course Learning	On succes	sful completion of this course	, students should be able	e to:			
Outcomes	CLO 1 identify and describe the major objects in our Solar System and our universe (including stars and galaxies), and explain their main properties						
	CLO 2 us	the celestial sphere model to	describe the apparent t	trajectories of celestial objects			
	CLO 3 review the evolution of the world-view from the geocentric model to the heliocentric model and the discovery of the expansion of the universe on our world-view						
	CLO 4 apply quantitative physical laws, including Kepler's three laws of planetary motion, Newton's law of universal gravitation, Doppler shift formula and Hubble's law to calculate and solve simple astronomical problems						
	CLO 5 explain the evolution of stars and the evolution of the universe						
	CLO 6 communicate astronomical problems and solutions using appropriate astronomical terminology and good English						
Pre-requisites (and Co-requisites and Impermissible combinations)	NIL						
Offer in 2019 - 2020	Y 1st	sem 2nd sem Offer in 202	0 - 2021 : Y	Examination	Dec May		
Grade Descriptors (A+ to F)	Α	Demonstrate thorough mastery at learning outcomes. Show strong ar to apply knowledge to a wide range	alytical and critical abilities an ge of complex, familiar and u	ve knowledge and skills required for at d logical thinking, with evidence of origin nfamiliar situations. Apply highly effective chiques. Critical use of data and resul	taining all the course all thought, and ability we organizational and		
	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 observation skills and techniques. Correct use of data of results to draw appropriate conclusions.						

Course Website	http://moodle.hku.hk					
Required/recommended reading and online materials	E. Chaisson and S. McMillan	n: Astronomy Today (Pearson, 201	1)			
	Test		25	CLO 1,2,3,4,5,6		
	Examination	2-hour written exam	50	CLO 1,2,3,4,5,6		
	Assignments		25	CLO 1,2,3,4,5,6		
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Reading / Self study			64		
	Tutorials			8		
_	Laboratory					
& Learning Activities	Lectures					
Course Teaching	Activities	Details				
Course Type	Lecture with laboratory com-	ponent course				
	of analytical and cri problems. Organizat	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 observation skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions.				
	Show evidence of so knowledge to solve observation skills and	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.				
	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course lea 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. Apply moderately effective observ skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.					

PHYS2055	Introdu	ctory relativity (6 cr	edits)	Academic Yea	ar 2019		
Offering Department	Physics			Quota			
Course Co-ordinator	Dr K M L	ee, Physics (kmlee@lily	.physics.hku.hk)				
Teachers Involved	(Dr K M L	Or K M Lee,Physics)					
Course Objectives	in all disc	his course aims at introducing students the essence of special relativity. It is designed as an elective for studen all disciplines and all years with science background. It is also a discipline elective for the physics major/min and astronomy minor. Completion of this course is one of the pre-requisites for PHYS4653 and PHYS4654.					
Course Contents & Topics	Examples	opics include: "Common-sense" concepts of space and time versus Einstein's conceptions of space and time versus Einstein's conceptions of space and time kamples of time dilation and space contraction, Paradoxes of relativity including the famous twin paradox are "pole-in-the-barn", Four vectors and Lorentz invariant, Some discussion on general relativity.					
Course Learning	On succe	essful completion of this	course, students should be abl	e to:			
Outcomes	CLO 1	recall the setup and si	ignificance of Michelson-Morley	experiment			
	CLO 2	state the basic postula	ates and the spacetime concep	t of special relativity			
	CLO 3	explain time dilation a	nd length contraction				
	CLO 4	describe Lorentz trans	sformation and its applications				
	CLO 5	state the resolution of	the twin and pole-in-the-barn p	aradoxes			
Pre-requisites (and Co-requisites and Impermissible combinations)		PHYS1050 or PHYS1150	0 or PHYS1250 or ENGG1300				
Offer in 2019 - 2020	Y 2n	d sem Offer in 2020 -	2021 : 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						
	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	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.						
Course Type	Lecture-b	ased course					
Course Teaching	Activitie	S	Details		No. of Hours		
& Learning Activities	Lectures				36		
=	Tutorials				8		
		/ Self study			80		
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignm	ents		25	CLO 2,4		
	Examina		2-hour written exam	50	CLO 1,2,3,4,5		
	Test				CLO 1,2,3,4,5		
Required/recommended reading and online materials	Lecture n Robert R 1992, 2nd	ecttre notes provided by Course Coordinator obert Resnick and David Halliday: Basic Concepts in Relativity and Early Quantum Theory (992, 2nd revised edition) dwin F. Taylor and John A. Wheeler: Spacetime Physics: Introduction to Special Relativity (W. H.					
	2nd edition	n)					

PHYS2150	Methods	s in physics I (6 cre	dits)	Academic Ye	ear 2019	
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 one of the second level courses 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. Instead of the cookbook approach, we focus on training students how to think and work as physicists through tackling simple physics problems by both analytical and numerical means. After completion, interested students may take the other second level courses in this series PHYS2155 and/or PHYS2160 or the third level course in this series PHYS3150.					
Course Contents & Topics	This course introduces the principles and theories of various mathematical methods and skills that are essential for 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			course, students should be able to			
Outcomes	CLO 1 re	eview the theory and prir	nciples of mathematical methods	and compare the features o	f various methods	
	CLO 2 de	escribe the connections	between mathematical equations	and physical problems		
	CLO 3 st	tate and set up mathema	atical equations to describe the dy	namics and evolution of ph	ysics systems	
	CLO 4 de	emonstrate knowledge o	of choosing correct solution of ma	thematical equations		
	CLO 5 so	olve various problems a	nd operate the calculations with c	omputer		
	CLO 6 in	terpret and judge the ph	nysical meaning of result after cal	culations		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in M	IATH1013 or MATH182 [.]	1 or MATH1851 or PHYS1150			
Offer in 2019 - 2020	Y 1st	sem Offer in 2020 - 2	021 · V	Examination	Dec	
Grade Descriptors	Α					
(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 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.					
	Fail	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.				
	i dii	of analytical and critical a	ibilities, logical and coherent thinking. S I presentational skills are minimally effecti	how very little or no ability to a		
Course Type	_	ased course				
Course Teaching	Activities	S	Details		No. of Hours	
& 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		Including computational assignments	20	CLO 1,2,3,4,5,6	
	Examinat	tion	2-hour written exam	50	CLO 2,3,4	
	Test			30	CLO 1,2,3,4	
Required/recommended reading and online materials	Susan J. Allen B. D Joel Hass 2016, 3rd K. F. Riley Guide (Ca Murray R					
Course Woheite	Education	. ,				
Course Website	nπp://mod	odle.hku.hk				

PHYS2155	Methods in physics II (6 credits)	Academic Year	2019
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 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-lever approach, we focus on training students how to think and work as physicist problems by both analytical and numerical means. After completion, interested level courses in this series PHYS2150 and/or PHYS2160 or the third level courses.	el physics. Instead ts through tackling students may take	of the cookbook g simple physics the other second
Course Contents & Topics	This course introduces the principles and theories of various mathematical met studying university physics. Topics include: matrices and vector spaces, syster systems of linear differential equations, Line integrals, surface integrals and vol further numerical computation techniques in physics. Applications to physic problems solving skills are discussed. Further MATLAB programming will be in	ns of linear algebra ume integrals, Fou cal systems and	aic equations and Irier analysis, and various practical
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 review the theory and principles of mathematical methods and compare CLO 2 describe the connections between mathematical equations and physica		rious methods

	CLO 3 st	ate and set up mathema	tical equations to describe the	e dynamics and evolution of p	hysics systems
			f choosing correct solution of		,
			nd operate the calculations with		
			ysical meaning of result after		
Pre-requisites			or MATH1851 or PHYS1150		
(and Co-requisites and Impermissible combinations)	1 433 11 10	7.1111010 01 W/X1111021	GI WINTI TOOT GITTITI GITTOO		
Offer in 2019 - 2020	Y 2nd	l sem Offer in 2020 - 2	021 : Y	Examinatio	n May
Grade Descriptors (A+ to F)	A	learning outcomes. Show st to apply knowledge to familia	tery at an advanced level of extens rong analytical and critical abilities al ar and unfamiliar situations. Apply hig	nd logical thinking, with evidence of phly effective organizational and pres	original thought, and ability entational skills.
	В	learning outcomes. Show ev	mmand of a broad range of knowled idence of analytical and critical abilitions. Apply effective organizational and	es and logical thinking, and ability to	
	С	outcomes. Show evidence	ncomplete command of knowledge of some analytical and critical abilitie derately effective organizational and	es and logical thinking, and ability to	
	D	Show evidence of some coh	ted command of knowledge and skill terent and logical thinking, but with lir s. Apply limited or barely effective org	mited analytical and critical abilities.	Show limited ability to apply
	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.				
Course Type	Lecture-b	ased course			
Course Teaching	Activities	3	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 computational assignments	20	CLO 1,2,3,4,5,6
	Examinat	ion	2-hour written 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 Guide (Ca Murray R	ownéy: Physical Modelii V. Goode and Scott A. A s, Maurice D. Weir, and edition) ble: Linear Algebra: A Mo y, M. P. Hobson, and S. ambridge University Pres s. Spiegel: Schaum's C	Pearson, 2011, 4th edition) ng in MATLAB (Green Tea Preunin: Differential Equations are George B. Thomas Jr.: Universell Introduction (Cengage L. J. Bence: Mathematical Metho	nd Linear Algebra (Pearson, 2 versity Calculus: Early Trans Learning, 2015, 4th edition) ods for Physics and Engineer	cendentals (Pearson, ing: A Comprehensive
Course Website	Education	dle.hku.hk			
ourse website	mup.//mod	ule.liku.lik			

PHYS2160	Introduct	tory computational physics (6 credits) Academic Year	2019		
Offering Department	Physics	Quota	30		
Course Co-ordinator	Dr F K Cho	ow, Physics (judychow@hku.hk)			
Teachers Involved	(Dr F K Ch	ow,Physics)			
Course Objectives	computatio computatio language. physical pr	of the second level courses in our series of courses that introduces problem solving, real skill sets that are commonly used in the study of university-level physics. This control tools, techniques, and methods in physics and related fields using the Pythos Students are expected to spend a substantial amount of time in writing computer problems. After completion, interested students may take the sequel courses PHYS315 to further their studies in computational physics.	course introduces on programming rograms to solve		
Course Contents & Topics	with Pythor and SciPy; projectile r	ude: basics of computer programming; Python programming for physicists; graphics n; introduction to object-oriented programming in Python; scientific programming with M; simple error analysis in scientific programming; solution of non-linear equations w notion; Calculus and numerical methods with relevant examples in physics; nume ferential equations with application to planetary motion; Monte Carlo simulations in phy	latplotlib, NumPy ith application to erical solution of		
Course Learning	On success	sful completion of this course, students should be able to:			
Outcomes	CLO 1 der	monstrate knowledge in basic computational techniques and methods in physics			
	CLO 2 app	ply Python programming language and relevant packages to solve simple physical prob	lems		
	CLO 3 employ appropriate numerical methods for solving ordinary differential equations that commonly arise in physics				
	CLO 4 rev	iew the numerical methods for simulation of various physical systems			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in MA	ATH1013 or MATH1821 or MATH1851 or PHYS1150			
Offer in 2019 - 2020	Y 2nd	sem Offer in 2020 - 2021 : Y Examination	May		
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for atta learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of origina to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective presentational skills. Apply highly effective lab skills and techniques. Critical use of data and results to dissipliful conclusions.	al thought, and ability e organizational and		
	В	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at leas learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply and some unfamiliar situations. Apply effective organizational and presentational skills. Apply effective labs correct use of data of results to draw appropriate conclusions.	knowledge to familiar		

	outcomes. Show exfamiliar situations. A techniques. Mostly	ral but incomplete command of knowledge a vidence of some analytical and critical abilities Apply moderately effective organizational and correct but some erroneous use of data and re-	s and logical thinking, and ability to a presentational skills. Apply moderate sults to draw appropriate conclusions.	apply knowledge to most ly effective lab skills and
	Show evidence of s knowledge to solve	I but limited command of knowledge and skills some coherent and logical thinking, but with lim problems. Apply limited or barely effective or ques. Limited ability to use data and results to	ited analytical and critical abilities. Sh ganizational and presentational skills	ow limited ability to apply
	of analytical and c	ir no evidence of command of knowledge and sirritic evidential abilities, logical and coherent thinking, attion and presentational skills are minimally effices. Misuse of data and results and/or unable to	Show very little or no ability to apective or ineffective. Apply minimally	oply knowledge to solve
Course Type	Lecture with laboratory com	nponent course		
Course Teaching	Activities	Details		No. of Hours
& Learning Activities	Lectures			36
	Laboratory			18
	Project work			12
	Reading / Self study	Reading / Self study		64
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Examination	2-hour written exam	50	CLO 1,2,3,4
	Laboratory reports		20	CLO 1,2
	Presentation		10	CLO 1,2,3,4
	Project report		20	CLO 1,2,3,4
Required/recommended	Lecture notes provided by (Course Coordinator		
reading and online materials	Nicholas J. Giordano and H Christian Hills: Learning Sc Mark Newman: Computatio Hans Petter Langtangen: A	disao Nakanishi: Computational Physi ientific Programming with Python (Ca anal Physics (CreateSpace Independe Primer on Scientific Programming wi Matplotlib Essentials for Scientists an	mbridge University Press, 201 ent Publishing Platform, 2012) th Python (Springer, 2016, 5th	6) edition)

PHYS2250	Introdu	ctory mechanics (6	credits)	Academic Year	2019	
Offering Department	Physics		•	Quota		
Course Co-ordinator	Dr M K Y	ip, Physics (mankit@hku	ı.hk)			
Teachers Involved	\ \	Yip,Physics) u,Physics)				
Course Objectives	physics fundame chemistr supplem	major, a discipline electi ntal Newtonian mechan y and mathematics. P	is the foundation of Newtonian mecha we for physics minor, as well as an ics concepts and to link them up ward roblem solving and analytical sk is occasionally. Upon completion, in the mechanics.	elective course for those was with their studies in fields ills will be extensively used.	who want to learr like engineering used. They are	
Course Contents & Topics	Conserva Inertia, A Harmoni	Topics include: Kinematics, Newton's Laws of Motion and Their Applications, Linear Momentum and its Conservation, Variable Mass Problems, System of Particles and Centre of Mass, Torque and Rotation, Moment of Inertia, Angular Momentum and its Conservation, Work, Energy and its Conservation, Gravitation, Simple Harmonic Motions, Damped and Driven Oscillations, Wave Equation, Energy in Wave Motion, Interference and the Principle of Superposition.				
Course Learning	On succe	essful completion of this	course, students should be able to:			
Outcomes	CLO 1 c	lescribe and explain the f	undamental physical principles			
	CLO 2 a	apply these principles, too	ether with logical and mathematical	reasoning, to situations of the	he physical world	
	CLO 3 a	nalyse and solve probler	ns with the aids of mathematics	<u> </u>	. ,	
	CLO 4 a	acquire and interpret expe	erimental data to examine the physic	al laws		
(and Co-requisites and Impermissible						
combinations)						
combinations)	Y 1s	t sem 2nd sem Offer	in 2020 - 2021 : Y	Examination	Dec May	
combinations) Offer in 2019 - 2020	Y 1s	Demonstrate thorough mass learning outcomes. Show s to apply knowledge to a w	in 2020 - 2021 : Y stery at an advanced level of extensive kno trong analytical and critical abilities and logic ide range of complex, familiar and unfamili highly effective lab skills and techniques. C	wledge and skills required for att al thinking, with evidence of origina ar situations. Apply highly effectiv	caining all the course al thought, and ability or organizational and	
combinations) Offer in 2019 - 2020 Grade Descriptors		Demonstrate thorough mastearning outcomes. Show s to apply knowledge to a wpresentational skills. Apply insightful conclusions. Demonstrate substantial cc learning outcomes. Show e and some unfamiliar situations.	stery at an advanced level of extensive kno trong analytical and critical abilities and logic- ide range of complex, familiar and unfamilia- highly effective lab skills and techniques. C immand of a broad range of knowledge and vidence of analytical and critical abilities and lones. Apply effective organizational and preser	wledge and skills required for att al thinking, with evidence of originar ar situations. Apply highly effective ritical use of data and results to co- skills required for attaining at leas ogical thinking, and ability to apply	aining all the course al thought, and ability e organizational and draw appropriate and st most of the course knowledge to familiar	
combinations) Offer in 2019 - 2020 Grade Descriptors	Α	Demonstrate thorough mastearning outcomes. Show so to apply knowledge to a way presentational skills. Apply insightful conclusions. Demonstrate substantial cclearning outcomes. Show e and some unfamiliar situatic Correct use of data of result Demonstrate general but in outcomes. Show evidence familiar situations. Apply metals to apply metals outcomes.	stery at an advanced level of extensive kno trong analytical and critical abilities and logic ride range of complex, familiar and unfamilia highly effective lab skills and techniques. C windence of analytical and critical abilities and logical ons. Apply effective organizational and preser is to draw appropriate conclusions. Incomplete command of knowledge and ski of some analytical and critical abilities and logical oderately effective organizational and preser	wledge and skills required for attal thinking, with evidence of originar situations. Apply highly effective ritical use of data and results to consider the skills required for attaining at least opical thinking, and ability to apply national skills. Apply effective labulational skills. Apply effective labulational skills. Apply moderately etational skills. Apply moderately etational skills. Apply moderately etational skills.	aining all the course al thought, and ability ee organizational and draw appropriate and st most of the course knowledge to familiar skills and techniques. the course learning y knowledge to most	
combinations) Offer in 2019 - 2020 Grade Descriptors	В	Demonstrate thorough mas learning outcomes. Show s to apply knowledge to a w presentational skills. Apply insightful conclusions. Demonstrate substantial cc learning outcomes. Show e and some unfamiliar situatic Correct use of data of result outcomes. Show evidence familiar situations. Apply m techniques. Mostly correct to Demonstrate partial but lim Show evidence of some colknowledge to solve probler	stery at an advanced level of extensive kno trong analytical and critical abilities and logic- ide range of complex, familiar and unfamilia- highly effective lab skills and techniques. Command of a broad range of knowledge and vidence of analytical and critical abilities and lons. Apply effective organizational and preser is to draw appropriate conclusions. Incomplete command of knowledge and ski of some analytical and critical abilities and long some some some some some some some some	wledge and skills required for attal thinking, with evidence of originar situations. Apply highly effective ritical use of data and results to consider the skills required for attaining at least origical thinking, and ability to apply natational skills. Apply effective labulational skills. Apply moderately edraw appropriate conclusions. ed for attaining some of the cours allytical and critical abilities. Show tional and presentational skills. Apply moderately edraw appropriate conclusions.	aining all the course at thought, and ability e organizational and draw appropriate and st most of the course knowledge to familiar skills and techniques. the course learning y knowledge to most offective lab skills and see learning outcomes.	
combinations) Offer in 2019 - 2020 Grade Descriptors	A B C	Demonstrate thorough mas learning outcomes. Show s to apply knowledge to a w presentational skills. Apply insightful conclusions. Demonstrate substantial colearning outcomes. Show e and some unfamiliar situatic Correct use of data of resul Demonstrate general but i outcomes. Show evidence familiar situations. Apply m techniques. Mostly correct I Demonstrate partial but lim Show evidence of some colonowledge to solve probler lab skills and techniques. Li Demonstrate little or no evidence of some colonowledge to solve probler lab skills and techniques. Li Demonstrate little or no evidence of some colonowledge to solve probler lab skills and techniques. Li pemonstrate little or no evidence of some colonowledge to solve probler lab skills and techniques. Demonstrate little or no evidence of some colonomic solvent little or no evidence or	stery at an advanced level of extensive kno trong analytical and critical abilities and logic ide range of complex, familiar and unfamilia highly effective lab skills and techniques. Command of a broad range of knowledge and vidence of analytical and critical abilities and leads. Apply effective organizational and present is to draw appropriate conclusions. Incomplete command of knowledge and skill of some analytical and critical abilities and leads oderately effective organizational and present but some erroneous use of data and results to tited command of knowledge and skills requirement and logical thinking, but with limited an Ins. Apply limited or barely effective organizations.	wledge and skills required for attal thinking, with evidence of originar structures. Apply highly effective ritical use of data and results to consider the skills required for attaining at least opical thinking, and ability to apply near thinking, and ability to apply attained skills. Apply effective labels in the skills apply attained skills. Apply moderately edraw appropriate conclusions, and critical abilities. Show the skills and presentational skills. Appropriate conclusions, appropriate conclusions. Sequired for attaining the course leavery little or no ability to apply or ineffective. Apply minimally effective.	aining all the course al thought, and ability e organizational and draw appropriate and st most of the course knowledge to familiar skills and techniques. The course learning y knowledge to most effective lab skills and see learning outcomes. Limited ability to apply poply partially effective rning outcomes. Lack knowledge to solve	
combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	A B C D	Demonstrate thorough mas learning outcomes. Show s to apply knowledge to a w presentational skills. Apply insightful conclusions. Demonstrate substantial colearning outcomes. Show e and some unfamiliar situatic Correct use of data of resul Demonstrate general but i outcomes. Show evidence familiar situations. Apply m techniques. Mostly correct I Demonstrate partial but lim Show evidence of some colonowledge to solve probler lab skills and techniques. Li Demonstrate little or no evidence of some colonowledge to solve probler lab skills and techniques. Li Demonstrate little or no evidence of some colonowledge to solve probler lab skills and techniques. Li pemonstrate little or no evidence of some colonowledge to solve probler lab skills and techniques. Demonstrate little or no evidence of some colonomic solvent little or no evidence or	stery at an advanced level of extensive kno trong analytical and critical abilities and logicitide range of complex, familiar and unfamiliahighly effective lab skills and techniques. Command of a broad range of knowledge and vidence of analytical and critical abilities and lons. Apply effective organizational and presers to draw appropriate conclusions. Incomplete command of knowledge and skill of some analytical and critical abilities and loderately effective organizational and presen but some erroneous use of data and results to ited command of knowledge and skills requirerent and logical thinking, but with limited an ins. Apply limited or barely effective organiza mited ability to use data and results to draw a dence of command of knowledge and skills rebilities, logical and coherent thinking. Show I presentational skills are minimally effective of of data and results and/or unable to draw a dence of data and results and/or unable to draw a	wledge and skills required for attal thinking, with evidence of originar structures. Apply highly effective ritical use of data and results to consider the skills required for attaining at least opical thinking, and ability to apply near thinking, and ability to apply attained skills. Apply effective labels in the skills apply attained skills. Apply moderately edraw appropriate conclusions, and critical abilities. Show the skills and presentational skills. Appropriate conclusions, appropriate conclusions. Sequired for attaining the course leavery little or no ability to apply or ineffective. Apply minimally effective.	aining all the course al thought, and ability e organizational and draw appropriate and st most of the course knowledge to familiar skills and techniques. The course learning y knowledge to most effective lab skills and see learning outcomes. Limited ability to apply poply partially effective rning outcomes. Lack knowledge to solve	
combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching	A B C D	Demonstrate thorough mas learning outcomes. Show s to apply knowledge to a w presentational skills. Apply insightful conclusions. Demonstrate substantial colearning outcomes. Show e and some unfamiliar situatic Correct use of data of result outcomes. Show evidence familiar situations. Apply m techniques. Mostly correct be Demonstrate partial but lim Show evidence of some cole knowledge to solve probler lab skills and techniques. Li Demonstrate little or no evior analytical and critical a problems. Organization and skills and techniques. Misus with laboratory componer	stery at an advanced level of extensive kno trong analytical and critical abilities and logicitide range of complex, familiar and unfamiliahighly effective lab skills and techniques. Command of a broad range of knowledge and vidence of analytical and critical abilities and lons. Apply effective organizational and presers to draw appropriate conclusions. Incomplete command of knowledge and skill of some analytical and critical abilities and loderately effective organizational and presen but some erroneous use of data and results to ited command of knowledge and skills requirerent and logical thinking, but with limited an ins. Apply limited or barely effective organiza mited ability to use data and results to draw a dence of command of knowledge and skills rebilities, logical and coherent thinking. Show I presentational skills are minimally effective of of data and results and/or unable to draw a dence of data and results and/or unable to draw a	wledge and skills required for attal thinking, with evidence of originar structures. Apply highly effective ritical use of data and results to consider the skills required for attaining at least ocical thinking, and ability to apply near thinking, and ability to apply attained skills. Apply effective labels in the skills apply attained skills. Apply moderately edraw appropriate conclusions, and critical abilities. Show the skills and presentational skills. Appropriate conclusions, appropriate conclusions. Sequired for attaining the course leavery little or no ability to apply or ineffective. Apply minimally effective.	aining all the course al thought, and ability e organizational and draw appropriate and st most of the course knowledge to familiar skills and techniques. The course learning y knowledge to most effective lab skills and see learning outcomes. Limited ability to apply poply partially effective rning outcomes. Lack knowledge to solve	
combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching	B C D Fail	Demonstrate thorough mas learning outcomes. Show s to apply knowledge to a w presentational skills. Apply insightful conclusions. Demonstrate substantial coleraming outcomes. Show e and some unfamiliar situatic Correct use of data of result outcomes. Show evidence familiar situations. Apply m techniques. Mostly correct be Demonstrate partial but lim Show evidence of some cole knowledge to solve probler lab skills and techniques. Liberonstrate little or no evion analytical and critical a problems. Organization and skills and techniques. Misus with laboratory componer 1955.	stery at an advanced level of extensive kno trong analytical and critical abilities and logicide range of complex, familiar and unfamiliahighly effective lab skills and techniques. Command of a broad range of knowledge and vidence of analytical and critical abilities and lons. Apply effective organizational and presents to draw appropriate conclusions. Incomplete command of knowledge and skill of some analytical and critical abilities and loderately effective organizational and present out some erroneous use of data and results to tited command of knowledge and skills requirement and logical thinking, but with limited an sms. Apply limited or barely effective organizamited ability to use data and results to draw a dence of command of knowledge and skills rebilities, logical and coherent thinking. Show I presentational skills are minimally effective of et al. I presentational skills are minimally effective of et al. I course	wledge and skills required for attal thinking, with evidence of originar structures. Apply highly effective ritical use of data and results to consider the skills required for attaining at least ocical thinking, and ability to apply near thinking, and ability to apply attained skills. Apply effective labels in the skills apply attained skills. Apply moderately edraw appropriate conclusions, and critical abilities. Show the skills and presentational skills. Appropriate conclusions, appropriate conclusions. Sequired for attaining the course leavery little or no ability to apply or ineffective. Apply minimally effective.	aining all the course at thought, and ability ee organizational and draw appropriate and st most of the course knowledge to familia skills and techniques the course learning y knowledge to most affective lab skills and se learning outcomes. Limited ability to apply partially effective rning outcomes. Lack knowledge to solve ctive or ineffective lab	
Course Type Course Teaching	B C D Fail Lecture (Demonstrate thorough mas learning outcomes. Show s to apply knowledge to a w presentational skills. Apply insightful conclusions. Demonstrate substantial collearning outcomes. Show e and some unfamiliar situatic Correct use of data of resulf Demonstrate general but io outcomes. Show evidence familiar situations. Apply m techniques. Mostly correct to Demonstrate partial but lim Show evidence of some colknowledge to solve probler lab skills and techniques. Liberon problems. Organization and skills and techniques. Misus with laboratory componer as to approblems. Organization and skills and techniques. Misus with laboratory componer as to approblems. Organization and skills and techniques. Misus with laboratory componer as to approblems. Organization and skills and techniques. Misus with laboratory componer as to apply the substantial control of the	stery at an advanced level of extensive kno trong analytical and critical abilities and logicide range of complex, familiar and unfamiliahighly effective lab skills and techniques. Command of a broad range of knowledge and vidence of analytical and critical abilities and lons. Apply effective organizational and presents to draw appropriate conclusions. Incomplete command of knowledge and skill of some analytical and critical abilities and loderately effective organizational and present out some erroneous use of data and results to tited command of knowledge and skills requirement and logical thinking, but with limited an sms. Apply limited or barely effective organizamited ability to use data and results to draw a dence of command of knowledge and skills rebilities, logical and coherent thinking. Show I presentational skills are minimally effective of et al. I presentational skills are minimally effective of et al. I course	wledge and skills required for attal thinking, with evidence of originar structures. Apply highly effective ritical use of data and results to consider the skills required for attaining at least ocical thinking, and ability to apply near thinking, and ability to apply attained skills. Apply effective labels in the skills apply attained skills. Apply moderately edraw appropriate conclusions, and critical abilities. Show the skills and presentational skills. Appropriate conclusions, appropriate conclusions. Sequired for attaining the course leavery little or no ability to apply or ineffective. Apply minimally effective.	aining all the course at thought, and ability ee organizational and draw appropriate and st most of the course knowledge to familia skills and techniques the course learning y knowledge to most affective lab skills and se learning outcomes. Limited ability to apply partially effective rning outcomes. Lack knowledge to solve ctive or ineffective lab.	
combinations) Offer in 2019 - 2020 Grade Descriptors	B C D Fail Lecture (Activitie Lectures)	Demonstrate thorough mas learning outcomes. Show s to apply knowledge to a w presentational skills. Apply insightful conclusions. Demonstrate substantial cot learning outcomes. Show e and some unfamiliar situatic Correct use of data of result Demonstrate general but io outcomes. Show evidence familiar situations. Apply m techniques. Mostly correct be Demonstrate partial but lim Show evidence of some col knowledge to solve probler lab skills and techniques. Li Demonstrate little or no evio of analytical and critical a problems. Organization and skills and techniques. Misus with laboratory componer as some componer of the control	stery at an advanced level of extensive kno trong analytical and critical abilities and logicide range of complex, familiar and unfamiliahighly effective lab skills and techniques. Command of a broad range of knowledge and vidence of analytical and critical abilities and lons. Apply effective organizational and presents to draw appropriate conclusions. Incomplete command of knowledge and skill of some analytical and critical abilities and loderately effective organizational and present out some erroneous use of data and results to tited command of knowledge and skills requirement and logical thinking, but with limited an sms. Apply limited or barely effective organizamited ability to use data and results to draw a dence of command of knowledge and skills rebilities, logical and coherent thinking. Show I presentational skills are minimally effective of et al. I presentational skills are minimally effective of et al. I course	wledge and skills required for attal thinking, with evidence of originar structures. Apply highly effective ritical use of data and results to consider the skills required for attaining at least ocical thinking, and ability to apply near thinking, and ability to apply attained skills. Apply effective labels in the skills apply attained skills. Apply moderately edraw appropriate conclusions, and critical abilities. Show the skills and presentational skills. Appropriate conclusions, appropriate conclusions. Sequired for attaining the course leavery little or no ability to apply or ineffective. Apply minimally effective.	aining all the course at thought, and ability ere organizational and draw appropriate and st most of the course knowledge to familial skills and techniques the course learning y knowledge to most affective lab skills and se learning outcomes. Limited ability to apply partially effective rning outcomes. Lack knowledge to solve ctive or ineffective lab. No. of Hours 36	

Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignments	Including computational 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	Lecture notes provided by Course D. Kleppner and Robert J. Kolenko P.A Tipler and G. Mosca: Physics	ow: An Introduction to Mechanics		ess, 2013, 2nd edition)
Course Website	http://moodle.hku.hk	j ,	,	

Offering Department	Introduc	ctory electricity and	magnetism (6 credits)	Academic Ye	ear 2019	
Offering Department	Physics			Quota		
Course Co-ordinator	Dr J C S F	Pun, Physics <i>(jcspun@h</i>	nku.hk)			
eachers Involved	(Dr J C S	Pun,Physics)				
Course Objectives	for physic fundamen chemistry by numer	es major, a discipline ele ntal electricity and magr and mathematics. Prob	is the foundation of electricity and ictive for physics minor, as well as netism concepts and to link them elem solving and analytical skills w Upon completion, interested study	s an elective course for those up with their studies in fie vill be extensively used. The	se who want to learr lds like engineering ey are supplemented	
Course Contents & Topics	potential;	capacitance and DC	d electric field; Gauss' law and el circuits; magnetic force; magne law; Maxwell's equations; wave n	tic field and Ampere's law	/; Faraday's law of	
Course Learning			course, students should be able to	•		
Outcomes		· · · · · · · · · · · · · · · · · · ·	fundamental physical principles			
	CLO 2 apply these principles, together with logical and mathematical reasoning, to situations of the physical work CLO 3 analyse and solve problems with the aids of mathematics CLO 4 acquire and interpret experimental data to examine the physical laws Pass in PHYS1050 or PHYS1150 or PHYS1250 or ENGG1310					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in P	HYS1050 or PHYS1150	or PHYS1250 or ENGG1310			
Offer in 2019 - 2020	Y 2nd	d sem Offer in 2020 - 2		Examination	May	
Grade Descriptors (A+ to F)	A	learning outcomes. Show s to apply knowledge to a w presentational skills. Apply insightful conclusions.	stery at an advanced level of extensive trong analytical and critical abilities and la- ride range of complex, familiar and unfa highly effective lab skills and techniques	ogical thinking, with evidence of or miliar situations. Apply highly effe s. Critical use of data and results	iginal thought, and ability ective organizational and to draw appropriate and	
	В	Demostrate 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 mos familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective lab skills an techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.				
	D	Show evidence of some co knowledge to solve probler	ited command of knowledge and skills re herent and logical thinking, but with limite ms. Apply limited or barely effective orga mited ability to use data and results to dra	d analytical and critical abilities. Sh nizational and presentational skills	ow limited ability to apply	
	Fail	Demonstrate little or no evi of analytical and critical a problems. Organization and	dence of command of knowledge and skil bilities, logical and coherent thinking. S d presentational skills are minimally effecti se of data and results and/or unable to dra	Is required for attaining the course how very little or no ability to ap ve or ineffective. Apply minimally of		
				w appropriate conclusions.		
		rith laboratory componer	nt course	w appropriate conclusions.	effective or ineffective lab	
Course Teaching	Activities		nt course Details	w appropriate conclusions.	No. of Hours	
Course Teaching	Activities Lectures	s		w appropriate conclusions.	No. of Hours 36	
Course Teaching	Activities Lectures Laborator	s		w appropriate conclusions.	No. of Hours 36 6	
Course Teaching	Activities Lectures Laborator Tutorials	s ry		w appropriate conclusions.	No. of Hours 36 6 12	
Course Teaching & Learning Activities	Activities Lectures Laborator Tutorials	s	Details	w appropriate conclusions.	No. of Hours 36 6	
Course Teaching Learning Activities Assessment Methods	Activities Lectures Laborator Tutorials	s ry / Self study	Details Details	Weighting in final course grade (%)	No. of Hours 36 6 12	
Course Teaching Learning Activities Assessment Methods	Activities Lectures Laborator Tutorials Reading	ry / Self study	Details Details Including computational assignments	Weighting in final	No. of Hours 36 6 12 80 Assessment Methods	
Course Teaching Learning Activities Assessment Methods	Activities Lectures Laborator Tutorials Reading	s ry / Self study ents	Details Details Including computational	Weighting in final course grade (%)	No. of Hours 36 6 12 80 Assessment Methods to CLO Mapping	
Course Teaching Learning Activities Assessment Methods	Activities Lectures Laborator Tutorials Reading Methods Assignment	s ry / Self study ents	Details Details Including computational assignments	Weighting in final course grade (%)	No. of Hours 36 6 12 80 Assessment Methods to CLO Mapping CLO 1,2,3,4	
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	Activities Lectures Laborator Tutorials Reading Methods Assignment	ry / Self study ents tion	Details Details Including computational assignments	Weighting in final course grade (%) 10 50	No. of Hours 36 6 12 80 Assessment Methods to CLO 1,2,3,4 CLO 1,2,3	
Course Teaching & Learning Activities Assessment Methods	Activities Lectures Laborator Tutorials Reading Methods Assignme Examinat Laborator Test P. A. Tiple R. D. Knig R. Resnic	ry // Self study ents tion ry reports er and G. Mosca: Physic ght: Physics for Scientist ck, D. Halliday, and K. Ki	Details Details Including computational assignments	Weighting in final course grade (%) 10 50 15 25 eeman, 2008, 6th edition) 2nd edition) ey and Sons, 2002, 5th edit	No. of Hours 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	

PHYS2260	Heat and waves (6 credits)	Academic Year	2019
Offering Department	Physics	Quota	
Course Co-ordinator	Dr M Su, Physics (mengsu84@hku.hk)		
Teachers Involved	(Dr M Su,Physics)		
Course Objectives	This course covers the foundation of heat and waves in one semester. It serves	as a core course	for students who

Course Contents	take phys	ics as minor. Both con	stronomy, or mathematics/physiceptual ideas and mathematical	treatment in heat and waves a	re emphasized.	
Course Contents & Topics Course Learning Outcomes Pre-requisites (and Co-requisites	a stretche equation, resonance interferen and equilil energy, C gas, Mola including entropy cl On succe CLO 1 de CLO 2 ar CLO 3 ar CLO 4 ac	ed string as an examp Energy in wave moti- e, Beats, The Doppler ce, Interference from to ibrium, Ideal gas law, concept of heat, First la- ar heat capacities at adiabatic, isothermal, hange, The second law eseful completion of this escribe and explain the oply these principles, to halyse and solve proble	cinusoidal wave including transville for transverse wave, Sound on, The principle of superposi Effect, Light wave as an electrochin films, Single slit diffraction, Molecular view of pressure, Meaw of thermodynamic, Work don constant volume and constant constant-volume, cyclical and frow of thermodynamic, Carnot engo course, students should be able fundamental physical principles ogether with logical and mathemens with the aids of mathematic perimental data to examine the	wave as an example for long tion, Interference of waves, Somagnetic wave, Reflection, R Multiple slit and grating, Polarican free path, distributions of rie on or by an ideal gas, Intern the pressure, Different thermo ee expansion, Reversibility of line, Statistical view of entropy. e to: statical reasoning, to situations of statical reasoning statical reasonin	itudinal wave, Wave standing waves and efraction, Double sli zation, Temperature nolecular speed and al energy of an idea dynamic processes process, definition o	
and Impermissible combinations)						
Offer in 2019 - 2020	N Off	er in 2020 - 2021 : N		Examination		
Grade Descriptors (A+ to F)	Α	learning outcomes. Show to apply knowledge to a	astery at an advanced level of extens strong analytical and critical abilities at wide range of complex, familiar and t ly highly effective lab skills and technic	nd logical thinking, with evidence of or unfamiliar situations. Apply highly effe	iginal thought, and ability ective organizational and	
	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.				
	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.				
		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 app 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 e of analytical and critical problems. Organization a	vidence of command of knowledge and abilities, logical and coherent thinking nd presentational skills are minimally ef use of data and results and/or unable to	skills required for attaining the course Show very little or no ability to a fective or ineffective. Apply minimally	oply knowledge to solve	
Course Type	Lecture w	ith laboratory compone	ent course			
Course Teaching	Activities	S	Details		No. of Hours	
& Learning Activities	Lectures				36	
	Laborato	ry				
	Tutorials				8	
	Reading	/ Self study			80	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents		10	CLO 1,2,3,4	
	Examinat	tion	2-hour written exam	50	CLO 1,2,3	
	Laborato	ry reports		15	CLO 1,4	
	Test			25	CLO 1,2,3	
Required/recommended reading and online materials	R. Resnic	k, D. Halliday, and K. I	ics for Scientists and Engineers Krane: Physics Volume 1 (John Krane: Physics Volume 2 (John	Wiley and Sons, 2002, 5th edit		

PHYS2261	Introductory heat and thermodynamics (6 credits)	Academic Year	2019
Offering Department	Physics	Quota	
Course Co-ordinator	Dr S Z Zhang, Physics (shizhong@hku.hk)		
Teachers Involved	(Dr S Z Zhang,Physics)		
Course Objectives	This calculus-based course covers the basics of thermodynamics and kill course for physics major, a discipline elective for physics minor, as well as learn fundamental thermodynamics concepts and to link them up with chemistry and mathematics. Problem solving and analytical skills supplemented by numerical skills occasionally. Upon completion, interfurther their study in thermodynamics and statistical mechanics.	s an elective course for t their studies in fields will be extensively u	hose who want to like engineering, ısed. They are
Course Contents & Topics	Topics include: thermodynamic system, equilibrium state and its character and equation of state and state transformation; first law of thermodynentropy and second law of thermodynamics; various thermodynamic prequilibrium and mixtures; third law of thermodynamics and Nernst theorem theory.	amics, adiabatic proces otentials and their appli	ss, Carnot cycle; cations in phase
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 reas	soning, to situations of th	ne physical world
	CLO 3 analyse and solve problems with the aids of mathematics		
	CLO 4 acquire and interpret experimental data to examine the physical la	iws	
Pre-requisites (and Co-requisites and Impermissible	Pass in PHYS1050 or PHYS1150 or PHYS1250 or ENGG1350		

Offer in 2019 - 2020	Y 1s	t sem Offer in 2020 - 20	021 : Y	Examination	Dec	
Grade Descriptors (A+ to F)	A	learning outcomes. Show sti to apply knowledge to a wi presentational skills. Apply insightful conclusions.	tery at an advanced level of extensive rong analytical and critical abilities and I de range of complex, familiar and unfa highly effective lab skills and technique	ogical thinking, with evidence of o amiliar situations. Apply highly eff s. Critical use of data and results	riginal thought, and ability ective organizational and to draw appropriate and	
	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 of familiar situations. Apply mo	ncomplete command of knowledge and of some analytical and critical abilities a oderately effective organizational and prout to some erroneous use of data and resul	and logical thinking, and ability to esentational skills. Apply moderate	apply knowledge to mos	
	D	Show evidence of some coh knowledge to solve problem	ted command of knowledge and skills re erent and logical thinking, but with limite is. Apply limited or barely effective orga nited ability to use data and results to dra	d analytical and critical abilities. SI nizational and presentational skills	how limited ability to apply	
	Fail	of analytical and critical ab	ence of command of knowledge and ski illities, logical and coherent thinking. S presentational skills are minimally effect	show very little or no ability to a ive or ineffective. Apply minimally	pply knowledge to solve	
		skills and techniques. Misuse	e of data and results and/or unable to dra	aw appropriate conclusions.		
Course Type	Lecture v	skills and techniques. Misuse with laboratory component		aw appropriate conclusions.		
Course Teaching	Lecture v	with laboratory component		aw appropriate conclusions.	No. of Hours	
Course Teaching	1	with laboratory component	t course	aw appropriate conclusions.	No. of Hours	
Course Teaching	Activitie	with laboratory component es	t course	aw appropriate conclusions.		
Course Teaching	Activitie Lectures	with laboratory component es s ory	t course	aw appropriate conclusions.	36	
Course Type Course Teaching & Learning Activities	Activities Lectures Laborato Tutorials	with laboratory component es s ory	t course	aw appropriate conclusions.	36 6	
Course Teaching & Learning Activities Assessment Methods	Activities Lectures Laborato Tutorials	with laboratory component es s ory s / Self study	t course	Weighting in final course grade (%)	36 6 12	
Course Teaching & Learning Activities Assessment Methods	Activities Lectures Laborate Tutorials Reading	with laboratory component es s s pry s / Self study s	t course Details	Weighting in final	36 6 12 80 Assessment Methods	
Course Teaching & Learning Activities Assessment Methods	Activitie Lectures Laborate Tutorials Reading Methods	with laboratory components s s cory s / Self study s	Details Details Including computational	Weighting in final course grade (%)	36 6 12 80 Assessment Methods to CLO Mapping	
Course Teaching & Learning Activities Assessment Methods	Activitie Lectures Laborato Tutorials Reading Methods Assignm Examina	with laboratory components s s cory s / Self study s	t course Details Details Including computational assignments	Weighting in final course grade (%)	36 6 12 80 Assessment Methods to CLO Mapping CLO 1,2,3,4	
Course Teaching & Learning Activities Assessment Methods	Activitie Lectures Laborato Tutorials Reading Methods Assignm Examina	with laboratory components s s ory s / Self study s nents	t course Details Details Including computational assignments	Weighting in final course grade (%) 10 50	36 6 12 80 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4	
Course Teaching	Activitie Lectures Laborato Tutorials Reading Methods Assignm Examina Laborato Test Lecture r Stephen	with laboratory components s s ory s // Self study s ments ation ory reports notes provided by Course J. Blundell and Katherine	Details Details Including computational assignments 2-hour written exam	Weighting in final course grade (%) 10 50 15 25 al Physics, Oxford Universit	36 6 12 80 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 3 CLO 1,2,3,4 y Press, 2010	

PHYS2265	Introductory quantum physics (6 credits)	Academic Year	2019
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 calculus-based course covers the foundation of quantum physics physics major, a discipline elective for physics minor, as well as an ele fundamental quantum physics and to link them up with their studies i mathematics. Problem solving and analytical skills will be extensively us skills occasionally. Upon completion, interested students may take PHY mechanics.	ctive course for those w in fields like engineering ed. They are supplemer	tho want to learn g, chemistry and nted by numerical
Course Contents & Topics	Topics include: the birth of modern physics; electromagnetic waves be waves; the Schrodinger equation; solutions of time-independent Schrosystems; structure of the atom; the hydrogen atom; many-electron atoms.	odinger equation to bour	
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 rea	soning, to situations of th	ne physical world
	CLO 3 analyse and solve problems with the aids of mathematics		
	CLO 4 acquire and interpret experimental data to examine the physical la	aws	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in PHYS1050 or PHYS1150 or PHYS1250 or ENGG1300		
(and Co-requisites and Impermissible	Y 1st sem 2nd sem Offer in 2020 - 2021 : Y	Examination	Dec May
(and Co-requisites and Impermissible combinations)	Y 1st sem 2nd sem Offer in 2020 - 2021 : Y Demonstrate thorough mastery at an advanced level of extensive knowled learning outcomes. Show strong analytical and critical abilities and logical th to apply knowledge to a wide range of complex, familiar and unfamiliar sis presentational skills. Apply highly effective lab skills and techniques. Critica	dge and skills required for atta inking, with evidence of origina ituations. Apply highly effective	aining all the course al thought, and ability e organizational and
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Y 1st sem 2nd sem Offer in 2020 - 2021 : Y A Demonstrate thorough mastery at an advanced level of extensive knowled learning outcomes. Show strong analytical and critical abilities and logical the to apply knowledge to a wide range of complex, familiar and unfamiliar si	dge and skills required for atta inking, with evidence of origina ituations. Apply highly effective al use of data and results to d its required for attaining at leas al thinking, and ability to apply	aining all the course al thought, and ability e organizational and lraw appropriate and at most of the course knowledge to familiar
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Y 1st sem 2nd sem Offer in 2020 - 2021 : Y A Demonstrate thorough mastery at an advanced level of extensive knowled learning outcomes. Show strong analytical and critical abilities and logical th to apply knowledge to a wide range of complex, familiar and unfamiliar sis presentational skills. Apply highly effective lab skills and techniques. Critical insightful conclusions. B Demonstrate substantial command of a broad range of knowledge and skill learning outcomes. Show evidence of analytical and critical abilities and logicand some unfamiliar situations. Apply effective organizational and presentations.	dge and skills required for atta inking, with evidence of origina- inking, with evidence of origina- tuations. Apply highly effectiv- al use of data and results to do its required for attaining at leas all thinking, and ability to apply- onal skills. Apply effective lab se- equired for attaining most of all thinking, and ability to apply- onal skills. Apply moderately ef	aining all the course al thought, and ability e organizational and lraw appropriate and at most of the course knowledge to familiar skills and techniques. the course learning y knowledge to most
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Y 1st sem 2nd sem Offer in 2020 - 2021 : Y A Demonstrate thorough mastery at an advanced level of extensive knowled learning outcomes. Show strong analytical and critical abilities and logical the to apply knowledge to a wide range of complex, familiar and unfamiliar sip presentational skills. Apply highly effective lab skills and techniques. Critice insightful conclusions. B Demonstrate substantial command of a broad range of knowledge and skill learning outcomes. Show evidence of analytical and critical abilities and logice and some unfamiliar situations. Apply effective organizational and presentatic Correct use of data of results to draw appropriate conclusions. C Demonstrate general but incomplete command of knowledge and skills routcomes. Show evidence of some analytical and critical abilities and logic familiar situations. Apply moderately effective organizational and presentatic	dge and skills required for atta- inking, with evidence of origina- ittuations. Apply highly effectiv- al use of data and results to d is required for attaining at leas all thinking, and ability to apply- onal skills. Apply effective lab s- equired for attaining most of all thinking, and ability to apply- onal skills. Apply moderately ef- w appropriate conclusions. or attaining some of the cours ical and critical abilities. Show I al and presentational skills. Ap	aining all the course al thought, and ability e organizational and leave appropriate and at most of the course knowledge to familiar skills and techniques. The course learning y knowledge to most ffective lab skills and e learning outcomes.
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors	Y 1st sem 2nd sem Offer in 2020 - 2021 : Y A Demonstrate thorough mastery at an advanced level of extensive knowled learning outcomes. Show strong analytical and critical abilities and logical the to apply knowledge to a wide range of complex, familiar and unfamiliar sipresentational skills. Apply highly effective lab skills and techniques. Critical insightful conclusions. B Demonstrate substantial command of a broad range of knowledge and skill learning outcomes. Show evidence of analytical and critical abilities and logical and some unfamiliar situations. Apply effective organizational and presentatic Correct use of data of results to draw appropriate conclusions. C Demonstrate general but incomplete command of knowledge and skills reductomes. Show evidence of some analytical and critical abilities and logic familiar situations. Apply moderately effective organizational and presentatic techniques. Mostly correct but some erroneous use of data and results to draw Demonstrate partial but limited command of knowledge and skills required for Show evidence of some coherent and logical thinking, but with limited analytic knowledge to solve problems. Apply limited or barely effective organizations.	dge and skills required for atta- inking, with evidence of origina- ituations. Apply highly effective al use of data and results to d its required for attaining at leas al thinking, and ability to apply onal skills. Apply effective lab s equired for attaining most of rail thinking, and ability to apply onal skills. Apply moderately et wa appropriate conclusions. For attaining some of the course rical and critical abilities. Show I al and presentational skills. Ap private conclusions. For of attaining the course lear y little or no ability to apply effective. Apply minimally effec	aining all the course al thought, and ability e organizational and lraw appropriate and the third that the course the course knowledge to familiar skills and techniques. The course learning y knowledge to most ffective lab skills and e learning outcomes. Lack knowledge to solve knowledge to solve

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 computational 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	Robert Eisberg and Robert Resr Wiley & Sons, 1985) Randy Harris: Modern Physics (P Kenneth S. Krane: Modern Physic Raymond A. Serway, Clement J.	nick: Quantum Physics of Atoms,	edition) rn Physics (Cengage Learı	ning, 2005, 3rd edition)
Course Website	http://moodle.hku.hk			
Ocurse Hessite	map.//moodic.ma.mk			

PHYS2650	Modern	astronomy (6 credi	ts)	Academic Yea	r 2019		
Offering Department	Physics		•	Quota			
Course Co-ordinator	Dr J J L Li	m, Physics (jjlim@hku.i	hk)				
Teachers Involved	(Dr J J L L	im,Physics)	,				
Course Objectives	This is an intermediate course in astronomy for students in all disciplines and all years. This is also the second course in our series of two compulsory courses to introduce basic astronomy knowledge, methods and recent advances for astronomy minor. This course aims at deepening student knowledge of astronomy, with emphasis on the recent discoveries and modern techniques. After completing this course, interested students may take PHYS3650, PHYS3653 and/or PHYS3660, which are core or discipline elective courses for astronomy minor and astrophysics theme of physics major.						
Course Contents & Topics		Topics include: exoplanets; general relativity; gravitational waves; neutrinos in astronomy; stellar physics; gamma ray bursts; inflation and cosmology.					
Course Learning			course, students should be abl	e to:			
Outcomes	CLO 1		ction techniques of exoplanets				
outeemee	CLO 2		f general relativity and gravitat				
	CLO 3		ce of neutrinos physics in astro				
	CLO 3		ects of gamma-ray bursts	люпу			
	CLO 4		of inflation and how it solves pr	oblome in coomplease			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in PHYS1650						
Offer in 2019 - 2020	Y 2nd	sem Offer in 2020 - 2	2021 : Y	Examination	May		
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 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 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 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.						
Course Type	Lecture-ba	ased course					
Course Teaching	Activities	.	Details		No. of Hours		
& Learning Activities	Lectures				36		
-	Tutorials				8		
	Reading /	Self study			80		
Assessment Methods and Weighting	Methods	,	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents		35	CLO 1,2,3,4,5		
	Examinati		2-hour written exam	50	CLO 1,2,3,4,5		
	Test			15	CLO 1,2,3		
Required/recommended		otes provided by Course	Coordinator		,-,0		
reading and online materials	B. W. Carı 2nd editior	roll & D. A. Ostlie: An Iı า)		ysics (Addison-Wesley Publishin	g Company, 2007		
	L. Chaisse	JII aliu O. Modvillali. Ast	iononiy roday (r carson, zo ri	,			

PHYS2850	Atomic and nuclear physics (6 credits)	Academic Year	2019
Offering Department	Physics	Quota	

Course Co-ordinator	Dr S Z Zł	nang, Physics <i>(shizhong</i> (@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 o provide a coherent and concise coverage of traditional atomic and nuclear physics. Important topics of curren 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	f hydrogen and hydrogen-l	ike atom, multi-electron atom, ato	m in electromagnetion	
& Topics		field, spectroscopy, laser trapping and cooling; nuclear structure, shell model and nuclear reactions. Applications o the basic principles of atomic and nuclear physics will be mentioned when appropriate.				
Course Learning	On succe	essful completion of this c	ourse, students should be	able to:		
Outcomes		pply general consideration of nagnitude of estimation of		atomic and nuclear system; make	ke general orders of	
	CLO 2 e	xplain how light interactin	ig with atom; the working p	rinciple of laser trapping and cooli	ng	
			ures of atomic/nuclear spe-			
	CLO 4 a	pply quantum physics to	understand the basic featu	res of simple nuclei, binding of de	uteron et al	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in F	Pass in PHYS2265				
Offer in 2019 - 2020	N Of	fer in 2020 - 2021 : 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 lab skills and techniques. Critical use of data and results to draw appropriate and					
	В	insightful conclusions. 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					
	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.					
Course Type	Lecture-b	ased course				
Course Teaching	Activitie	s	Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials				18 80	
	Reading	/ Self study				
Assessment Methods and Weighting	Methods	5	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignm	ents		20	CLO 1,2,3,4	
	Examina	tion		50	CLO 1,2,3,4	
	Test			30	CLO 1,2,3,4	
Required/recommended	Lecture n	otes provided by Course	Coordinator	·		
reading and			and photons (Springer, 2nd	I, 2011)		
online materials			rsics (John Wiley & Sons, 1 n: Physics of Atoms and Mo	988) blecules (Pearson, 2nd, 2003)		
Course Website	http://ww	w.physics.hku.hk/~phys2	628/			

PHYS3150	Theoretical physics (6 credits)	Academic Year	2019			
Offering Department	Physics	Quota				
Course Co-ordinator	Prof Z D Wang, Physics (zwang @hku.hk)					
Teachers Involved	(Prof Z D Wang, Physics)					
Course Objectives	The aim of this course is to provide students with the conceptual skills and key analytical tools for solving real problems in all major areas of physics.					
Course Contents & Topics	This course will introduce and address the following topics: Application of complex variables including the Cauchy's integral formula and calculus of residues, Partial differential equations (the general wave equation, the Schrodinger equation, the Poisson equation, and the diffusion equation), Properties of special functions widely used in Physics (Gamma functions, Beta functions, Bessel functions, spherical harmonics etc.), Fourier Series, and Fourier Transform.					
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 analyse and examine the analytical properties of complex functions CLO 2 calculate various definite integrals using the method of residues CLO 3 analyse and solve the first and second order ordinary equations, and typical partial differential equations CLO 4 apply the special functions in handling various physical problems CLO 5 use the Fourier Series and Fourier transform in describing, respectively, any periodic function and wave					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in (PHYS2250 or PHYS2255 or PHYS2265) and (MATH2211 or PHYS2150)					
Offer in 2019 - 2020	Y 2nd sem Offer in 2020 - 2021 : Y	Examination	May			
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 thinkir to apply knowledge to a wide range of complex, familiar and unfamiliar situation presentational skills.	ng, with evidence of origina	al thought, and ability			

	В	learning outcomes. Show e		edge and skills required for attaining at lities and logical thinking, and ability to ap nd presentational skills.		
	С	Demonstrate general but outcomes. Show evidence	incomplete command of knowledge	e and skills required for attaining most ities and logical thinking, and ability to a		
	D	.,,				
	Fail					
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		20	CLO 1,2,3,4,5	
	Examination		3-hour written exam	70	CLO 1,2,3,4,5	
	Test			10	CLO 1,2,3,4,5	
Required/recommended reading and online materials		ecture notes provided by Course Coordinator Arfken and H. Weber: Mathematical Methods for Physicists (Academic Press, 2005)				

PHYS3151	Machin	ne learning in phys	sics (6 credits)	Academic Yea	r 2019			
Offering Department	Physics		•	Quota				
Course Co-ordinator	Dr Z Y N	leng, Physics (zymen	g@hku.hk)					
Teachers Involved		(Dr S C Y Ng,Physics) (Dr Z Y Meng,Physics)						
Course Objectives	Machine essentia the basic physics.	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 Principal Neighbo	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			nis course, students should be able					
Outcomes	CLO 2 a	CLO 1 demonstrate knowledge in essential methods and techniques for machine learning and its application physics CLO 2 apply the techniques of machine learning in data analysis CLO 3 use Python machine learning packages to solve simple problems						
	CLO 4 t	use of effective written	and verbal communication skills t	hrough oral presentation				
Pre-requisites and Co-requisites and Impermissible combinations)			101 or MATH2211 or PHYS2155 is needed (please talk to the cour					
Offer in 2019 - 2020	Y 1s	st sem Offer in 2020	- 2021 : Y	Examination	Dec			
Grade Descriptors (A+ to F)	В	to apply knowledge to presentational skills. Al insightful conclusions. Demonstrate substanti- learning outcomes. Sho and some unfamiliar sit	ow strong analytical and critical abilities ar a wide range of complex, familiar and upply highly effective lab skills and technical command of a broad range of knowled we evidence of analytical and critical abilities uations. Apply effective organizational and esults to draw appropriate conclusions.	infamiliar situations. Apply highly effec- ques. Critical use of data and results to ge and skills required for attaining at le is and logical thinking, and ability to app	tive organizational and draw appropriate and ast most of the cours ly knowledge to familia			
	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. La 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. Apply minimally effective or ineffective. Skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions.							
Course Type		with laboratory compo	nent course					
ourse Teaching	Activitie		Details		No. of Hours 36			
Learning Activities	Lectures							
	Laborate	•						
	Tutorials							
	Reading	g / Self study			80			
Assessment Methods and Weighting	Method	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappir			
	Assignm	nents		15	CLO 1,2,3,4			
					0_0 .,_,0, .			
	Examina	ation	2-hour written exam	50	CLO 1,2,3			

	Project report		20	CLO 1,2,3,4		
Required/recommended	Lecture notes provided by Course Coordinator					
reading and	E. Alpaydin, Introduction to Machine Learning, 3rd ed., MIT Press (2014)					
online materials	T. Hastie, R. Tibshirani, & J. Friedman, The Elements of Statistical Learning, 2nd ed., Springer (2016)					
	S. Raschka, Python Machine Learning, 2nd ed., Packt Publishing (2017)					
Course Website	http://moodle.hku.hk		<u> </u>			

	Classic	al mechanics (6 cre	edits)	Academic Ye	ear 2019	
Offering Department	Physics		·	Quota		
Course Co-ordinator	Prof S Q	Shen, Physics (sshen@	@hku.hk)	'		
Teachers Involved		Shen, Physics)	•			
Course Objectives	undergra an elective related to	Build on the foundation course PHYS2250, this course discusses classical mechanics in the advanced undergraduate level using Lagrangian formalism. It serves as a core course for physics major students as well as an elective core for those who are interested in gaining a deep understanding of classical mechanics and to apply elated techniques in their own majors. This is also an essential course for those who plan to pursue postgraduate studies in physics or related disciplines. Both conceptual ideas and mathematical treatment are emphasized.				
Course Contents & Topics	This cour mechanic mechanic central fo	This course will be essentially divided into two parts. In the first part, fundamental concepts related to Lagrangiar mechanics will be treated. Topics include the variational principle, conservation laws and its relation to Newtoniar 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 nor inertial frame will also be discussed.				
Course Learning Outcomes	On succe	essful completion of this	course, students should be able structure of Lagrangian mech		ver the Newtonian	
	fo	ormulation;	Lagrangian for a mechanical sys			
	С	ases		•		
		nderstand the general s well as many-body ar	feature of a many-body system and rigid body dynamics	and the role of center of mass	s frame in two-body	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in F	PHYS2250				
Offer in 2019 - 2020	Y 1st	t sem Offer in 2020 - :	2021 : Y	Examination	Dec	
Grade Descriptors	A		astery at an advanced level of extensiv			
(A+ to F)		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. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate ar 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.				
		techniques. Mostly correct	i but some enomeous use or data and res	uits to draw appropriate conclusions.	ly effective lab skills and	
	D	Demonstrate partial but li Show evidence of some c knowledge to solve proble	mited command of knowledge and skills coherent and logical thinking, but with limit ems. Apply limited or barely effective org	required for attaining some of the co ted analytical and critical abilities. Sh ganizational and presentational skills	ly effective lab skills and ourse learning outcomes low limited ability to apply	
	Fail	Demonstrate partial but ling Show evidence of some control was said to show evidence of some control was skills and techniques. Demonstrate little or no evidence of analytical and critical problems. Organization at skills and techniques. Mississipport of the said of the	mited command of knowledge and skills oherent and logical thinking, but with limil ems. Apply limited or barely effective org Limited ability to use data and results to dividence of command of knowledge and sidelities, logical and coherent thinking, abilities, logical and coherent thinking, do presentational skills are minimally effectives of data and results and/or unable to do	required for attaining some of the co ted analytical and critical abilities. Sh janizational and presentational skills fraw appropriate conclusions. kills required for attaining the course Show very little or no ability to ap ctive or ineffective. Apply minimally e	ly effective lab skills and ourse learning outcomes low limited ability to apply . Apply partially effective learning outcomes. Lack pply knowledge to solve	
	Fail Lecture v	Demonstrate partial but ling Show evidence of some of knowledge to solve problem as skills and techniques. Demonstrate little or no even analytical and critical problems. Organization as skills and techniques. Missivith laboratory componers.	mited command of knowledge and skills oherent and logical thinking, but with limil ems. Apply limited or barely effective org Limited ability to use data and results to dividence of command of knowledge and sidelities, logical and coherent thinking, abilities, logical and coherent thinking, do presentational skills are minimally effectives of data and results and/or unable to do	required for attaining some of the co ted analytical and critical abilities. Sh janizational and presentational skills fraw appropriate conclusions. kills required for attaining the course Show very little or no ability to ap ctive or ineffective. Apply minimally e	ly effective lab skills and ourse learning outcomes low limited ability to apply. Apply partially effective learning outcomes. Lack oply knowledge to solve effective or ineffective lab	
Course Teaching	Fail Lecture w	Demonstrate partial but ling Show evidence of some of knowledge to solve problem as skills and techniques. Demonstrate little or no even of analytical and critical problems. Organization as skills and techniques. Miss with laboratory componens.	mited command of knowledge and skills oherent and logical thinking, but with limil ems. Apply limited or barely effective org Limited ability to use data and results to dividence of command of knowledge and sidelities, logical and coherent thinking, abilities, logical and coherent thinking, do presentational skills are minimally effectives of data and results and/or unable to do	required for attaining some of the co ted analytical and critical abilities. Sh janizational and presentational skills fraw appropriate conclusions. kills required for attaining the course Show very little or no ability to ap ctive or ineffective. Apply minimally e	ly effective lab skills and ourse learning outcomes low limited ability to apply. Apply partially effective learning outcomes. Lack oply knowledge to solve effective or ineffective lal	
Course Teaching	Fail Lecture v	Demonstrate partial but ling Show evidence of some of knowledge to solve problem as skills and techniques. Demonstrate little or no even of analytical and critical problems. Organization as skills and techniques. Miss with laboratory componens.	mited command of knowledge and skills oberent and logical thinking, but with limil ems. Apply limited or barely effective org Limited ability to use data and results to dividence of command of knowledge and sabilities, logical and coherent thinking, not presentational skills are minimally effective of data and results and/or unable to dent course	required for attaining some of the co ted analytical and critical abilities. Sh janizational and presentational skills fraw appropriate conclusions. kills required for attaining the course Show very little or no ability to ap ctive or ineffective. Apply minimally e	ly effective lab skills and purse learning outcomes low limited ability to apply. Apply partially effective learning outcomes. Lacipply knowledge to solve effective or ineffective lal	
Course Teaching	Fail Lecture w Activitie Lectures Laborato	Demonstrate partial but ling Show evidence of some of knowledge to solve problem skills and techniques. Demonstrate little or no evident and critical problems. Organization at skills and techniques. Miss with laboratory components.	mited command of knowledge and skills oberent and logical thinking, but with limil ems. Apply limited or barely effective org Limited ability to use data and results to dividence of command of knowledge and sabilities, logical and coherent thinking, not presentational skills are minimally effective of data and results and/or unable to dent course	required for attaining some of the co ted analytical and critical abilities. Sh janizational and presentational skills fraw appropriate conclusions. kills required for attaining the course Show very little or no ability to ap ctive or ineffective. Apply minimally e	ly effective lab skills and ourse learning outcomes ow limited ability to apply. Apply partially effective learning outcomes. Lacipply knowledge to solve effective or ineffective lat the control of the	
Course Teaching	Fail Lecture w Activitie Lectures Laborato Tutorials	Demonstrate partial but lii Show evidence of some of knowledge to solve proble lab skills and techniques. Demonstrate little or no evidence of analytical and critical problems. Organization at skills and techniques. Missivith laboratory components	mited command of knowledge and skills oberent and logical thinking, but with limil ems. Apply limited or barely effective org Limited ability to use data and results to dividence of command of knowledge and sabilities, logical and coherent thinking, not presentational skills are minimally effective of data and results and/or unable to dent course	required for attaining some of the co ted analytical and critical abilities. Sh janizational and presentational skills fraw appropriate conclusions. kills required for attaining the course Show very little or no ability to ap ctive or ineffective. Apply minimally e	ly effective lab skills and burse learning outcomes ow limited ability to apply. Apply partially effective learning outcomes. Lacipply knowledge to solve effective or ineffective lat the lab of the	
Course Teaching	Fail Lecture w Activitie Lectures Laborato	Demonstrate partial but lii Show evidence of some of knowledge to solve proble lab skills and techniques. Demonstrate little or no evidence of analytical and critical problems. Organization at skills and techniques. Missivith laboratory components	mited command of knowledge and skills oberent and logical thinking, but with limil ems. Apply limited or barely effective org Limited ability to use data and results to dividence of command of knowledge and sabilities, logical and coherent thinking, not presentational skills are minimally effective of data and results and/or unable to dent course	required for attaining some of the co ted analytical and critical abilities. Sh janizational and presentational skills fraw appropriate conclusions. kills required for attaining the course Show very little or no ability to ap ctive or ineffective. Apply minimally e	ly effective lab skills and ourse learning outcomes ow limited ability to apply. Apply partially effective learning outcomes. Lacipply knowledge to solve effective or ineffective lat the control of the	
Course Teaching & Learning Activities Assessment Methods	Fail Lecture w Activitie Lectures Laborato Tutorials	Demonstrate partial but lii Show evidence of some c knowledge to solve proble lab skills and techniques. Demonstrate little or no ev of analytical and critical problems. Organization at skills and techniques. Miss with laboratory componens.	mited command of knowledge and skills oberent and logical thinking, but with limil ems. Apply limited or barely effective org Limited ability to use data and results to dividence of command of knowledge and sabilities, logical and coherent thinking, not presentational skills are minimally effective of data and results and/or unable to dent course	required for attaining some of the co ted analytical and critical abilities. Sh janizational and presentational skills fraw appropriate conclusions. kills required for attaining the course Show very little or no ability to ap ctive or ineffective. Apply minimally e	ly effective lab skills and burse learning outcomes ow limited ability to apply. Apply partially effective learning outcomes. Lacipply knowledge to solve effective or ineffective lat the lab of the	
Course Teaching & Learning Activities Assessment Methods	Fail Lecture w Activitie Lectures Laborato Tutorials Assessm	Demonstrate partial but lii Show evidence of some chrowledge to solve proble lab skills and techniques. Demonstrate little or no evof analytical and critical problems. Organization as skills and techniques. Miss with laboratory components.	mited command of knowledge and skills oberent and logical thinking, but with limit erms. Apply limited or barely effective org. Limited ability to use data and results to dividence of command of knowledge and si abilities, logical and coherent thinking ab presentational skills are minimally effeuse of data and results and/or unable to dent course Details	required for attaining some of the conted analytical and critical abilities. Sh quarizational and presentational skills fraw appropriate conclusions. It is required for attaining the course Show very little or no ability to appropriate conclusions. Weighting in final	No. of Hours No. of Hours 36 6 8 80 Assessment Methods	
Course Teaching & Learning Activities Assessment Methods	Fail Lecture w Activitie Lectures Laborato Tutorials Assessm Methods	Demonstrate partial but lii Show evidence of some chrowledge to solve problem to skills and techniques. Demonstrate little or no evof analytical and critical problems. Organization as skills and techniques. Miss with laboratory components.	mited command of knowledge and skills oberent and logical thinking, but with limit erms. Apply limited or barely effective org. Limited ability to use data and results to dividence of command of knowledge and si abilities, logical and coherent thinking ab presentational skills are minimally effeuse of data and results and/or unable to dent course Details	required for attaining some of the cotted analytical and critical abilities. Sh janizational and presentational skills fraw appropriate conclusions. It is required for attaining the course Show very little or no ability to ap ctive or ineffective. Apply minimally of the appropriate conclusions. Weighting in final course grade (%)	No. of Hours No. of Hours 36 6 8 80 Assessment Methods to CLO Mapping and outcomes Apply partially effective Ilearning outcomes. Lack Ilearning outcomes. Ilearning ou	
Course Teaching & Learning Activities Assessment Methods	Fail Lecture w Activitie Lectures Laborato Tutorials Assessm Methods Assignm Examina	Demonstrate partial but lii Show evidence of some chrowledge to solve problem to skills and techniques. Demonstrate little or no evof analytical and critical problems. Organization as skills and techniques. Missivith laboratory components.	mited command of knowledge and skills oherent and logical thinking, but with limit ems. Apply limited or barely effective org. Limited ability to use data and results to dividence of command of knowledge and sibilities, logical and coherent thinking, nd presentational skills are minimally effeuse of data and results and/or unable to dent course Details	required for attaining some of the ceted analytical and critical abilities. Sh janizational and presentational skills traw appropriate conclusions. It is required for attaining the course Show very little or no ability to apctive or ineffective. Apply minimally elarw appropriate conclusions. Weighting in final course grade (%)	No. of Hours No. of Hours 80 Assessment Methods CLO 1,2,3 CLO 1,2,3 CLO 1,2,3	
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	Fail Lecture w Activitie Lectures Laborato Tutorials Assessm Methods Assignm Examina	Demonstrate partial but lii Show evidence of some chrowledge to solve proble lab skills and techniques. Demonstrate little or no evof analytical and critical problems. Organization as skills and techniques. Miss with laboratory components.	mited command of knowledge and skills oherent and logical thinking, but with limit ems. Apply limited or barely effective org. Limited ability to use data and results to dividence of command of knowledge and sibilities, logical and coherent thinking, nd presentational skills are minimally effeuse of data and results and/or unable to dent course Details	required for attaining some of the coted analytical and critical abilities. Sh janizational and presentational skills traw appropriate conclusions. It is required for attaining the course Show very little or no ability to aptive or ineffective. Apply minimally elarw appropriate conclusions. Weighting in final course grade (%) 20 60	ly effective lab skills and burse learning outcomes low limited ability to apply. Apply partially effective learning outcomes. Lacipply knowledge to solve effective or ineffective lal limited ability in the last learning outcomes. Lacipply knowledge to solve effective or ineffective lal limited ability in the last learning outcomes. Lacipply knowledge to solve effective or ineffective lal limited ability in the last learning ability in the last le	
Course Teaching & Learning Activities Assessment Methods	Fail Lecture w Activitie Lectures Laborato Tutorials Assessm Methods Assignm Examina Laborato Test Lecture n David Mo	Demonstrate partial but lis Show evidence of some chrowledge to solve problem to skills and techniques. Demonstrate little or no evidence of snalytical and critical problems. Organization as skills and techniques. Miswith laboratory components.	mited command of knowledge and skills oherent and logical thinking, but with limit ems. Apply limited or barely effective org. Limited ability to use data and results to dividence of command of knowledge and sibilities, logical and coherent thinking, and presentational skills are minimally effeuse of data and results and/or unable to dent course Details Details Details Details	required for attaining some of the cotted analytical and critical abilities. Sh aparizational and presentational skills fraw appropriate conclusions. It is required for attaining the course Show very little or no ability to apctive or ineffective. Apply minimally for a property of the conclusions. Weighting in final course grade (%) 20 60 10 10 10 007).	No. of Hours No. of Hours 36 6 8 80 Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2,3 CLO 3 CLO 1,2,3 CLO 1,2,3	

PHYS3351	Quantum mechanics (6 credits)	Academic Year	2019
Offering Department	Physics	Quota	
Course Co-ordinator	Prof W Yao, Physics (wangyao@hku.hk)		
Teachers Involved	(Prof W Yao, Physics)		
Course Objectives	Build on the foundation course PHYS2265, this course discusses quantuundergraduate level with rigorous mathematical treatment. It serves as a core as well as an elective core for those who are interested to gain a deep underst to apply related techniques in their own majors. This is also an essential coupostgraduate studies in physics or related disciplines. Both conceptual ideas emphasized.	course for physic anding of quantur urse for those wh	s major students n mechanics and o plan to pursue

Course Contents & Topics	current an principle; transmissi wavepack and eiger	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	On succes	sful completion of this c	ourse, students should be able	to:		
Outcomes	CLO 2 for	d uncertainty of physica	erpretation of quantum mechar I observables alue problems, and solve ther		•	
	en	ergy eigenfunctions	f the wavefunction and the expe			
	co	rrections in certain pertu	time-independent perturbation irbations applied to the physical	system	ding order energy	
		· · · · · · · · · · · · · · · · · · ·	rimental data to examine the ph	ysical laws		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Ph	1YS2265				
Offer in 2019 - 2020	Y 1st	sem Offer in 2020 - 20	021 : Y	Examination	Dec	
Grade Descriptors	Α	Demonstrate thorough mas	tery at an advanced level of extensive	knowledge and skills required for	attaining all the course	
(A+ to F)	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. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate an insightful conclusions.					
	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 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 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.					
Course Type	Lecture wi	th laboratory component	t course			
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures				36	
	Laborator	у			6	
	Tutorials	0 15 1 1			8	
		Self study			80	
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	nts		10	CLO 1,2,3,4	
	Examinat		2-hour written exam	60	CLO 1,2,3,4	
	Laborator Test	y reports		10 20	CLO 5 CLO 1,2,3,4	
Required/recommended reading and online materials		. ,	Coordinator ntum Mechanics (Pearson Prent	ice Hall, 2004, 2nd ed.)		
Course Website	http://moo	dle.hku.hk				
		ntp.//moodie.nku.nk				

PHYS3450	Electromagnetism (6 credits)	Academic Year	2019				
Offering Department	Physics	Quota					
Course Co-ordinator	Prof X D Cui, Physics (xdcui@hku.hk)						
Teachers Involved	(Prof X D Cui,Physics)						
Course Objectives	Build on the foundation course PHYS2255, this course discusses electromagnetism in the advanced undergraduate level with vigorous mathematical treatment. It serves as a core course for physics major students as well as an elective core for those who are interested to gain a deep understanding of electromagnetism and to apply related techniques in their own majors. This is also an essential course for those who plan to pursue postgraduate studies in physics or related disciplines. Both conceptual ideas and mathematical treatment are emphasized.						
Course Contents & Topics	Topics include electric fields and potential, methods in electrostatics, conducte and electromagnetic induction, magnetic properties of materials and Maxwell's e		, magnetostatics				
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 identify the fundamental physics in electrostatics and magnetism						
	CLO 2 apply mathematical tools to describe electrostatics and magnetism						
	CLO 3 use the Maxwell's equations to explain various electrostatic and magnetic phenomena						
	CLO 4 differentiate between electrostatics in vacuum and in dielectric materials						
	CLO 5 differentiate between magnetism in vacuum and in magnetic materials						
	CLO 6 apply essential skills of making measurements with appropriate instruments in physics. experiments; Interpret the experimental data and compare with the prediction of underlying physical principle						
Pre-requisites (and Co-requisites	Pass in PHYS2255						

and Impermissible combinations)							
Offer in 2019 - 2020	Y 2nd	sem Off	er in 2020 -	2021 : 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 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	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	outcomes. familiar situ	Show evidence ations. Apply n	of some analytical and crit noderately effective organiza	tical abilities and lational and preser	ills required for attaining mos logical thinking, and ability to ntational skills. Apply moderate o draw appropriate conclusions.	apply knowledge to most
	D	Show evide knowledge	ence of some co to solve proble	pherent and logical thinking,	but with limited ar effective organiza	red for attaining some of the conalytical and critical abilities. Shational and presentational skills appropriate conclusions.	ow limited ability to apply
	Fail	of analytica problems. (al and critical a Organization an	abilities, logical and cohere	nt thinking. Show inimally effective	equired for attaining the course v very little or no ability to a or ineffective. Apply minimally appropriate conclusions.	ply knowledge to solve
Course Type	Lecture wit	th laborato	ry compone	nt course			
Course Teaching	Activities	Activities		Details			No. of Hours
& Learning Activities	Lectures						36
	Laboratory	y					6
	Tutorials						8
	Reading /	Reading / Self study					80
Assessment Methods and Weighting	Methods			Details		Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignme	nts				10	CLO 1,2,3,4,5,6
	Examination	on		3-hour written exam		60	CLO 1,2,3,4,5
	Laboratory	y reports				10	CLO 1,6
	Test					20	CLO 1,2,3,4,5
Required/recommended	Lecture notes provided by Course Coordinator D. J. Griffiths: Introduction to Electrodynamics, 3rd ed., (Prentice-Hall, 1999).						
reading and online materials	D. J. Griffit	ihs: Introdi	action to Ele	ctrodynamics, 3rd ed.,	(Prentice-Hall,	1999).	

PHYS3550	Statistic	cal mechanics & thermodynamics (6 credits)	Academic Year	2019					
Offering Department	Physics	CS Quota							
Course Co-ordinator	Dr S Z Zł	hang, Physics (shizhong@hku.hk)							
Teachers Involved	(Dr S Z Z	Zhang,Physics)							
Course Objectives	advanced students mechanic course fo	Build on the foundation course PHYS2260, this course discusses statistical mechanics and thermodynamics in the advanced undergraduate level with vigorous mathematical treatment. It serves as a core course for physics major students as well as an elective core for those who are interested to gain a deep understanding of statistical mechanics and thermodynamics and to apply related techniques in their own majors. This is also an essential course for those who plan to pursue postgraduate studies in physics or related disciplines. Both conceptual ideas and mathematical treatment are emphasized.							
Course Contents & Topics	Topics in Disorder	Topics include: Boltzmann, Fermi and Bose-Einstein statistics. Partition function and the laws of Thermodynamics. Disorder and entropy; concept of temperature; the free energy. Density of states. Classical gas, electrons in metals, and black body radiation. Heat capacities. Equilibrium and phase transition. Einstein and Debye solids.							
Course Learning Outcomes	CLO 1 d CLO 2 a CLO 3 a	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, 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)		PHYS2260							
Offer in 2019 - 2020		d sem Offer in 2020 - 2021 : Y	Examination	May					
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 thin to apply knowledge to a wide range of complex, familiar and unfamiliar sit presentational skills. Apply highly effective lab skills and techniques. Critical insightful conclusions.	nking, with evidence of original uations. Apply highly effective	al thought, and ability re organizational and					
	В	•							
	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. 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.								
	I all	of analytical and critical abilities, logical and coherent thinking. Show very problems. Organization and presentational skills are minimally effective or ine	little or no ability to apply ffective. Apply minimally effective.	knowledge to solve					

Course Teaching	Activities Details		No. of Hours	
& Learning Activities	Lectures			36
	Laboratory			6
	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
	Examination	2-hour written exam	60	CLO 1,2,3
	Laboratory reports		10	CLO 1,4
	Test		20	CLO 1,2,3
Required/recommended reading and online materials		urse Coordinator duction to Thermal Physics (Pears	on, 2014).	
Course Website	http://moodle.hku.hk			

PHYS3551	Introduc	ctory solid state	physics (6 credits)	Academic Ye	ar 2019				
Offering Department	Physics			Quota					
Course Co-ordinator	Prof J Ga	rof J Gao, Physics (jugao @hku.hk)							
Teachers Involved									
Course Objectives	is designe	To provides a broad introduction to modern theories of the behaviour and properties of the solid state of matter. It is designed as a self-contained course which at the same time will serve as a basis for more advanced courses and projects in solid state physics.							
Course Contents & Topics	Lattice vil	Crystal structures and symmetry. The formation of crystals. The reciprocal lattice and X-ray diffraction in crystals. Lattice vibrations and thermal properties. Free-electron theory of metals. Energy bands; metals, semiconductors, and insulators. If time permits, special topics such as superconductor will be briefly mentioned.							
Course Learning			this course, students should be able						
Outcomes	CLO 1 d	emonstrate knowled	dge for crystal structures and charac	cterization					
	CLO 2 d	escribe the behavio	r of solid matter and explain the und	derlying physical concepts					
	CLO 3 a	pply physical princip	oles and mathematical equations to	discuss the physical propertie	s of materials				
	CLO 4	pply essential skills	of making measurements with appr	opriate instruments in physics	experiments				
	CLO 5 ir	nterpret the experim	ental data and compare with the pre	ediction of underlying physical	principle				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in P	HYS2260 and PHY	S2265						
Offer in 2019 - 2020	N Off	er in 2020 - 2021 : I	N	Examination					
Grade Descriptors	Α	Demonstrate thoroug	n mastery at an advanced level of extension	ve knowledge and skills required for	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.								
	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.								
Course Type	Lecture w	ith laboratory comp	onent course						
Course Teaching	Activitie	s	Details		No. of Hours				
& Learning Activities	Lectures								
	Laborato	ry							
	Tutorials				8				
	Reading / Self study				80				
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping				
	Assignme	ents		15	CLO 1,2,3,5				
	Examina		2-hour written exam	60	CLO 1,2,3				
		ry reports	2.1. 2.1.2.1.1	10	CLO 4,5				
	Test	, ,		15	CLO 1,2,3				
Required/recommended reading and online materials	C. Kittel:	Introduction to Solid	State Physics (John Wiley, 1986, 6	th ed.)					

PHYS3650	Observational astronomy (6 credits)	Academic Year	2019
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	An introduction to tools of contemporary observation astronomy, with a focus on	those used at opt	ical wavelengths,

behindstate flate of the viteries of command of knowledge and schede and control attaining of attaining 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. Lecture with laboratory component course Activities Details No. of Hours							
D Fail	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						
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							
A	learning outcomes. Show to apply knowledge to a presentational skills. App	v strong analytical and critical abilities ar a wide range of complex, familiar and ι	nd logical thinking, with evidence of ori unfamiliar situations. Apply highly effe	ginal thought, and ability ctive organizational and			
			Examination	Dec			
			and night sky observations				
optical wavelengths CLO 2 describe the effects of the properties of light and Earth's atmosphere on astronomical observa CLO 3 explain how the methods of astronomical photometry and spectroscopy are applied to the obstars, galaxies, and the universe							
system, emission and absorption spectrum, and astronomical redshifts. On successful completion of this course, students should be able to: CLO 1 describe and explain the workings of astronomical telescopes and modern astronomical det							
observati	Topics include: properties and configurations of optical telescopes; properties of light, atmospheric effects on observations; properties of astronomical detectors (PMT, CCD); astronomical imaging and magnitude system; astronomical spectroscopy; observations of stars and galaxies including blackbody radiation, color-magnitude						
	observati astronom system, e On succe CLO 1 d CLO 2 d CLO 3 e S CLO 4 o Pass in F	observations; properties of asl astronomical spectroscopy; ob system, emission and absorptic On successful completion of thi CLO 1 describe and explain to optical wavelengths CLO 2 describe the effects of the CLO 3 explain how the method stars, galaxies, and the CLO 4 operate a small optical stars, galaxies, and the CLO 4 operate a small optical stars, galaxies, and the CLO 4 operate a small optical stars, galaxies, and the CLO 4 operate a small optical stars, galaxies, and the CLO 4 operate a small optical stars, galaxies, and the CLO 4 operate a small optical stars, galaxies, and the CLO 4 operate a small optical stars, galaxies, and the CLO 4 operate a small optical stars, galaxies, and techniques. Show to apply knowledge to apresentational skills. Apply insightful conclusions. B Demonstrate substantial learning outcomes. Show end some unfamiliar situations. Apply techniques. Mostly correct use of data of reconstrate general but Show evidence of some knowledge to solve problab skills and techniques. Fail Demonstrate little or no of analytical and critical problems. Organization a skills and techniques. Missills and techniques. Missills and techniques. Missills and techniques. Missills and techniques.	observations; properties of astronomical detectors (PMT, CCI astronomical spectroscopy; observations of stars and galaxie system, emission and absorption spectrum, and astronomical re On successful completion of this course, students should be able CLO 1 describe and explain the workings of astronomical te optical wavelengths CLO 2 describe the effects of the properties of light and Earth's CLO 3 explain how the methods of astronomical photometry ar stars, galaxies, and the universe CLO 4 operate a small optical telescope to conduct simple day Pass in PHYS1650 and (PHYS2250 or PHYS2265) Y 1st sem Offer in 2020 - 2021 : Y A Demonstrate thorough mastery at an advanced level of extens learning outcomes. Show strong analytical and critical abilities are to apply knowledge to a wide range of complex, familiar and upresentational skills. Apply highly effective lab skills and technic insightful conclusions. B Demonstrate substantial command of a broad range of knowledge learning outcomes. Show evidence of analytical and critical abilities and some unfamiliar situations. Apply effective organizational and Correct use of data of results to draw appropriate conclusions. C Demonstrate general but incomplete command of knowledge and skills familiar situations. Apply moderately effective organizational and techniques. Mostly correct but some erroneous use of data and results to Demonstrate partial but limited command of knowledge and skills from the proposed partial but limited command of knowledge and skills are minimally effective organizational and resounce of some coherent and logical thinking, but with link knowledge to solve problems. Apply limited or barely effective organization and presentational skills are minimally effective organization and presentational ski	observations; properties of astronomical detectors (PMT, CCD); astronomical imaging and astronomical spectroscopy; observations of stars and galaxies including blackbody radiation system, emission and absorption spectrum, and astronomical redshifts. On successful completion of this course, students should be able to: CLO 1 describe and explain the workings of astronomical telescopes and modern astronomical wavelengths CLO 2 describe the effects of the properties of light and Earth's atmosphere on astronomical of the stars, galaxies, and the universe CLO 3 explain how the methods of astronomical photometry and spectroscopy are applied to stars, galaxies, and the universe CLO 4 operate a small optical telescope to conduct simple day and night sky observations Pass in PHYS1650 and (PHYS2250 or PHYS2265) Y 1st sem Offer in 2020 - 2021 : 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 or 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 insightful conclusions. 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 familiar situations. Apply moderately effective organizational and presentational skills. Apply moderate techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. D Demonstrate paneral but licomplete command of knowledge and skills required for attaining most outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to a familiar situations. Apply moderately effective organizational and presentational skills. Apply moderate techniques. Mostly correct but some erroneous use of data and result			

PHYS3651	The phy	ysical universe (6 credits)	Academic Year	2019
Offering Department	Physics	· · · · · · · · · · · · · · · · · · ·	Quota	
Course Co-ordinator	Dr K M Le	ee, Physics (kmlee@lily.physics.hku.hk)		
Teachers Involved	(Dr K M L	_ee,Physics)		
Course Objectives	To introd	uce basic physical principles of astronomy and build a foundation i	n modern astrophysics	
Course Contents	Topics in	nclude: the sky and celestial coordinates, spherical geometry,	optics and telescopes	, basic celestial
& Topics	mechanic	cs, two-body problem, radiative transfer, and blackbody radiation.		
Course Learning	On succe	essful completion of this course, students should be able to:		
Outcomes	CLO 1	calculate the transformation between different celestial coordinat	e systems	
	CLO 2	describe the formation of spectral lines and basic structures of te	lescopes	
	CLO 3	derive the orbits in two body problem from first principle		
	CLO 4	recall the radiative transfer equation		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in P	PHYS1650 and (PHYS2250 or PHYS2265)		
Offer in 2019 - 2020	Y 1st	t sem Offer in 2020 - 2021 : N	Examination	Dec
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 think to apply knowledge to a wide range of complex, familiar and unfamiliar situal presentational skills.	ing, with evidence of origina	al thought, and ability
	В	Demonstrate substantial command of a broad range of knowledge and skills r learning outcomes. Show evidence of analytical and critical abilities and logical t and some unfamiliar situations. Apply effective organizational and presentationa	hinking, 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 familiar situations. Apply moderately effective organizational and presentational	thinking, and ability to apply	

	Fail Show know of an	v evidence of some co rledge to solve problen onstrate little or no evi nalytical and critical a	ut limited command of knowledge and skills required for attaining some of the course learning ne coherent and logical thinking, but with limited analytical and critical abilities. Show limited ab oblems. Apply limited or barely effective organizational and presentational skills. no evidence of command of knowledge and skills required for attaining the course learning outcical abilities, logical and coherent thinking. Show very little or no ability to apply knowledgen and presentational skills are minimally effective or ineffective.					
Course Type	Lecture-based	cture-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				12	CLO 1,2,3,4		
	Examination		2-hour written exam		60	CLO 1,2,3,4		
	Presentation				13	CLO 2,4		
	Test				15	CLO 1,2,3,4		
Required/recommended reading and online materials	Bradley W. Car George B. Rybi Frank H. Shu, 1 A. C. Phillips, T	Lecture notes provided by Course Coordinator Bradley W. Carroll and Dale A. Ostlie, An Introduction to Modern Astrophysics, 2nd ed. (Pearson, 2007) George B. Rybicki and Alan P. Lightman, Radiative Processes in Astrophysics (Wiley-Interscience, 1985) Frank H. Shu, The Physical Universe: An Introduction to Astronomy (University Science Books, 1982) A. C. Phillips, The Physics of Stars (John Wiley & Sons, 1999) F. Mandl, Statistical Physics, 2nd ed. (John Wiley & Sons, 1988)						
Course Website		sics.hku.hk/~phys3		. ,				

PHYS3652	Principl	es of astronomy	(6 credits)		Academic Year	2019		
Offering Department	Physics				Quota			
Course Co-ordinator	Dr L X Da	r L X Dai, Physics (lixindai @hku.hk)						
Teachers Involved	(Dr L X D	Dr L X Dai,Physics)						
Course Objectives		uce or review a nun y to gain knowledge	nber of basic physical pr of the Universe.	inciples, and explain l	now these principle	es are applied in		
Course Contents & Topics		Topics include: special relativity, Doppler effect; interaction of light and matter, spectral lines; single-dish elescopes and interferometers; binary stars and stellar parameters, exoplanets; classification of stellar spectra.						
Course Learning	On succe	ssful completion of the	nis course, students shoule	d be able to:				
Outcomes	CLO 1 de	escribe and explain th	ne physical principles disc	ussed				
	CLO 2 as	ssociate the correct p	hysical principles with the	observed properties of	f certain astronomi	cal objects		
		oply their understan roperties of select ast	ding of the physical pri cronomical objects	nciple discussed to e	explain or comput	te the observed		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in P	ass in PHYS1650 and (PHYS2250 or PHYS2265)						
Offer in 2019 - 2020	Y 2nd	d sem Offer in 2020) - 2021 : N		Examination	May		
Grade Descriptors (A+ to F)	A Demonstrate thorough mastery of the knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities, clear logical thinking, evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar, and unfamiliar situations using highly effective organizational and presentation skills.							
	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, reasoned 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.							
Course Type	Lecture-b	ased course						
Course Teaching	Activities	S	Details	Details				
& Learning Activities	Lectures					36		
	Tutorials					12		
	Reading	/ Self study				80		
Assessment Methods and Weighting	Methods		Details		hting in final se grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents			50	CLO 1,2,3		
	Examinat		2-hour written exam		50	CLO 1,2,3		
Required/recommended reading and online materials	Lecture n	otes provided by Cou rroll & D. A. Ostlie: A		Astrophysics (Addison-	Wesley Publishing			

PHYS3653	Astrophysics (6 credits)	Academic Year	2019
Offering Department	Physics	Quota	
Course Co-ordinator	Dr L X Dai, Physics (lixindai@hku.hk)		
Teachers Involved			
Course Objectives	This course is a beginner course in astrophysics - the application of physics in understand astronomical objects and phenomena. Emphasis is placed on becommon objects/phenomena in astronomy that either form the foundation castrophysics. It is one of the core electives for astronomy minor and an election of the core electives for astronomy minor and an election of the core electives for astronomy minor and an election of the core electives for astronomy minor and an election of the core electives for astronomy minor and an election of the core electives for astronomy minor and an election of the core electives for astronomy minor and an election of the core electives for astronomy minor and an election of the core electives for astronomy minor and an election of the core electives for astronomy minor and an election of the core electives for astronomy minor and an election of the core electives for astronomy minor and an election of the core electives for astronomy minor and an election of the core electives for astronomy minor and an election of the core electives for astronomy minor and an election of the core electives for astronomy minor and an election of the core electives for astronomy minor and an election of the core ele	asic observational or are at the fore	aspects and/or front of modern

	theme. U	Ipon completion, interest	ed student may take its s	equel PHYS4656 to fur	rther their stu	dies in astrophysics.		
Course Contents & Topics	Topics include: special relativity, Doppler effect, and relativistic beaming; interaction of light and matter, atomic physics, quantum mechanics; single-dish telescopes and interferometers; binary stars and stellar parameters, exoplanets; physics of stellar spectra.							
Course Learning	On succe	n successful completion of this course, students should be able to:						
Outcomes	CLO 1 de	escribe and explain the p	ohysical principles introdu	ced				
	CLO 2 re	elate the correct physical	principles to a given astro	onomical phenomenon				
		erform computations to o a given astronomical ph	demonstrate competence nenomenon	on and understanding	of the physic	al principles related		
Pre-requisites (and Co-requisites and Impermissible combinations)		ass in PHYS2250 or PHYS2265 or PHYS2650						
Offer in 2019 - 2020	N Off	fer in 2020 - 2021 : Y		E	Examination			
Grade Descriptors (A+ to F)	A	learning outcomes. Show s	stery at an advanced level of e trong analytical and critical abili ride range of complex, familiar	ties and logical thinking, wit	h 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.							
	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.							
Course Type	Lecture-b	ased course						
Course Teaching	Activitie	s	Details			No. of Hours		
& Learning Activities	Lectures		5 chapters			36		
	Tutorials		6 sessions			10		
	Reading	/ Self study				80		
Assessment Methods and Weighting	Methods	•	Details		ng in final grade (%)	Assessment Methods to CLO Mapping		
	Assignm	ents			40	CLO 1,2,3		
	Examina	tion	2-hour written exam		60	CLO 1,2,3		
Required/recommended	An Introd	uction to Modern Astroph	nysics, by Bradley Carroll	& Dale A. Ostlie				
reading and online materials								

PHYS3660	Astrono	omy laboratory (6 credits)	Academic Year	2019				
Offering Department	Physics		Quota	10				
Course Co-ordinator	Dr S C Y	Ng, Physics (ncy@astro.physics.hku.hk)						
Teachers Involved								
Course Objectives	focus is or results ra and an o	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 mino 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 laborator blackbod	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, and blackbody radiation; observations and data reduction techniques in multi-wavelength astronomy; introduction to data analysis software packages.						
Course Learning		ssful completion of this course, students should be able to:						
Outcomes		cquire astronomy observation techniques						
	CLO 2 conduct observations to verify the physical principle(s) in astronomy							
	CLO 3 apply analytical methods required to interpret and analyze results, and draw conclusions from the data							
	CLO 4 use of effective written and verbal communication skills through written laboratory reports and oral presentation							
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in (I	PHYS2261 or PHYS2650); and Pass in PHYS3650, or already enrolled	d in this course.					
Offer in 2019 - 2020	N Of	fer in 2020 - 2021 : Y	Examination					
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. Apply highly effective lab skills and techniques. Critical use o insightful conclusions.	with evidence of originals. Apply highly effective	al thought, and ability e organizational and				
	В							
	С	Demonstrate general but incomplete command of knowledge and skills required outcomes. Show evidence of some analytical and critical abilities and logical thinkin familiar situations. Apply moderately effective organizational and presentational skil techniques. Mostly correct but some erroneous use of data and results to draw appro	ing, and ability to appl lls. Apply moderately e	knowledge to most				
	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	ning some of the cours					

		re problems. Apply limited or barely effective organiques. Limited ability to use data and results to dra		. Apply partially effective			
	of analytical and problems. Organiz	r no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack ritical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve tion and presentational skills are minimally effective or ineffective. Apply minimally effective or ineffective lab is. Misuse of data and results and/or unable to draw appropriate conclusions.					
Course Type	Lecture with laboratory cor	mponent course					
Course Teaching	Activities	Details		No. of Hours			
& Learning Activities	Lectures	Working principle of telescop analysis skills	es, error analysis, data	8			
	Laboratory	Conduct astronomy observation	Conduct astronomy observational and data analysis laboratories				
	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	6-8 Laboratory reports	70	CLO 1,2,3,4			
	Presentation	1 oral presentation	15	CLO 1,2,3,4			
	Test	1 in-class test	15	CLO 1,3,4			
Required/recommended	Lecture notes provided by	Course Coordinator					
reading and		Experiments in Physics for Modern Astro					
online materials	R. Buchheim, The Sky is Y	Your Laboratory: Advanced Astronomy P	rojects for Amateurs, Praxis	(2007)			
Course Website	http://moodle.hku.hk						

PHYS3750	Laser a	nd spectroscop	y (6 credits)		Academic Y	ear 2019		
Offering Department	Physics				Quota			
Course Co-ordinator	Prof S J >	(u, Physics <i>(sjxu</i> @	hku.hk)					
Teachers Involved								
Course Objectives	The cours	se aims at providin	g a broad introduction	to major types of	of lasers and modern laser s	pectroscopy.		
Course Contents & Topics	technique	s. Lasers as spec	•		nentals of optical processes f spectroscopic instruments.			
Sauraa I aamalaa	Raman sp		f this serves stredentes	علماء عما اماريماء	.			
Course Learning Outcomes	On successful completion of this course, students should be able to:							
Julcomes	CLO 1 restate the properties of fundamental optical processes							
	CLO 2 describe fundamental operation principle of modern lasers CLO 3 demonstrate solid knowledge of modern laser spectroscopic techniques							
			nents of modern optic		•			
	CLO 5 er				emperature photoluminesce	nce spectra of solid		
			nental data and compa	are with the pred	iction of underlying physical	principle		
Pre-requisites (and Co-requisites and Impermissible combinations)			ndy enrolled in this cou		, 31 ,	'		
Offer in 2019 - 2020	N Off	er in 2020 - 2021	Υ		Examination			
Grade Descriptors	Α			d level of extensive	knowledge and skills required for			
	В	to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizationa presentational skills. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate insightful conclusions. B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the conclusions. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to fa and some unfamiliar situations. Apply effective organizational and presentational skills. Apply effective lab skills and technical skills.						
		Correct use of data of results to draw appropriate conclusions.						
				d skills required for attaining mos				
		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 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. Apply partially effective lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions.						
	Fail	of analytical and cr problems. Organizat skills and techniques	itical abilities, logical and ion and presentational skill s. Misuse of data and result	coherent thinking.	ills required for attaining the course Show very little or no ability to a stive or ineffective. Apply minimally aw appropriate conclusions.	pply knowledge to solve		
Course Type		ith laboratory com						
Course Teaching	Activities	S	Details			No. of Hours		
& Learning Activities	Lectures					36		
	Laborato	ry				10		
	Tutorials	/ O. If				8		
		/ Self study				80		
Assessment Methods and Weighting	Methods		Details		Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents			20	CLO 1,2,3,4,6		
	Examinat	tion	2-hour written	exam	60	CLO 1,2,3,4		
	Laborato	ry reports			20	CLO 5,6		
Required/recommende reading and online materials	J. Garcia		Course Coordinator , and D. Jaque: An In	troduction to the	Optical Spectroscopy of In	organic Solids (Joh		

PHYS3751	Physics	s of nanomaterials (6 credits)		Academic Year	2019			
Offering Department	Physics	,	,	(Quota				
Course Co-ordinator	TBC, Phy	ysics ()							
Teachers Involved	(TBC,Ph	ysics)							
Course Objectives	concepts	O .	s of nanomaterials inc	dents and fresh postgrad cluding two-dimensional					
Course Contents & Topics	nanomate Physical nanocrys	erials. Optical and trans properties of carbon na	port properties of quant notubes and semicond iples of scanning tunne	ect. Dimensionalities and tum wells, superlattices a uctor nanowires. Physica ling microscopy and adva ical yapor deposition.	nd two-dimension of contract o	onal electron gas uantum dots and			
Course Learning		n successful completion of this course, students should be able to:							
Outcomes	CLO 1 re	ecall basic concepts and	guantum size eff	ect					
	е	lectron gas		erties of quantum wells, s	•				
				metalorganic chemical va					
	CLO 4 d	escribe the basic physic	s of carbon nanotubes	and semiconductor nanov	vires				
				sional quantum dots and nanocrystals					
Pre-requisites (and Co-requisites and Impermissible combinations)		PHYS3351; and PHYS3551, or already er	nrolled in this course.						
Offer in 2019 - 2020	N Of	fer in 2020 - 2021 : N		E	Examination				
Grade Descriptors (A+ to F)	A	learning outcomes. Show s	strong analytical and critical a	of extensive knowledge and slabilities and logical thinking, with liar and unfamiliar situations. A	h 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 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 lim Show evidence of some co	nited command of knowledge wherent and logical thinking, b	and skills required for attaining ut with limited analytical and cri ctive organizational and presen	some of the cours tical abilities. Show	e learning outcomes.			
	Fail	of analytical and critical a	abilities, logical and coheren	edge and skills required for atta t thinking. Show very little or imally effective or ineffective.					
Course Type	Lecture-b	pased course							
Course Teaching & Learning Activities	Activitie	s	Details			No. of Hours			
Assessment Methods and Weighting	Methods	5	Details		ng in final grade (%)	Assessment Methods to CLO Mapping			
Required/recommended reading and online materials	TBC					-			

PHYS3760	Physics laboratory (6 credits) Academic Year 2019								
Offering Department	Physics	Quota 24							
Course Co-ordinator	Prof X D Cui, Physics (xdcui@hku.hk)								
Teachers Involved									
Course Objectives	This course trains students with experimental knowledge aphysics principles with measurements. The focus is or acquisition, and data analysis by computers rather than ve electives for physics major and a required course for the estudents may apply the techniques learnt here in experime	n advanced lab skills and techniques, including data rification of known physical theories. It is one of the core experimental physics theme. Upon completion, interested							
Course Contents & Topics	This course equips students with the necessary experime level physics experiments drawn from classical mechanics, and quantum mechanics. After introduci the way from experimental setup, data acquisition to data small group or an individual. In addition to eight labs, the present their result orally. Contents of the experiments and	nanics, electromagnetism, statistical mechanics and ng the basics in a few lectures, students have to work a analysis, possibly with the aid of a computer, either in a a also have to conduct a small experimental project and							
Course Learning	On successful completion of this course, students should be	e able to:							
Outcomes	CLO 1 acquire advanced physics experimental techniques								
	CLO 2 design and conduct experiments to verify the physics principle(s) commonly used in advanced university-level physics courses								
	CLO 3 apply analytical methods required to interpret and analyze results, and draw conclusions from the data								
	CLO 4 make use of effective written and verbal commun presentation								
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in any two of the following courses: PHYS3350, PHY	S3351, PHYS3450, PHYS3550							
Offer in 2019 - 2020	N Offer in 2020 - 2021 : Y	Examination							
Grade Descriptors (A+ to F)	learning outcomes. Show strong analytical and critical abile to apply knowledge to a wide range of complex, familiar	extensive knowledge and skills required for attaining all the course ities and logical thinking, with evidence of original thought, and ability and unfamiliar situations. Apply highly effective organizational and techniques. Critical use of data and results to draw appropriate and							

	В	learning outcomes. Show evi and some unfamiliar situation Correct use of data of results	idence of analytical and critical abilit ns. Apply effective organizational ar to draw appropriate conclusions.	dge and skills required for attaining at I ies and logical thinking, and ability to ap nd presentational skills. Apply effective la	ply knowledge to familiar ab skills and techniques.			
	С	outcomes. Show evidence of familiar situations. Apply mo	of some analytical and critical abiliti derately effective organizational an	and skills required for attaining most es and logical thinking, and ability to a d presentational skills. Apply moderatel results to draw appropriate conclusions.	pply knowledge to most			
	D	Show evidence of some cohe knowledge to solve problem	emonstrate partial but limited command of knowledge and skills required for attaining some of the how evidence of some coherent and logical thinking, but with limited analytical and critical abilities. In nowledge to solve problems. Apply limited or barely effective organizational and presentational skills and techniques. Limited ability to use data and results to draw appropriate conclusions.					
	Fail	of analytical and critical ab problems. Organization and	ilities, 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			
Course Type	Lecture w	ith laboratory component	course					
Course Teaching	Activities	3	Details	No. of Hours				
& Learning Activities	Lectures		Working principle of equipmanalysis, Writing skills	8				
	Laborator	У	8 standard labs and 1 project	28				
	Project w	ork	Presentation and preparation	n	20			
	Reading	Self study		64				
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Laborator	ry reports	8 lab reports	70	CLO 1,2,3,4			
	Presenta	tion	1 oral presentation	15	CLO 2,3			
	Project re	port	1 full project report	15	CLO 1,2,3,4			
Required/recommended reading and online materials	L. Lyons, P. Horowi	tz and W. Hill, The Art of	Coordinator a Analysis for Physical Scien Electronics, CUP (1989) on.org/about/gettingstarted/	ce Students, CUP (1991)				

PHYS3850	Waves	and optics (6 credi	ts)	Academic Yea	ır 2019		
Offering Department	Physics			Quota			
Course Co-ordinator	Dr D K Ki	, Physics (dkki@hku.h	k)				
Teachers Involved	(Dr D K K	(i,Physics)					
Course Objectives		coherent introduction s of light and optic appl		ohysical optics, with particular at	tention to the way		
Course Contents & Topics	of reflect	on and refraction; sup		heory of light; the propagation o of waves; theories, experiment nses.			
Course Learning			s course, students should be abl				
Outcomes	ir	terference and diffract	ion by using the theory of waves				
		pply the theory of opt evices	tics to calculate the geometrica	al parameters of thick lenses a	and design optica		
	CLO 3 a	pply essential theories	to design anti-reflection and refl	ection-enhancement films			
Pre-requisites (and Co-requisites and Impermissible combinations)		HYS2255 and PHYS2					
Offer in 2019 - 2020	Y 1st	sem Offer in 2020 -	2021 : 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	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. 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 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 lab skills and techniques. Limited ability to use data and results to draw appropriate conclusions.						
	Fail	of analytical and critical problems. Organization a	abilities, logical and coherent thinking	skills required for attaining the course leg. Show very little or no ability to app fective or ineffective. Apply minimally efortive appropriate conclusions.	ly knowledge to sol		
Course Type	Lecture v	ith laboratory compone	ent course				
Course Teaching	Activitie	S	Details		No. of Hours		
Learning Activities	Lectures						
& Learning Activities	Laborato	ry			6		
g	Tutorials				8		
	ratoriais				80		
3		/ Self study			80		
Assessment Methods		•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin		
Assessment Methods and Weighting	Reading	,	Details		Assessment Methods		

	Laboratory reports		10	CLO 1
	Test		15	CLO 1,2,3
Required/recommended	Lecture notes provided by Course	Coordinator		
reading and	Eugene Hecht: Optics, (Addison-W	/esley, 2001, 4th ed.).		
online materials	R. Guenther: Modern Optics, (John	n Wiley, 1990).		
Course Website	http://moodle.hku.hk			

PHYS3851	Atomic	and nuclear physi	ics (6 credits)	Academic Y	ear 2019				
Offering Department	Physics		· · · · · · · · · · · · · · · · · · ·	Quota					
Course Co-ordinator	Dr J H C	Lee, Physics (jleehc@	Dhku.hk)						
Teachers Involved	(Dr J H C	Lee,Physics)							
Course Objectives	This cour	se will introduce stude	ents to the fundamentals of a	atomic physics and nuclear physic	s. It will also disc				
-	nuclear a	strophysics and appl	ications of atomic and nucle	ar science. It aims to provide s	udents a concep				
	framewor	k of atomic and nucle	ar physics and serves as an	elective course to better prepare	students for grad				
		relevant subjects.							
Course Contents				quid Drop Model, Shell Model in					
& Topics				etectors, Nuclear Astrophysics, F	rontier research				
		ns in atomic and nucl		11.					
Course Learning	On successful completion of this course, students should be able to:								
Outcomes	CLO 1 describe and explain the basic features of atoms and nuclei								
		1170	•	s to atomic and nuclear system					
				physical effects in atoms and nuc	lei				
			ay processes and nuclear rea	ctions in nucleosynthesis					
Pre-requisites	Pass in P	HYS3351, or already	enrolled in this course						
(and Co-requisites									
and Impermissible									
combinations)			0004 1/						
Offer in 2019 - 2020		d sem Offer in 2020		Examination					
Grade Descriptors	Α			tensive knowledge and skills required for es and logical thinking, with evidence of o					
(A+ to F)				and unfamiliar situations. Apply highly ef					
	presentational skills. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate an								
	insightful conclusions. B 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. Apply effective lab skills and te								
	_	Correct use of data of results to draw appropriate conclusions.							
	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 moderat	ely effective lab skills				
	_			nd results to draw appropriate conclusions skills required for attaining some of the					
	D			th limited analytical and critical abilities. S					
	knowledge to solve problems. Apply limited or barely effective organizational and presentational skills. Apply partially eff								
	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. Law of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve								
		problems. Organization a	and presentational skills are minimal	ly effective or ineffective. Apply minimally					
		skills and techniques. Mi	suse of data and results and/or unab	ble to draw appropriate conclusions.					
Course Type		ith laboratory compor	nent course						
Course Teaching	Activitie		Details		No. of Hours				
& Learning Activities	Lectures				36				
	Laborato	,			6				
	Tutorials				8				
	Assessm	ent			80				
Assessment Methods	Methods	3	Details	Weighting in final	Assessmen				
and Weighting				course grade (%)	Methods				
					to CLO Mapp				
	Assignme			20	CLO 1,2,3,4				
	Examina			50	CLO 1,2,3,4				
	Laborato	ry reports		10	CLO 1				
	Test			20	CLO 1,2,3,4				
O	Lecture n	otes from the Course	Coordinator						
Requirea/recommenaea									
reading and online materials	W. Demtr		es and photons (Springer, 20 ohysics (John Wiley & Sons,						

PHYS3999	Directed studies in physics (6 credits) Academic Year 2019						
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 (intensis should be taken normally in their final year of study. It provides students with problem by themselves, either theoretical, experimental or numerical, under the using the subject materials the student has learn in all years of his/her major st from small scale research, critical literature review and comment, and to develop astronomy teaching tools.	the opportunity supervision of a udy. The availab	to study a small n academic staff le projects range				
Course Contents & Topics	Students interested in taking this course should contact their prospective sup- contents and the nature of their projects in the coming academic year. They mu- prospective supervisor and the course coordinator to take this course. Students will receive training in research literature reading and reviewing, to	ust get the appro	val from both the				
	member. For theoretical project, students may need to fill in mathematical gaps						

			search methods used in the fielding numerical or simulation result						
			periment, carrying it out and analy	,	is, students have to				
Course Learning			course, students should be able						
Outcomes		· · · · · · · · · · · · · · · · · · ·			review of books and				
	CLO 1 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 2 criticize existing approaches for solving the selected physics 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								
			cts) propose and execute physices of errors of the experiment or	•					
	CLO 6 (fo	or projects involving t	eam work) collaborate and corferent culture, gender and national	nmunicate effectively in th					
Pre-requisites			vanced level (3XXX level or above		courses of the Physics				
and Co-requisites			, Mathematics/Physics Major or A	, . ,	,				
and Impermissible	This caps	stone course is for Ast	ronomy, Mathematics/Physics, P	Physics, and Physics (Inten	sive) Majors students				
combinations)	only.								
			wed to take this capstone course	is their year 3 study.					
Offer in 2019 - 2020	Y 1st		nmer Offer in 2020 - 2021 : Y	Examination					
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.								
	C 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.								
	Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Show limited evidence of logical and independent thinking. 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. 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.								
Course Type	Project-ba	ased course							
Course Teaching	Activities	S	Details		No. of Hours				
& Learning Activities	Meeting v	with supervisor			36				
	Reading	/ Self study			84				
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping				
	Oral pres	entation	including supervisor's comments (10%)	30	CLO 1,3,4,5				
	Research	report		70	CLO 1,2,3,4,5,6				
Required/recommended reading and online materials	To be pro	vided by individual proj	ect supervisor						

PHYS4150	Computa	ational	physics	(6 cred	its)				Acaden	nic Year	2019
Offering Department	Physics										
Course Co-ordinator	Prof J Wan	ng, Phys	cs (jianwa	ang@hku.	hk)						
Teachers Involved	(Prof J Wa	ang,Phys	ics)								
Course Objectives	problems tapproache computation	The aim of the course is show how the power of computers enables to computational approach to solving physproblems to be adopted, which is distinct from, and complimentary to, traditional experimental and theoret approaches. The material covered will be found useful in any project or problem solving work that contains a str computational or data analysis element. The course is designed such that a significant fraction of the student's t is spent actually programming specific physical problems rather than learning abstract techniques.								al and theoretic contains a stror the student's tin	
Course Contents & Topics	and different mechanics Schrodinge Poisson's e	entiation s, partial er equal equation	interpola differenti ion), matr and elect	ation and ial equat rix metho tronic stru	extrapo ions (sud ds (such icture ca	lation, o ch as th n as sys lculations	rdinary one Maxw stems of s), Monte	lifferential e ell's equations a Carlo (Metr	equation suc on, the diffe and eigenva	ch as thusion ecoloris	gebra, integration ose of classical plation, and the plems applied to their simulation.
Course Learning	methods (such as molecular dynamics), and several physics projects. On successful completion of this course, students should be able to:										
Outcomes	CLO 1 der	monstra	e knowled	lge in ess	ential me	ethods ar	nd technic	ues for num	nerical comp	utation i	n physics
	CLO 2 apply Monte Carlo method and other simulation methods to solve deterministic as well as probabilistic physical problems										
	CLO 3 employ appropriate numerical method to interpolate and extrapolate data collected from physics experiments										
	CLO 4 use appropriate numerical method to solve the differential equations governing the dynamics of physical systems										
Pre-requisites (and Co-requisites and Impermissible combinations)									60 or PHYS3 50, PHYS35		d
Offer in 2019 - 2020	Y 1st s	sem O	fer in 202	0 - 2021 :	Υ				Examin	ation	Dec
Grade Descriptors	Α	. 15.55 51.51 252							and skills requ	ired for att	aining all the cours

Assessment Methods and Weighting		/ Self study s ments ation	Details 2-hour written exam	Weighting in final course grade (%) 20 40 15	8 80 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,3,4				
	Methods Assignm	/ Self study s nents		course grade (%)	Assessment Methods to CLO Mapping CLO 1,2,3,4				
	Reading Methods	/ Self study s	Details	course grade (%)	Assessment Methods to CLO Mapping				
	Reading	/ Self study	Details	0 0	80 Assessment Methods				
	Reading	/ Self study			80				
	Tutorials)							
	Tutorials								
•	Laborato				12				
& Learning Activities	Lectures	3			36				
Course Teaching	Activitie	es	Details		No. of Hours				
Course Type	Lecture v	with laboratory componer							
	Fail	of analytical and critical al problems. Organization and	bilities, logical and coherent thinking	skills required for attaining the course g. Show very little or no ability to ap fective or ineffective. Apply minimally of a draw appropriate conclusions	oply knowledge to solve				
	D	Show evidence of some col knowledge to solve probler	nerent and logical thinking, but with lir	is required for attaining some of the co nited analytical and critical abilities. Sh organizational and presentational skills ordraw appropriate conclusions.	now limited ability to apply				
		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.							
	В	learning outcomes. Show end and some unfamiliar situation Correct use of data of results	vidence of analytical and critical abilitions. Apply effective organizational and to draw appropriate conclusions.	lge and skills required for attaining at es and logical thinking, and ability to ap d presentational skills. Apply effective	oply knowledge to familian lab skills and techniques.				
		to apply knowledge to a w presentational skills. Apply insightful conclusions.	ride range of complex, familiar and undirective lab skills and technic	nd logical thinking, with evidence of or unfamiliar situations. Apply highly effe ques. Critical use of data and results	ective organizational and to draw appropriate and				

	Data ar	nalysis and modeling in physics (6 credits)	Academic Year	2019			
Offering Department	Physics	·	Quota				
Course Co-ordinator	Prof H F	Chau, Physics (hfchau@hku.hk)					
Teachers Involved	(Prof H F	F Chau, Physics)					
Course Objectives	special e basic pri for stude	This course covers general modeling and data analysis techniques used in physics and related subjects wit special emphasis on their uses in complex systems, nonlinear systems and adaptive systems. The focus is on the basic principles and concepts rather than the use of computer packages. This course provides a solid foundation for students who intended to do computational physics and complex systems research. It also prepares student to work in related industries.					
Course Contents & Topics	basic hyp differenc complex data ana physical be drawr	Topics include basic data analysis techniques, linear and non-linear fittings, determining the goodness of the fit, basic hypothesis testing techniques, modeling physical and related systems via differential (ordinary and/or partial), difference equations as well as discrete models such as cellular automata, introduction to complex systems, complex adaptive systems and nonlinear dynamics, the use of computer package such as Matlab in modeling and data analysis. The emphasis is on the basic principles and concepts rather than a particular software package or physical model. Depending on the mutual interests of the coordinators and the 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.					
Course Learning	On succ	essful completion of this course, students should be able to:					
Outcomes	CLO 1 c	describe and explain state-of-the-art modeling methods used in ph	nysics				
	CLO 3	CLO 2 apply basic modeling techniques, together with logical and mathematical reasoning, to situations of physical world CLO 3 analyse and solve problems with the aid of computer packages such as Matlab CLO 4 critically interpret experimental data from physics experiments					
Pre-requisites			2160 or DUVS2160); on	d			
(and Co-requisites and Impermissible	Pass in (MATH3301 or MATH3401 or MATH3403 or MATH3405 or PHYS2160 or PHYS3150); and Pass in any one of the following courses: PHYS3350, PHYS3351, PHYS3450, PHYS3550						
combinations)							
combinations) Offer in 2019 - 2020	N O	offer in 2020 - 2021 : N	Examination				
•	N Of	Offer in 2020 - 2021: N Demonstrate thorough mastery at an advanced level of extensive knowledge learning outcomes. Show strong analytical and critical abilities and logical thire to apply knowledge to a wide range of complex, familiar and unfamiliar site presentational skills. Apply highly effective computer modeling skills and tec appropriate and insightful conclusions.	ge and skills required for attanking, with evidence of original uations. Apply highly effective	al thought, and ability e organizational and			
Offer in 2019 - 2020 Grade Descriptors		Demonstrate thorough mastery at an advanced level of extensive knowledge learning outcomes. Show strong analytical and critical abilities and logical thir to apply knowledge to a wide range of complex, familiar and unfamiliar sit presentational skills. Apply highly effective computer modeling skills and tec	ge and skills required for attanking, with evidence of origina uations. Apply highly effectiveniques. Critical use of data attaining most of the course and ability to apply knowledge	al thought, and ability e organizational and and results to draw e learning outcomes, to familiar and some			
Offer in 2019 - 2020 Grade Descriptors	A	Demonstrate thorough mastery at an advanced level of extensive knowledg learning outcomes. Show strong analytical and critical abilities and logical thir to apply knowledge to a wide range of complex, familiar and unfamiliar sit presentational skills. Apply highly effective computer modeling skills and tec appropriate and insightful conclusions. Demonstrate substantial command of the knowledge and skills required for Show evidence of analytical and critical abilities, reasoned logical thinking, ar unfamiliar situations using effective organizational and presentation skills techniques. Correct use of data of results to draw appropriate conclusions. Demonstrate general but incomplete command of knowledge and skills re outcomes. Show evidence of some analytical and critical abilities and logica familiar situations. Apply moderately effective organizational and presentation.	ge and skills required for attanking, with evidence of origina uations. Apply highly effective chniques. Critical use of data attaining most of the course attaining to apply knowledge. Apply effective computer equired for attaining most of all thinking, and ability to apply ional skills. Apply moderately ional skills.	al thought, and ability e organizational and and results to draw e learning outcomes to familiar and some modeling skills and the course learning y knowledge to mos y effective computer			
Offer in 2019 - 2020 Grade Descriptors	В	Demonstrate thorough mastery at an advanced level of extensive knowledglearning outcomes. Show strong analytical and critical abilities and logical thir to apply knowledge to a wide range of complex, familiar and unfamiliar sit presentational skills. Apply highly effective computer modeling skills and tec appropriate and insightful conclusions. Demonstrate substantial command of the knowledge and skills required for Show evidence of analytical and critical abilities, reasoned logical thinking, ar unfamiliar situations using effective organizational and presentation skills techniques. Correct use of data of results to draw appropriate conclusions. Demonstrate general but incomplete command of knowledge and skills re outcomes. Show evidence of some analytical and critical abilities and logica	ge and skills required for attanking, with evidence of origina uations. Apply highly effective chniques. Critical use of data attaining most of the course and ability to apply knowledge. Apply effective computer equired for attaining most of al thinking, and ability to applyional skills. Apply moderately and results to draw appropria or attaining some of the course at and critical abilities. Show It and presentational skills. Ap	al thought, and ability e organizational and and results to draw a learning outcomes to familiar and some modeling skills and the course learning y knowledge to most y effective computer ate conclusions. e learning outcomes limited ability to applyply partially effective process.			
Offer in 2019 - 2020 Grade Descriptors	B C	Demonstrate thorough mastery at an advanced level of extensive knowledg learning outcomes. Show strong analytical and critical abilities and logical thir to apply knowledge to a wide range of complex, familiar and unfamiliar sit presentational skills. Apply highly effective computer modeling skills and tecappropriate and insightful conclusions. Demonstrate substantial command of the knowledge and skills required for Show evidence of analytical and critical abilities, reasoned logical thinking, an unfamiliar situations using effective organizational and presentation skills techniques. Correct use of data of results to draw appropriate conclusions. Demonstrate general but incomplete command of knowledge and skills re outcomes. Show evidence of some analytical and critical abilities and logica familiar situations. Apply moderately effective organizational and presentati modeling skills and techniques. Mostly correct but some erroneous use of data Demonstrate partial but limited command of knowledge and skills required fo Show evidence of some coherent and logical thinking, but with limited analytick knowledge to solve problems. Apply limited or barely effective organizational	ge and skills required for attanking, with evidence of origina uations. Apply highly effective chniques. Critical use of data attaining most of the course and ability to apply knowledge. Apply effective computer equired for attaining most of all thinking, and ability to apply ional skills. Apply moderately an and results to draw appropria attaining some of the courseal and critical abilities. Show I and presentational skills. Aps to draw appropriate conclused for attaining the course lear in the course learned in th	al thought, and ability e organizational and and results to draw and results to draw to familiar and some modeling skills and the course learning y knowledge to most y effective computer ate conclusions. e learning outcomes limited ability to apply popular and the course learning outcomes limited ability to apply poly partially effective ions. The provided the course outcomes are the conclusions.			

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	B. Hahn and D. Valentine: Esse L. Lam: Nonlinear Physics for E N. Boccara: Modeling Complex	Error Analysis (Univ. Sci. Books, ential Matlab for Engineers and S	cientists (Academic Press, 5th 2)	ed., 2013)

PHYS4350	Advance	ed classical mechan	ics (6 credits)	Ac	ademic Year	2019	
Offering Department	Physics			Qu	ota		
Course Co-ordinator	Prof S Q S	Shen, Physics (sshen@h	nku.hk)				
Teachers Involved	(Prof S Q	Shen, Physics)					
Course Objectives	mathemat course to	ical techniques in classi better prepare students t	duate level course PHYS cal mechanics through spe for their postgraduate studie	cial topics and applicates in physics or other r	ations. It serv elated discipli	es as an elective nes.	
Course Contents & Topics			ciples, Lagrangian formula eralized coordinates, simple				
Course Learning	On succes	ssful completion of this c	ourse, students should be a	able to:			
Outcomes	CLO 1 ex	plain the difference betw	veen Newtonian mechanics	and analytical mechai	nics		
	CLO 2 solve the mechanical problems using Lagrangian formalism						
	CLO 3 dis	CLO 3 discuss the connection between classical mechanics and quantum mechanics from Hamiltonian form					
	CLO 4 ap	ply the variational princi	ple to real physical situation	IS			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Pl	HYS3350					
Offer in 2019 - 2020	N Offe	er in 2020 - 2021 : Y		Ex	amination		
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. 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						
	D	Demonstrate partial but limit Show evidence of some coh	amiliar situations. Apply moderately effective organizational and presentational skills. lemonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. inhow evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply nowledge to solve problems. Apply limited or barely effective organizational and presentational skills.				
	Fail	Demonstrate little or no evid of analytical and critical ab	ence of command of knowledge a illities, logical and coherent think presentational skills are minimally	nd skills required for attaining. Show very little or no	ng the course lea		
Course Type	Lecture-ba	ased course	· · · · · · · · · · · · · · · · · · ·				
Course Teaching	Activities	3	Details			No. of Hours	
& Learning Activities	Lectures					36	
	Tutorials					12	
	Reading /	Self study				80	
Assessment Methods and Weighting	Methods	·	Details	Weighting course gr	ade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents		20		CLO 1,2,3,4	
	Examinat	ion	3-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 Course ein, C. Poole, and J. Safl	Coordinator ko, Classical Mechanics, (Pe	earson Education Inc,	2004)	· · · /	
Course Website	http://moo	dle.hku.hk					
Jourge Website		dle.hku.hk					

PHYS4351	Advanced quantum mechanics (6 credits) Academic Year		
Offering Department	Physics	Quota	
Course Co-ordinator	Prof W Yao, Physics (wangyao @hku.hk)		
Teachers Involved	(Prof W Yao, Physics)		
Course Objectives	Build on the advanced undergraduate level course PHYS3351, this course mathematical techniques in quantum mechanics through special topics and appropriate to better prepare students for their postgraduate studies in physics or oth	plications. It serve	es as an elective
Course Contents & Topics	Identical particles. Pauli exclusion principle. Fermion and bosons. WKB appridegenerate and degenerate perturbation theory. Time dependent perturbation partial waves and Born approximation. Variational method.		

Course Learning	On successful completion of this course, students should be able to:					
Outcomes			n theory and some other approxin		ntum systems	
	CLO 2 ap	pply physics principle	es to describe the physical proper	ties of various quantum systems	S	
		emonstrate knowled uantum systems	ge and discuss the underlying	physical concepts associated	with the selected	
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in P	ass in PHYS3351				
Offer in 2019 - 2020	Y 2nd	d sem Offer in 2020	0 - 2021 : Y	Examination	May	
Grade Descriptors (A+ to F)	Α	learning outcomes. She	mastery at an advanced level of extensions strong analytical and critical abilities at a wide range of complex, familiar and	and logical thinking, with evidence of or	iginal thought, and ability	
	В	learning outcomes. Sho	al command of a broad range of knowled by evidence of analytical and critical abiliti uations. Apply effective organizational and	ies 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.				
	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 critic	evidence of command of knowledge and al abilities, logical and coherent thinking and presentational skills are minimally ef	g. Show very little or no ability to ap		
Course Type	Lecture-b	ased course				
Course Teaching	Activities	S	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		20	CLO 1,2,3	
	Examination		3-hour written exam	60	CLO 1,2,3	
	Test			20	CLO 1,2,3	
eading and	Lecture notes provided by Cou		urse Coordinator Quantum Mechanics (Pearson Pre	entice Hall, 2004, 2nd edition).		
online materials						

PHYS4450	Advance	ed electromagnetisn	n (6 credits)	Academic Year	2019	
Offering Department	Physics		•	Quota		
Course Co-ordinator	Prof X D (Cui, Physics (xdcui@hku	.hk)			
Teachers Involved	(Prof X D	Cui, Physics)				
Course Objectives	mathemat	Build on the advanced undergraduate level course PHYS3450, this course further discusses concepts and mathematical techniques in electromagnetism 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			ns, Poynting theorem, wave equage transformations, dipole ra			
Course Learning	On succe	ssful completion of this c	ourse, students should be able t	0:	,	
Outcomes	CLO 1 r	CLO 1 review and discuss the fundamental physics in classical electrodynamics				
	CLO 2	apply Maxwell's equations	s to analyze complicated electro	static and magnetic phenomen	a	
			tivity is incorporated in the study			
		•	ems in electromagnetism using	•	niaues	
Pre-requisites (and Co-requisites and Impermissible combinations)	1-455 III P	HYS3450				
Offer in 2019 - 2020	Y 1st	sem Offer in 2020 - 20	21 : Y	Examination	Dec	
Grade Descriptors (A+ to F)	В	learning outcomes. Show st to apply knowledge to a wipresentational skills. Demonstrate substantial core	tery at an advanced level of extensive rong analytical and critical abilities and de range of complex, familiar and unfa mmand of a broad range of knowledge	ogical thinking, with evidence of original amiliar situations. Apply highly effection and skills required for attaining at lea	al thought, and ability we organizational and st 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 learni Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited a knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
		knowledge to solve problems	 Apply limited or barely effective organi 	zational and presentational skills.	limited ability to appl	
	Fail	Demonstrate little or no evid of analytical and critical ab	s. Apply limited or barely effective organience of command of knowledge and skillities, logical and coherent thinking. Spresentational skills are minimally effect	Ils required for attaining the course lead Show very little or no ability to apply	arning outcomes. Lac	
Course Type		Demonstrate little or no evid of analytical and critical ab	ence of command of knowledge and skillities, logical and coherent thinking. S	Ils required for attaining the course lead show very little or no ability to apply	arning outcomes. Lac	
		Demonstrate little or no evid of analytical and critical ab problems. Organization and ased course	ence of command of knowledge and skillities, logical and coherent thinking. S	Ils required for attaining the course lead show very little or no ability to apply	arning outcomes. Lac	
Course Teaching	Lecture-b	Demonstrate little or no evid of analytical and critical ab problems. Organization and ased course	ence of command of knowledge and sk illities, logical and coherent thinking. S presentational skills are minimally effect	Ils required for attaining the course lead show very little or no ability to apply	arning outcomes. Lac knowledge to solve	
Course Teaching	Lecture-b	Demonstrate little or no evid of analytical and critical ab problems. Organization and ased course	ence of command of knowledge and sk illities, logical and coherent thinking. S presentational skills are minimally effect	Ils required for attaining the course lead show very little or no ability to apply	aming outcomes. Lac knowledge to solve	
Course Type Course Teaching & Learning Activities	Lecture-b Activities Lectures Tutorials	Demonstrate little or no evid of analytical and critical ab problems. Organization and ased course	ence of command of knowledge and sk illities, logical and coherent thinking. S presentational skills are minimally effect	Ils required for attaining the course lead show very little or no ability to apply	naming outcomes. Lac knowledge to solve No. of Hours 36	

	Assignments		10	CLO 1,2,3,4
	Examination	3-hour written exam	60	CLO 1,2,3,4
	Test		30	CLO 1,2,3,4
Required/recommended reading and online materials	, , , , , , , , , , , , , , , , , , ,	Coordinator rodynamics, 3rd ed., (Prentice-Hall,	1999).	

PHYS4550	Advanc	ed statistical mech	anics (6 credits)		Academic Year	2019
Offering Department	Physics				Quota	
Course Co-ordinator	Dr Y J Tu	i, Physics (yanjuntu@hk	ku.hk)			
Teachers Involved		u,Physics)				
Course Objectives	mathema	Build on the advanced undergraduate level course PHYS3550, this course further discusses concepts ar mathematical techniques in statistical mechanics through special topics and applications. It serves as an electi course to better prepare students for their postgraduate studies in physics or other related disciplines.				
Course Contents & Topics			bles for isolated and open s Landau theory. Classical idea			
Course Learning			course, students should be a	•		
Outcomes	CLO 1 d	escribe and explain the	fundamental physical princip	les		
	CLO 2 a	pply these principles, to	gether with logical and mathe	ematical reasoning	, to situations of t	he physical world
	CLO 3 a	CLO 3 analyses and solve problems with the aids of mathematics				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in P	PHYS3550				
Offer in 2019 - 2020	N Off	fer in 2020 - 2021 : Y			Examination	
Grade Descriptors (A+ to F)	A	learning outcomes. Show s	stery at an advanced level of exte strong analytical and critical abilities wide range of complex, familiar an	and logical thinking, v	vith evidence of origin	al 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.					
	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 critical a	idence of command of knowledge a abilities, logical and coherent think d presentational skills are minimally	ing. Show very little	or no ability to apply	
Course Type	Lecture-b	ased course				
Course Teaching	Activitie	S	Details			No. of Hours
Learning Activities	Lectures					36
	Tutorials					12
	Reading	/ Self study				80
Assessment Methods and Weighting	Methods	•	Details		ting in final e grade (%)	Assessment Methods to CLO Mapping
	Assignments				20	CLO 1,2,3
	Examina		3-hour written exam		50	CLO 1,2,3
	Test				30	CLO 1,2,3
Required/recommended reading and online materials		otes provided by Course hria and Paul D. Beale:	e Coordinator Statistical Mechanics, 3rd ed	lition (Academic Pr	ress, 2011)	

PHYS4551	Solid sta	ate physics (6 credits)	Academic Year	2019		
Offering Department	Physics		Quota			
Course Co-ordinator	Prof M H 2	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 physics. Some selected advanced topics will also be discussed. This is an elective course for the theoretical and experimental physics themes. This is also an essential course for those who plan to pursue postgraduate studies in condensed matter, solid state physics and material science or to work in related industries.					
Course Contents & Topics	free electr and optica	ructures and symmetry; the reciprocal lattice and X-ray diffraction; leads of metals; band structures and Bloch theory; nearly free electroal properties; semi-classical model of electron dynamics; if time per Hall effect, superconductivity will also be covered.	ons and tight binding	model; electronic		
Course Learning Outcomes	CLO 1 de CLO 2 de CLO 3 ap	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 physical concepts apply physical principles and mathematical equations to discuss the physical properties of materials CLO 4 discuss the physics of semiconductors, quantum Hall effect and superconductivity				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in (P	PHYS2255 or PHYS2260) and PHYS3351	·			
Offer in 2019 - 2020	Y 1st	sem Offer in 2020 - 2021 : Y	Examination	Dec		
Grade Descriptors (A+ to F)	Α	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	ng, 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 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.			
	С	Demonstrate general but i outcomes. Show evidence	ncomplete command of knowledge	and skills required for attaining most es and logical thinking, and ability to a	
	D	Demonstrate partial but liming Show evidence of some colling to the colling and the colling and the colling are colling at the	ited command of knowledge and skil nerent and logical thinking, but with li	ls required for attaining some of the committed analytical and critical abilities. Shiganizational and presentational skills.	
	Fail	of analytical and critical al		I skills required for attaining the course g. Show very little or no ability to ap fective or ineffective.	
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		20	CLO 1,2,3,4
	Examinati	on	2-hour written exam	60	CLO 1,2,3,4
	Test			20	CLO 1,2,3,4
Required/recommended reading and	C. Kittel: Ir		physics (John Wiley, 1996).		
online materials	N.W. Asho	roft and D.N. Mermin: S	Solid state physics (Holt, Rinel	hart and Winston, 1987).	

	Stellar p	physics (6 cred	its)	Academic Y	ear 2019	
Offering Department	Physics		•	Quota		
Course Co-ordinator	Dr S C Y	Ng, Physics (ncy@	@bohr.physics.hku.hk)			
Teachers Involved	(Dr S C Y	Ng,Physics)				
Course Objectives	stresses	o introduce the basic theory of stellar structure and evolution. It follows a vigorous mathematical treatment that tresses on the underlying physical processes. Knowledge in quantum mechanics and statistical mechanics will be dvantageous.				
Course Contents & Topics	stellar rad sequence explosion and plane	opics include: Definition of stars. The H-R diagram. Stellar structure equations. Polytropic model. Elementa tellar radiation processes. Simple stellar nuclear processes. Saha equation. Stability of stars. Zero-age ma equence stars and their evolution. The solar neutrino problem. Late stage evolution of stars. Supernox xplosion. If time permits, special topics selected from below will be briefly mentioned: star formation, brown dwa nd planets, AGB stars and planetary nebulae, binary stars and their evolution, Cepheid variables and theory tellar pulsation, and introduction to helioseismology.				
Course Learning	On succe	ssful completion o	f this course, students should be able	e to:		
Outcomes	CLO 1 de	CLO 1 describe what is stars and to classify different types of stars				
			e and solve problems related to the s ations and Saha equations	structure and evolution of stars	s including the use o	
		ritically examine th f stars	ne physical processes occurring in st	tars and how these processes	s affect the evolution	
			earch papers in the field of stellar as	trophysics		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in P	PHYS3351 and PH	YS3651			
Offer in 2019 - 2020	Y 2nd	d sem Offer in 20	020 - 2021 : 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 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 Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show like 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 learn of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply the control of the course learn of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply the course learn of analytical and critical abilities.					
	Fail	Demonstrate little or of analytical and cr	r no evidence of command of knowledge and ritical abilities, logical and coherent thinking	skills required for attaining the course. Show very little or no ability to a	how limited ability to apply e learning outcomes. Lac	
Course Type		Demonstrate little or of analytical and cr problems. Organizat	no evidence of command of knowledge and	skills required for attaining the course. Show very little or no ability to a	how limited ability to apply e learning outcomes. Lac	
• • • • • • • • • • • • • • • • • • • •	Lecture-b	Demonstrate little or of analytical and cr problems. Organizato pased course	no evidence of command of knowledge and ritical abilities, logical and coherent thinking tion and presentational skills are minimally effe	skills required for attaining the course. Show very little or no ability to a	how limited ability to apply e learning outcomes. Lack pply knowledge to solve	
Course Teaching	Lecture-b	Demonstrate little or of analytical and or problems. Organizato passed course	r no evidence of command of knowledge and ritical abilities, logical and coherent thinking	skills required for attaining the course. Show very little or no ability to a	how limited ability to apply elearning outcomes. Lack pply knowledge to solve	
Course Teaching	Lecture-b Activitie Lectures	Demonstrate little or of analytical and or problems. Organizationssed course	no evidence of command of knowledge and ritical abilities, logical and coherent thinking tion and presentational skills are minimally effe	skills required for attaining the course. Show very little or no ability to a	how limited ability to apply e learning outcomes. Lack pply knowledge to solve	
Course Teaching	Lecture-b Activitie Lectures Tutorials	Demonstrate little or of analytical and or problems. Organizat pased course	no evidence of command of knowledge and ritical abilities, logical and coherent thinking tion and presentational skills are minimally effe	skills required for attaining the course. Show very little or no ability to a	how limited ability to apply e learning outcomes. Lack pply knowledge to solve No. of Hours 36 12	
Course Teaching & Learning Activities Assessment Methods	Lecture-b Activitie Lectures Tutorials	Demonstrate little or of analytical and or problems. Organizationsed course	no evidence of command of knowledge and ritical abilities, logical and coherent thinking tion and presentational skills are minimally effe	skills required for attaining the course. Show very little or no ability to a	No. of Hours 36 12 80 Assessment Methods	
Course Teaching & Learning Activities Assessment Methods	Lecture-b Activitie Lectures Tutorials Reading Methods	Demonstrate little or of analytical and or problems. Organization assed course s	no evidence of command of knowledge and ritical abilities, logical and coherent thinking tion and presentational skills are minimally efferments. Details	skills required for attaining the course. Show very little or no ability to a active or ineffective. Weighting in final	No. of Hours 36 12 80 Assessment Methods to CLO Mapping	
Course Teaching & Learning Activities Assessment Methods	Lecture-b Activitie Lectures Tutorials Reading Methods	Demonstrate little or of analytical and or problems. Organization assed course s	rno evidence of command of knowledge and ritical abilities, logical and coherent thinking tion and presentational skills are minimally efferment of the property of the proper	skills required for attaining the course. Show very little or no ability to a ective or ineffective. Weighting in final course grade (%)	No. of Hours 36 12 80 Assessment Methods to CLO Mapping CLO 1,2,3,4	
Course Teaching & Learning Activities Assessment Methods	Lecture-b Activitie Lectures Tutorials Reading Methods Assignme	Demonstrate little or of analytical and or problems. Organization assed course is	no evidence of command of knowledge and ritical abilities, logical and coherent thinking tion and presentational skills are minimally efferments. Details	skills required for attaining the course. Show very little or no ability to a ective or ineffective. Weighting in final course grade (%) 10 60	No. of Hours No. of Hours 36 12 80 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3	
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	Lecture-b Activitie Lectures Tutorials Reading Methods	Demonstrate little or of analytical and or problems. Organization assed course is	rno evidence of command of knowledge and ritical abilities, logical and coherent thinking tion and presentational skills are minimally efferment of the property of the proper	skills required for attaining the course. Show very little or no ability to a ective or ineffective. Weighting in final course grade (%)	No. of Hours 36 12 80 Assessment Methods to CLO Mapping CLO 1,2,3,4	

	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/~phys4650/

000	Selected	d topics in astroph	ysics (6 credits)		Academic Year	2019	
Offering Department	Physics		,		Quota		
Course Co-ordinator	Prof K S C	Cheng, Physics (hrspks	sc@hku.hk)				
Teachers Involved	(Prof K S (Cheng, Physics)					
Course Objectives	To introdu	uce students some cu	rrent topics in astrophysics.	It may be taken	as a self-contair	ed course or as	
	backgroun	nd to research work in	astrophysics.				
Course Contents & Topics	of shock v						
Course Learning	On succes	ssful completion of this	course, students should be a	ible to:			
Outcomes	CLO 1 ap	ply physics principles	to describe the physical prope	erties of various as	trophysical syster	ns	
	CLO 2 ex	plain the observed phe	enomena of some selected as	strophysical objects	3		
		•	and discuss the underlying	physical concepts	associated with	the astrophysica	
	sy	stems and their dynam	nic interactive processes				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Ph	HYS3351 or PHYS345	0 or PHYS3550 or PHYS365	1			
Offer in 2019 - 2020	Y 1st	sem Offer in 2020 - 2	2021 : N		Examination	Dec	
Grade Descriptors (A+ to F)	A	learning outcomes. Show	astery at an advanced level of exte strong analytical and critical abilities wide range of complex, familiar an	and logical thinking, w	ith evidence of origin	al thought, and abilit	
	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	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.					
		knowledge to solve proble		organizational and pres	entational skills.	штией аршу ю аррг	
	Fail	Demonstrate little or no ev of analytical and critical		nd skills required for at ing. Show very little of	taining the course lea	rning outcomes. Lac	
Course Type		Demonstrate little or no ev of analytical and critical	ms. Apply limited or barely effective of vidence of command of knowledge a abilities, logical and coherent think Ind presentational skills are minimally	nd skills required for at ing. Show very little of	taining the course lea	rning outcomes. Lac	
		Demonstrate little or no evor analytical and critical problems. Organization and ith laboratory componed	ms. Apply limited or barely effective of vidence of command of knowledge a abilities, logical and coherent think Ind presentational skills are minimally	nd skills required for at ing. Show very little of	taining the course lea	rning outcomes. Lac	
Course Teaching	Lecture wi	Demonstrate little or no evor analytical and critical problems. Organization and ith laboratory componed	ms. Apply limited or barely effective of idence of command of knowledge a abilities, logical and coherent think id presentational skills are minimally ent course	nd skills required for at ing. Show very little of	taining the course lea	rning outcomes. Lac knowledge to solve	
Course Teaching	Lecture wi	Demonstrate little or no ev of analytical and critical problems. Organization an ith laboratory compone	ms. Apply limited or barely effective of idence of command of knowledge a abilities, logical and coherent think id presentational skills are minimally ent course	nd skills required for at ing. Show very little of	taining the course lea	rning outcomes. Lac knowledge to solve	
Course Teaching	Lecture wi	Demonstrate little or no ev of analytical and critical problems. Organization an ith laboratory compone	ms. Apply limited or barely effective of idence of command of knowledge a abilities, logical and coherent think id presentational skills are minimally ent course	nd skills required for at ing. Show very little of	taining the course lea	rning outcomes. Lac knowledge to solve No. of Hours 36	
Course Teaching	Lecture wi Activities Lectures Laborator Tutorials	Demonstrate little or no ev of analytical and critical problems. Organization an ith laboratory compone	ms. Apply limited or barely effective of idence of command of knowledge a abilities, logical and coherent think id presentational skills are minimally ent course	nd skills required for at ing. Show very little of	taining the course lea	nning outcomes. Lacknowledge to solve No. of Hours 36 8	
Course Teaching & Learning Activities Assessment Methods	Lecture wi Activities Lectures Laborator Tutorials	Demonstrate little or no ev of analytical and critical problems. Organization and ith laboratory compone s	ms. Apply limited or barely effective of idence of command of knowledge a abilities, logical and coherent think id presentational skills are minimally ent course	nd skills required for at ing. Show very little c effective or ineffective.	taining the course lead or no ability to apply	nning outcomes. Lac knowledge to solve	
Course Teaching Learning Activities Assessment Methods	Lecture wi Activities Lectures Laborator Tutorials Reading /	Demonstrate little or no ev of analytical and critical problems. Organization and ith laboratory compones.	ms. Apply limited or barely effective of idence of command of knowledge a abilities, logical and coherent think id presentational skills are minimally ent course Details	nd skills required for at ing. Show very little c effective or ineffective.	taining the course lead or no ability to apply	No. of Hours 36 8 8 80 Assessment Methods	
Course Teaching Learning Activities Assessment Methods	Lecture wi Activities Lectures Laborator Tutorials Reading / Methods	Demonstrate little or no ev of analytical and critical problems. Organization and ith laboratory compone ith laboratory compone is	ms. Apply limited or barely effective of idence of command of knowledge a abilities, logical and coherent think id presentational skills are minimally ent course Details	nd skills required for at ing. Show very little ceffective or ineffective. Weigh	taining the course lead or no ability to apply	No. of Hours 36 8 8 80 Assessment Methods to CLO Mapping	
Course Teaching Learning Activities Assessment Methods	Lecture wi Activities Lectures Laborator Tutorials Reading / Methods	Demonstrate little or no ev of analytical and critical problems. Organization and ith laboratory compone ith laboratory compone is 'Y' Self study	ms. Apply limited or barely effective of idence of command of knowledge a abilities, logical and coherent think id presentational skills are minimally ent course Details	nd skills required for at ing. Show very little ceffective or ineffective. Weigh	taining the course lead or no ability to apply ting in final e grade (%)	No. of Hours 36 8 80 Assessment Methods to CLO Mapping CLO 1,2,3	
Course Teaching Learning Activities Assessment Methods	Lecture wi Activities Lectures Laborator Tutorials Reading / Methods	Demonstrate little or no ev of analytical and critical problems. Organization an ith laboratory compone ith laboratory compone ith self-self-self-self-self-self-self-self-	ms. Apply limited or barely effective of idence of command of knowledge a abilities, logical and coherent think id presentational skills are minimally ent course Details	nd skills required for at ing. Show very little ceffective or ineffective. Weigh	taining the course lead or no ability to apply ting in final e grade (%)	No. of Hours 36 8 8 8 80 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	
Course Teaching & Learning Activities Assessment Methods	Lecture wi Activities Lectures Laborator Tutorials Reading / Methods Assignme Examinati Laborator	Demonstrate little or no ev of analytical and critical problems. Organization an ith laboratory compone ith laboratory compone ith self-self-self-self-self-self-self-self-	ms. Apply limited or barely effective of idence of command of knowledge a abilities, logical and coherent think id presentational skills are minimally ent course Details	nd skills required for at ing. Show very little ceffective or ineffective. Weigh	taining the course lead or no ability to apply ting in final e grade (%) 8 50 7	No. of Hours 36 8 8 8 80 Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2,3 CLO 1,2,3	
Course Teaching & Learning Activities Assessment Methods and Weighting	Lecture wi Activities Lectures Laborator Tutorials Reading / Methods Assignme Examinati Laborator Presentat Test	Demonstrate little or no ev of analytical and critical problems. Organization an ith laboratory compone ith laboratory compone ith self-self-self-self-self-self-self-self-	ms. Apply limited or barely effective of idence of command of knowledge a babilities, logical and coherent think id presentational skills are minimally ent course Details Details	nd skills required for at ing. Show very little ceffective or ineffective. Weigh	ting in final e grade (%) 8 50 7	No. of Hours 36 8 8 8 80 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	
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended reading and online materials	Lecture wi Activities Lectures Laborator Tutorials Reading / Methods Assignme Examinati Laborator Presentat Test Lecture no S. L. Shap	Demonstrate little or no ev of analytical and critical problems. Organization and ith laboratory compone ith laboratory compone is Y / Self study ents ion ry reports tion oftes provided by Cours or and S. A. Teukolsk roll & D. A. Ostlie: An I	ms. Apply limited or barely effective of idence of command of knowledge a babilities, logical and coherent think id presentational skills are minimally ent course Details Details	nd skills required for at ing. Show very little ceffective or ineffective. Weigh course	ting in final e grade (%) 8 50 7 15 20 s (John Wiley, 198	No. of Hours 36 8 8 80 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	

PHYS4652	Planetary science (6 credits)	Academic Year	2019				
Offering Department	Physics	Quota					
Course Co-ordinator	Dr M H Lee, Physics (mhlee@hku.hk)						
Teachers Involved	(Dr M H Lee, Physics)						
Course Objectives	This course provides students with a modern advanced-level understanding of and planetary systems around other stars and of the physical, chemical, and them.		,				
Course Contents & Topics	Terrestrial planets, giant planets, moons and minor bodies in our Solar Systransport; planetary atmospheres, surfaces, and interiors; planet formation; extra		ynamics; energy				
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 describe key aspects of our Solar System and extrasolar planetary system and experiments	ems acquired thro	ugh observations				
	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 and evolution of planetary bodies						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in PHYS3651 or (PHYS3350 and PHYS3550)						
Offer in 2019 - 2020	Y 2nd sem Offer in 2020 - 2021 : N	Examination	May				
Grade Descriptors	A Demonstrate thorough mastery at an advanced level of extensive knowledge and	skills required for atta	aining 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.						
	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 limit Show evidence of some coh	ted command of knowledge and si erent and logical thinking, but with	kills required for attaining some of the or limited analytical and critical abilities. Sh organizational and presentational skills.			
	Fail	Demonstrate little or no evid of analytical and critical ab	ence of command of knowledge a	nd skills required for attaining the course ing. Show very little or no ability to ap			
Course Type	Lecture-ba	ased 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		20	CLO 1,2,3		
	Essay			15	CLO 1,2,3		
	Examinat	on	2-hour written exam	50	CLO 1,2,3		
	Test			15	CLO 1,2,3		
Required/recommended reading and online materials	I. de Pater		netary Sciences (Cambridge	Univ. Press, 2010, 2nd Ed.) the Solar System (Cambridge Un	iversity Press, 2011,		
Course Website	http://moo	dle.hku.hk					

PHYS4653	Cosmo	logy (6 credits)			Academic Yea	r 2019	
Offering Department	Physics				Quota		
Course Co-ordinator	Prof K S	Cheng, Physics (hrs.	oksc@hku.hk)				
Teachers Involved	(Prof K S	Cheng, Physics)					
Course Objectives	mathema	atical formulation use	o offer an advanced int d to model the evolution ory and structure and gal	and dynamics of the uni			
Course Contents & Topics	bang mo	odels. Thermodynam	iverse. Empirical basis fo ics of the early univers ological constant problen	e. Primordial nucleosy	nthesis. The ve		
Course Learning Outcomes	CLO 1 a	pply physics principle	nis course, students shou es to describe the observa phenomena of cosmology	tional/experimental asp	ects of cosmolog	у	
	CLO 2 explain the observed phenomena of cosmology CLO 3 demonstrate knowledge and discuss the underlying physical concepts as evolution of the universe and with the dynamic interactive processes that ta						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in F	ass in PHYS3651 or PHYS3652					
Offer in 2019 - 2020	N O	ffer in 2020 - 2021 : Y			Examination		
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 coul 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.					
	С	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 make 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 outcom 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. 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.						
Course Type	Lecture v	with laboratory compo	nent course				
Course Teaching	Activitie	es	Details			No. of Hours	
Learning Activities	Lectures	3				36	
	Laborato	ory				8	
	Tutorials	, , , , , , , , , , , , , , , , , , ,				12	
	Reading	/ Self study				80	
Assessment Methods and Weighting	Method	•	Details		nting in final se grade (%)	Assessment Methods to CLO Mapping	
	Assignm	nents			8	CLO 1,2,3	
	Examina				50	CLO 1,2,3	
		ory reports			7	CLO 1,2,3	
	Presenta				15	CLO 1,2,3	
	Test				20	CLO 1,2,3	
Required/recommended reading and			urse Coordinator A First Course (Cambrid	ge University Press, Car	mbridge, 1995)		

online materials	M. Rowan-Robinson: Cosmology (Clarendon Press, Oxford, 1996) T. P. Cheng: Relativity, Gravitation & Cosmology - A Basic Introduction (Oxford, 2005)
Course Website	http://moodle.hku.hk

PHYS4654	General	relativity (6 credits)	Academic Yea	r 2019	
Offering Department	Physics	•	,	Quota		
Course Co-ordinator	Dr M Su, F	Physics (mengsu84@hl	ku.hk)	·		
Teachers Involved	(Dr M Su,F	Physics)				
Course Objectives			of general relativity. To proval applications of the theory.	vide conceptual skills and analyti	cal tools necessary	
Course Contents & Topics	covariant of	differentiation. The Rie		ace-time. Vectors and tensors. Pasor. The Einstein gravitational fi ted by LIGO.		
Course Learning	On succes	sful completion of this	course, students should be ab	ole to:		
Outcomes		ply the mathematical a stems in astrophysics a		eory of general relativity for the	e study of various	
		plain the observational avity from a general rela		plar System that cannot be descr	ibed by Newtonian	
		monstrate knowledge a neral relativistic approa		active physical processes in astro	physics by using a	
Pre-requisites (and Co-requisites and Impermissible combinations)		HYS2055 and PHYS335	50			
Offer in 2019 - 2020	Y 1st	sem Offer in 2020 - 20	021 : 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.					
	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.					
Course Type	Lecture-ba	ased 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		20	CLO 1,2,3	
	Examinati	on	2-hour written exam	60	CLO 1,2,3	
	Test			20	CLO 1,2,3	
Required/recommended reading and	R. M. Wald		e Coordinator niversity of Chicago Press, 19 Workbook (Univ Science Boo			
online materials	J. B. Hartle	e: Gravity: An Introducti	ion to Einstein's General Rela eral Relativity (Cambridge Uni	tivity (Addison-Wesley 2003)		

PHYS4655	Interstell	ar medium (6 credi	its)		Academic Year	2019	
Offering Department	Physics	•	•		Quota		
Course Co-ordinator	Dr M H Lee	e, Earth Sciences (mhle	ee @hku.hk)				
Teachers Involved	(Dr M H Le	e,Earth Sciences)					
Course Objectives	absorption	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 interstell space, and their astrophysical applications and implications.					
Course Contents & Topics				radiative properties o s, nebulae, supernovae		um and heavier	
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 express what exists between stars in spiral and elliptical galaxies						
	CLO 2 apply physical principles to describe excitation/ionization and de-excitation/recombination of atoms and ions						
	CLO 3 recognize which process or processes occur or dominate in which object or phase of the interstellar medium						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in PH	Pass in PHYS3651 or (PHYS3351 and PHY3550)					
Offer in 2019 - 2020	N Offe	r in 2020 - 2021 : Y			Examination		
Grade Descriptors (A+ to F)	A			of extensive knowledge and bilities and logical thinking, w			

		to apply knowledge to a w presentational skills.	ide range of complex, familiar an	d unfamiliar situations. Apply highly effe	ective organizational and
	В	learning outcomes. Show ev		ledge and skills required for attaining at ilities and logical thinking, and ability to ap and presentational skills.	
	С	outcomes. Show evidence		ge and skills required for attaining most lities and logical thinking, and ability to a nd presentational skills.	
	D	Show evidence of some coh	erent and logical thinking, but with	kills required for attaining some of the co limited analytical and critical abilities. Sh organizational and presentational skills.	
	Fail	Demonstrate little or no evic of analytical and critical at	lence of command of knowledge a	and skills required for attaining the course king. Show very little or no ability to ap	
Course Type	Lecture-ba	ased 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	ents		20	CLO 1,2,3
	Essay			15	CLO 1,2,3
	Examinat	ion	2-hour written exam	50	CLO 1,2,3
	Test			15	CLO 1,2,3
Required/recommended reading and online materials		otes provided by Course Physics and Chemistry o		Iniversity Sciences Book, 2007)	

PHYS4656	Advan	ced astrophysics	s (6 credits)	Academic Year	2019
Offering Department	Physics	;		Quota	
Course Co-ordinator	TBA, Ph	hysics ()			
Teachers Involved					
Course Objectives	include introduc physical	radiation mechanismotion to compact objute processes. This is	urse covers selected astrophysics n and high energy processes, basets. It follows a vigorous mathen an elective course for the astroph stgraduate studies in astrophysics.	sic theory of stellar structure ar natical treatment that stresses o	nd evolution, and on the underlying
Course Contents & Topics	process	ses; simple stellar nu	echanisms; stellar structure equatic clear processes; stellar formation; la ts, additional selected topics will be	ate stage of stellar evolution; sup	
Course Learning	On succ	cessful completion of	this course, students should be able	e to:	
Outcomes	CLO 1	describe what is star	s and to classify different types of st	ars	
			and solve problems related to the sations and Saha equations	structure and evolution of stars in	cluding the use of
		of stars	e physical processes occurring in s	·	
			ples to describe the physical properti		
		systems and their dy	dge and discuss the underlying phynamic interactive processes	•	the astrophysical
			earch papers in the field of stellar as		
Pre-requisites (and Co-requisites and Impermissible	Pass in	PH153031 01 PH15	3653 or (PHYS3351 and PHYS345	0)	
-					
combinations)	N C	Offer in 2020 - 2021 :	N	Examination	
combinations) Offer in 2019 - 2020	N C	Demonstrate thoroug	N gh mastery at an advanced level of extens show strong analytical and critical abilities ar to a wide range of complex, familiar and u	ive knowledge and skills required for at ad logical thinking, with evidence of origin	nal thought, and ability
combinations) Offer in 2019 - 2020 Grade Descriptors		Demonstrate thoroug learning outcomes. S to apply knowledge presentational skills. Demonstrate substar learning outcomes. S	gh mastery at an advanced level of extens show strong analytical and critical abilities ar to a wide range of complex, familiar and u ntial command of a broad range of knowled thow evidence of analytical and critical abilitie	ive knowledge and skills required for at ad logical thinking, with evidence of origin infamiliar situations. Apply highly effection ge and skills required for attaining at lead as and logical thinking, and ability to apply	nal thought, and ability ve organizational and ast most of the course
combinations) Offer in 2019 - 2020 Grade Descriptors	A	Demonstrate thoroug learning outcomes. S to apply knowledge presentational skills. Demonstrate substar learning outcomes. S and some unfamiliar Demonstrate genera outcomes. Show evic	gh mastery at an advanced level of extensions strong analytical and critical abilities are to a wide range of complex, familiar and untial command of a broad range of knowled show evidence of analytical and critical abilitie situations. Apply effective organizational and I but incomplete command of knowledge addence of some analytical and critical abilitie	ive knowledge and skills required for at all olgical thinking, with evidence of origin infamiliar situations. Apply highly effective ge and skills required for attaining at least and logical thinking, and ability to apply presentational skills. and skills required for attaining most of s and logical thinking, and ability to apply and skills required for attaining most of s and logical thinking, and ability to apply	nal thought, and ability we organizational and last most of the course who knowledge to familian f the course learning
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combinations) Offer in 2019 - 2020 Grade Descriptors	B C	Demonstrate thoroug learning outcomes. S to apply knowledge presentational skills. Demonstrate substar learning outcomes. S and some unfamiliar Demonstrate genera outcomes. Show evifamiliar situations. Ap Demonstrate partial I Show evidence of so knowledge to solve p Demonstrate little or of analytical and crit	gh mastery at an advanced level of extensions strong analytical and critical abilities are to a wide range of complex, familiar and untial command of a broad range of knowled, show evidence of analytical and critical abilities situations. Apply effective organizational and libut incomplete command of knowledge adence of some analytical and critical abilities poly moderately effective organizational and pout limited command of knowledge and skills me coherent and logical thinking, but with lills me coherent and logical thinking, but with lills	ive knowledge and skills required for at dl olgical thinking, with evidence of origir infamiliar situations. Apply highly effective ge and skills required for attaining at lea eas and logical thinking, and ability to apply presentational skills. and skills required for attaining most of s and logical thinking, and ability to app presentational skills. Is required for attaining some of the cour- nited analytical and critical abilities. Show anizational and presentational skills. skills required for attaining the course lea . Show very little or no ability to apply	nal thought, and ability organizational and ast most of the course of knowledge to familia of the course learning oly knowledge to mos see learning outcomes of limited ability to apply arning outcomes. Laci
combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	B C D	Demonstrate thoroug learning outcomes. S to apply knowledge presentational skills. Demonstrate substar learning outcomes. S and some unfamiliar Demonstrate genera outcomes. Show evifamiliar situations. Ap Demonstrate partial I Show evidence of so knowledge to solve p Demonstrate little or of analytical and crit	gh mastery at an advanced level of extensions strong analytical and critical abilities are to a wide range of complex, familiar and untial command of a broad range of knowled thow evidence of analytical and critical abilities situations. Apply effective organizational and if but incomplete command of knowledge adence of some analytical and critical abilitie plyly moderately effective organizational and put limited command of knowledge and skills me coherent and logical thinking, but with linroblems. Apply limited or barely effective organizational and it on evidence of command of knowledge and tical abilities, logical and coherent thinking	ive knowledge and skills required for at dl olgical thinking, with evidence of origir infamiliar situations. Apply highly effective ge and skills required for attaining at lea eas and logical thinking, and ability to apply presentational skills. and skills required for attaining most of s and logical thinking, and ability to app presentational skills. Is required for attaining some of the cour- nited analytical and critical abilities. Show anizational and presentational skills. skills required for attaining the course lea . Show very little or no ability to apply	nal thought, and ability or organizational and ast most of the course, knowledge to familia of the course learning ly knowledge to most see learning outcomes. Lack aming outcomes. Lack arming outcomes. Lack arming outcomes. Lack
combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching	B C D	Demonstrate thoroug learning outcomes. S to apply knowledge presentational skills. Demonstrate substar learning outcomes. S 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 criproblems. Organization-based course	gh mastery at an advanced level of extensions strong analytical and critical abilities are to a wide range of complex, familiar and untial command of a broad range of knowled thow evidence of analytical and critical abilities situations. Apply effective organizational and if but incomplete command of knowledge adence of some analytical and critical abilitie plyly moderately effective organizational and put limited command of knowledge and skills me coherent and logical thinking, but with linroblems. Apply limited or barely effective organizational and it on evidence of command of knowledge and tical abilities, logical and coherent thinking	ive knowledge and skills required for at dl olgical thinking, with evidence of origir infamiliar situations. Apply highly effective ge and skills required for attaining at lea eas and logical thinking, and ability to apply presentational skills. and skills required for attaining most of s and logical thinking, and ability to app presentational skills. Is required for attaining some of the cour- nited analytical and critical abilities. Show anizational and presentational skills. skills required for attaining the course lea . Show very little or no ability to apply	nal thought, and ability or organizational and ast most of the course, knowledge to familia of the course learning ly knowledge to most see learning outcomes. Lack aming outcomes. Lack arming outcomes. Lack arming outcomes. Lack
combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching	B C D Fail	Demonstrate thoroug learning outcomes. S to apply knowledge presentational skills. Demonstrate substar learning outcomes. S and some unfamiliar Demonstrate genera outcomes. Show evifamiliar situations. Ap Demonstrate partial it Show evidence of so knowledge to solve p Demonstrate little or of analytical and criproblems. Organization-based course	th mastery at an advanced level of extensions strong analytical and critical abilities are to a wide range of complex, familiar and untial command of a broad range of knowled thow evidence of analytical and critical abilities situations. Apply effective organizational and but incomplete command of knowledge adence of some analytical and critical abilitie poly moderately effective organizational and pout limited command of knowledge and skillime coherent and logical thinking, but with lim roblems. Apply limited or barely effective org no evidence of command of knowledge and tical abilities, logical and coherent thinking on and presentational skills are minimally effective.	ive knowledge and skills required for at dl olgical thinking, with evidence of origir infamiliar situations. Apply highly effective ge and skills required for attaining at lea eas and logical thinking, and ability to apply presentational skills. and skills required for attaining most of s and logical thinking, and ability to app presentational skills. Is required for attaining some of the cour- nited analytical and critical abilities. Show anizational and presentational skills. skills required for attaining the course lea . Show very little or no ability to apply	nal thought, and ability ve organizational and ast most of the course very knowledge to familia f the course learning by knowledge to most see learning outcomes limited ability to apply arming outcomes. Lack very knowledge to solve
combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching	B C D Fail Lecture- Activiti	Demonstrate thoroug learning outcomes. S to apply knowledge presentational skills. Demonstrate substar learning outcomes. S and some unfamiliar. Demonstrate genera outcomes. Show evidential still show evidence of so knowledge to solve p. Demonstrate little or of analytical and criproblems. Organization-based course	th mastery at an advanced level of extensions strong analytical and critical abilities are to a wide range of complex, familiar and untial command of a broad range of knowled thow evidence of analytical and critical abilities situations. Apply effective organizational and but incomplete command of knowledge adence of some analytical and critical abilitie poly moderately effective organizational and pout limited command of knowledge and skillime coherent and logical thinking, but with lim roblems. Apply limited or barely effective org no evidence of command of knowledge and tical abilities, logical and coherent thinking on and presentational skills are minimally effective.	ive knowledge and skills required for at dl olgical thinking, with evidence of origir infamiliar situations. Apply highly effective ge and skills required for attaining at lea eas and logical thinking, and ability to apply presentational skills. and skills required for attaining most of s and logical thinking, and ability to app presentational skills. Is required for attaining some of the cour- nited analytical and critical abilities. Show anizational and presentational skills. skills required for attaining the course lea . Show very little or no ability to apply	nal thought, and ability ve organizational and ast most of the course y knowledge to familia if the course learning by knowledge to most see learning outcomes limited ability to apply arming outcomes. Lack y knowledge to solve No. of Hours
combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching	B C D Fail Lecture- Activiti Lecture Tutorial	Demonstrate thoroug learning outcomes. S to apply knowledge presentational skills. Demonstrate substar learning outcomes. S and some unfamiliar. Demonstrate genera outcomes. Show evidential still show evidence of so knowledge to solve p. Demonstrate little or of analytical and criproblems. Organization-based course	th mastery at an advanced level of extensions strong analytical and critical abilities are to a wide range of complex, familiar and untial command of a broad range of knowled thow evidence of analytical and critical abilities situations. Apply effective organizational and but incomplete command of knowledge adence of some analytical and critical abilitie poly moderately effective organizational and pout limited command of knowledge and skillime coherent and logical thinking, but with lim roblems. Apply limited or barely effective org no evidence of command of knowledge and tical abilities, logical and coherent thinking on and presentational skills are minimally effective.	ive knowledge and skills required for at dl olgical thinking, with evidence of origir infamiliar situations. Apply highly effective ge and skills required for attaining at lea eas and logical thinking, and ability to apply presentational skills. and skills required for attaining most of s and logical thinking, and ability to app presentational skills. Is required for attaining some of the cour- nited analytical and critical abilities. Show anizational and presentational skills. skills required for attaining the course lea . Show very little or no ability to apply	nal thought, and ability or organizational and and ast most of the course with the course learning by knowledge to familiar of the course learning by knowledge to most see learning outcomes limited ability to apply arming outcomes. Lack who will be considered to solve the course of
Combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching & Learning Activities Assessment Methods	B C D Fail Lecture- Activiti Lecture Tutorial	Demonstrate thoroug learning outcomes. Sto apply knowledge presentational skills. Demonstrate substar learning outcomes. Sand 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 criproblems. Organization-based course ies	th mastery at an advanced level of extensions strong analytical and critical abilities are to a wide range of complex, familiar and untial command of a broad range of knowled thow evidence of analytical and critical abilities situations. Apply effective organizational and but incomplete command of knowledge adence of some analytical and critical abilitie poly moderately effective organizational and pout limited command of knowledge and skillime coherent and logical thinking, but with lim roblems. Apply limited or barely effective org no evidence of command of knowledge and tical abilities, logical and coherent thinking on and presentational skills are minimally effective.	ive knowledge and skills required for at di logical thinking, with evidence of origir infamiliar situations. Apply highly effective ge and skills required for attaining at least and logical thinking, and ability to apply presentational skills. The still stil	nal thought, and ability or organizational and set most of the course learning by knowledge to familia of the course learning by knowledge to most see learning outcomes limited ability to apply arming outcomes. Lack / knowledge to solve 12
Combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F) Course Type Course Teaching & Learning Activities Assessment Methods	B C D Fail Lecture- Activiti Lecture Tutorial Reading	Demonstrate thoroug learning outcomes. Sto apply knowledge presentational skills. Demonstrate substar learning outcomes. So and some unfamiliar. Demonstrate genera outcomes. Show evid familiar situations. Applemonstrate partial I Show evidence of so knowledge to solve pomonstrate little or of analytical and criproblems. Organization-based course ies	gh mastery at an advanced level of extensible with the strong analytical and critical abilities are to a wide range of complex, familiar and untial command of a broad range of knowled show evidence of analytical and critical abilitie situations. Apply effective organizational and but incomplete command of knowledge adence of some analytical and critical abilitie plyl moderately effective organizational and pout limited command of knowledge and skills me coherent and logical thinking, but with limroblems. Apply limited or barely effective organizational apply incohems. Apply limited or barely effective organizational apply in the strong of the strong or evidence of command of knowledge and tical abilities, logical and coherent thinking on and presentational skills are minimally effective.	ive knowledge and skills required for at di logical thinking, with evidence of origir infamiliar situations. Apply highly effective ge and skills required for attaining at least and logical thinking, and ability to apply presentational skills. The still stil	nal thought, and ability or organizational and set most of the course learning by knowledge to familia of the course learning by knowledge to most see learning outcomes limited ability to apply arming outcomes. Lack / knowledge to solve 12
combinations) Offer in 2019 - 2020 Grade Descriptors	B C D Fail Lecture- Activiti Lecture Tutorial Reading Method	Demonstrate thoroug learning outcomes. Sto apply knowledge presentational skills. Demonstrate substar learning outcomes. Some unfamiliar Demonstrate genera outcomes. Show evit familiar situations. Appemonstrate partial I Show evidence of so knowledge to solve p Demonstrate little or of analytical and criproblems. Organization-based course ies Is g / Self study ds ments	gh mastery at an advanced level of extensible with the strong analytical and critical abilities are to a wide range of complex, familiar and untial command of a broad range of knowled show evidence of analytical and critical abilitie situations. Apply effective organizational and but incomplete command of knowledge adence of some analytical and critical abilitie plyl moderately effective organizational and pout limited command of knowledge and skills me coherent and logical thinking, but with limroblems. Apply limited or barely effective organizational apply incohems. Apply limited or barely effective organizational apply in the strong of the strong or evidence of command of knowledge and tical abilities, logical and coherent thinking on and presentational skills are minimally effective.	ive knowledge and skills required for at di logical thinking, with evidence of origin infamiliar situations. Apply highly effective ge and skills required for attaining at least and logical thinking, and ability to apply presentational skills. The still stil	nal thought, and ability ve organizational and ast most of the course y knowledge to familia if the course learning by knowledge to most se learning outcomes. I imited ability to apply arming outcomes. Lack y knowledge to solve No. of Hours 36 12 80 Assessment Methods to CLO Mapping

	Test		20	CLO 1,2,3,4,5
Required/recommended	Lecture notes provided by Course	Coordinator		
reading and	Prialnik, D.: An introduction to the t	heory of stellar structure and evolu	tion, 2nd ed. (CUP, 2010)	
online materials	Shapiro and S. A. Teukolsky Longa	air High Energy Astrophysics 3rd ed	d	
	Francis, LeBlanc, An Introduction t	o Stellar Astrophysics (Wiley, 2010)	

PHYS4750	Experime	ental physics (6 cre	edits)		Academic Year	2019	
Offering Department	Physics		•		Quota		
Course Co-ordinator	TBC, Phys	ics ()					
Teachers Involved	(TBC,Phys	sics)					
Course Objectives	TBC						
Course Contents & Topics	TBC	BC					
Course Learning Outcomes	On success	sful completion of this of	course, students should	be able to:			
Pre-requisites (and Co-requisites and Impermissible combinations)	TBC						
Offer in 2019 - 2020	N Offe	er in 2020 - 2021 : N			Examination		
Grade Descriptors (A+ to F)	A B C						
	D						
	Fail						
Course Type		⊥ th laboratory componen	at course				
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Activities		Details			NO. OI HOUIS	
Assessment Methods and Weighting	Methods		Details		ghting in final rse grade (%)	Assessment Methods to CLO Mapping	
Required/recommended reading and online materials	TBC		·	·		., -	

PHYS4850	Particle	physics (6 credits	Particle physics (6 credits) Academic Ye				
Offering Department	Physics		•		Quota		
Course Co-ordinator	Dr Y J Tu,	Physics (yanjuntu@h	hku.hk)				
Teachers Involved	(Dr Y J Tu	,Physics)	,				
Course Objectives			oretical and experimental asp eir postgraduate studies in p			an elective cours	
Course Contents & Topics	diagrams,						
Course Learning	On succes	sful completion of this	s course, students should be	able to:			
Outcomes	CLO 1 de	scribe and explain the	e fundamental physical princi	ples for the standard	model of particle	physics.	
		pply these principles, ocesses.	together with logical and r	nathematical reasor	ning, to analyze	particle physics	
	CLO 3 ca	pture the frontier and	progress of particle physics.				
Pre-requisites and Co-requisites and Impermissible combinations)	Pass in Ph	HYS3351					
Offer in 2019 - 2020	Y 2nd	sem Offer in 2020	- 2021 : Y		Examination	May	
Grade Descriptors (A+ to F)	В	learning outcomes. Show to apply knowledge to a presentational skills.	nastery at an advanced level of ex v strong analytical and critical abilitie wide range of complex, familiar a command of a broad range of kno	es and logical thinking, wand unfamiliar situations.	ith evidence of original Apply highly effective	al thought, and abilit e organizational and	
	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	of analytical and critical	evidence of command of knowledge abilities, logical and coherent thir				
		problems. Organization a	and presentational skills are minimal		, , , , ,	Knowledge to solv	
Course Type	Lecture-ba	sed course				Knowledge to solv	
ourse Teaching	Lecture-ba	ased course			, , , ,	No. of Hours	
ourse Teaching		ased course	and presentational skills are minimall		, , , ,		
ourse Teaching	Activities	ased course	and presentational skills are minimall		,	No. of Hours	
Course Teaching	Activities Lectures Tutorials	ased course	and presentational skills are minimall		,	No. of Hours	
Course Teaching & Learning Activities Assessment Methods	Activities Lectures Tutorials	ased course	and presentational skills are minimall	y effective or ineffective. Weight	ting in final	No. of Hours 36 12	
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	Activities Lectures Tutorials Reading /	ased course	and presentational skills are minimall Details	y effective or ineffective. Weight	ting in final	No. of Hours 36 12 80 Assessment Methods	

Test	30	CLO 1,2,3
Lecture notes provided by Course E. M. Henley and A. Garcia, Subat	ntific, 2007	

PHYS4966	Physics	internship (6 credit	s)	Academic Yea	r 2019			
Offering Department	Physics		•	Quota				
Course Co-ordinator	Dr J C S F	un, Physics (jcspun@h	ku.hk)					
Teachers Involved	(NIL,Phys	,Physics)						
Course Objectives	should be opportunit	taken normally in the so y to gain working experi	e students majoring in physics, phys ummer immediately before their fina ence in the field of physics or astror earnt in their majors in this intern.	al year of study. It provides	s students with the			
Course Contents & Topics	governme be arrange	udents will work as an intern for at least 160 hours within the University or outside the University in a company, vernment department or NGO. The work nature must be related to physics or astronomy. The internship should arranged by the Department or obtained by students themselves. In the latter case, it must be approved before a commencement of the internship.						
Course Learning	On succes	sful completion of this c	course, students should be able to:					
Outcomes	cLO 2 he	LO 1 apply physics or astronomy knowledge that students have learnt in their majors to real working environment LO 2 help to create, propose or design part of the project that they are working on during the internship LO 3 employ effective technical and inter-personal communication skills to people of different background,						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in at Major, Phy This caps only.	culture, gender and nationality ass in at least 24 credits of advanced level (3XXX level or above) disciplinary core/elective courses of the Physics ajor, Physics (Intensive) Major, Mathematics/Physics Major or Astronomy Major curriculum. his capstone course is for Astronomy, Mathematics/Physics, Physics, and Physics (Intensive) Majors students hly. he earliest that a student is allowed to take this capstone course is their year 3 study.						
Offer in 2019 - 2020	Y Sur	nmer Offer in 2020 - 2	021 : Y	Examination	No Exam			
Grade Descriptors (Pass /Pass with distinction /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".							
	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.							
Course Type	Internship							
Course Teaching	Activities		Details		No. of Hours			
& Learning Activities	Internship	work	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 1,2,3			
Required/recommended reading and online materials	To be prov	o be provided by individual project supervisor						
Additional Course			urse can be counted towards the Ca					
Information	interested Enrolment	to enrol in this course sl of this course is not co	nscript. This course will be assess hould contact the Department to obt inducted via the online course select after approval has been obtained from	ain the approval. tion system and should be	made through the			

PHYS4999	Physics project (12 credits)	Academic Year	2019			
Offering Department	Physics	Quota				
Course Co-ordinator	Dr J J L Lim, Physics (jjlim@hku.hk)					
Teachers Involved	(Various teachers in the department, Physics)					
Course Objectives	This capstone course is offered to students majoring in physics, physics (intensive), math/physics or astronomy. It 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. It provides students with the opportunity to study a specific problem by themselves, either theoretical, experimental or numerical, under the supervision of an academic staff using the knowledge the student gained in all years of his/her major study. The available projects are close to postgraduate level research in physics and/or astronomy.					
Course Contents & Topics	Students interested in taking this course should contact their prospective supcontents and the nature of their projects in the coming academic year. They muprospective supervisor and the course coordinator to take this course. For theoretical and numerical projects: Students will receive training in research and make investigation which is close to research work in nature, under the sustudent may need to perform some original calculations, to fill in mathemat derivations, or a combination of both. For numerical projects, students also numerical or simulation results.	ust get the appro n literature readin pervision of a sta ical gaps of sor	val from both the g and reviewing aff member. The ne sophisticated			
	For experimental projects: Students will carry out experiments in research labs under the supervision of a staff member. The student will receive a comprehensive training in advanced experimental techniques, including preparation of samples, determination of physical properties, measurement of small signals obscured by noise, laser, high-vacuum and low-temperature techniques and so on. Wide reading of the relevant scientific literature					

Course Learning			esign are expected. course, students should be able t	n:		
Outcomes			eoretical, numerical or experimen		tonic in physics or	
outoomoo		stronomy	coreacai, mamericai or experimer	ital rescarcii project on e	topic in physics of	
		•	f a physics or astronomy problem on what they have learnt in their n		review of books and	
	CLO 3 c	riticize existing approac	hes for solving the selected physic	s or astronomy problem		
	CLO 4 d	escribe and explain cor	nnections between the physical pri	nciples and the study prob	lem	
	ìr		putational projects) identify the analytical or numerical means, and			
			cts) propose and execute physic ces of errors of the experiment or			
			eam work) collaborate and com ferent culture, gender and nationa		ne team, which may	
Pre-requisites (and Co-requisites and Impermissible combinations)	Major, Ph This caps only.	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.				
Offer in 2019 - 2020	Y Ye	ar long Offer in 2020	- 2021 : Y	Examinatio	n No Exam	
Grade Descriptors (A+ to F)	A	original thought. Insightful to quote/reference aptly.	asp of the subject. Show strong analytica use and critical analysis/evaluation of info Critical use of data and results to draw a latational skills. Work of A+ should show co.	rmation drawn from a full range opropriate and insightful conclusi	of high quality sources and ions. Apply highly effective	
	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.				
	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.					
	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 abili	little or no grasp of the knowledge and ities, logical and coherent thinking. Limite d results and/or unable to draw appropria ective.	d use of secondary sources and	d no critical comparison of	
Course Type	Project-b	ased course				
Course Teaching	Activitie	S	Details		No. of Hours	
& Learning Activities	Meeting	with supervisor		54		
	Reading	/ Self study			126	
Assessment Methods and Weighting	Methods	3	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Oral pres	sentation	including supervisor's comments (10%)	30	CLO 2,4,5,6	
	Researc	h report	` ,	70	CLO 1,2,3,4,5,6,7	
Required/recommended	-		ect supervisor			
reading and						

PHYS7350	Gradua	Graduate classical mechanics (6 credits) Academic Year 20				
Offering Department	Physics	·	Quota			
Course Co-ordinator	TBC, Ph	nysics ()				
Teachers Involved	(TBC,Ph	nysics)				
Course Objectives	TBC					
Course Contents & Topics	TBC					
Course Learning Outcomes	On succ	ressful completion of this course, students should be able to:				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in	Pass in PHYS4350				
Offer in 2019 - 2020	N O	offer in 2020 - 2021 : N	Examination			
Grade Descriptors (A+ to F)	Α	Demonstrate thorough mastery at an advanced level of extensive knowledge an learning outcomes. Show strong analytical and critical abilities and logical thinking, to apply knowledge to a wide range of complex, familiar and unfamiliar situation presentational skills.	with evidence of original	al 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.				
	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					
Course Type	Lecture-	based course				

Course Teaching & Learning Activities	Activities	Details		No. of Hours
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping
Required/recommended reading and online materials	TBC			

PHYS7351	Graduat	e quantum mec	hanics (6 credits)	Academic Ye	ar 2019		
Offering Department	Physics			Quota			
Course Co-ordinator	Prof S Q S	Shen, Physics (sshe	en @hku.hk)				
Teachers Involved	(Prof S Q	Shen, Physics)					
Course Objectives			raduates and senior undergraduat ions to select topics in condensed		chniques in quantun		
Course Contents & Topics	and cons	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, ntroduction of relativistic quantum mechanics.					
Course Learning	On succes	ssful completion of	this course, students should be abl	e to:			
Outcomes	CLO 1	formulate and solve	e problems in quantum mechanics	using Dirac notation			
	CLO 2	examine and predic	ct the properties of identical quantu	m particles			
	CLO 3	argue the importan	ce of symmetry and conservation la	aws in quantum mechanics			
	CLO 4	explain physical ph	enomena in the modern language	of quantum mechanics			
	CLO 5	analyse physical sy	stem in a quantum mechanical wa	ν			
	CLO 6	recognise the conn	ection between relativity and quant	tum mechanics			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Pl	Pass in PHYS4351					
Offer in 2019 - 2020	Y 2nd	sem Offer in 202	20 - 2021 : Y	Examination	May		
Grade Descriptors (A+ to F)	В	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 abit to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational a presentational skills. Demonstrate substantial command of the knowledge and skills required for attaining most of the course learning outcome. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and sor					
	С	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	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.						
Course Type	Lecture-ba	ased course					
Course Teaching	Activities	3	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		
	Assignme	ents		30	CLO 1,2,3,4,5,6		
	Examinat		3-hour written exam	70	CLO 1,2,3,4,5,6		
Required/recommended reading and online materials	J. J. Saku	rai: Modern Quantu	ourse Coordinator Im Mechanics (Addison-Wesley, 19 ics (McGraw-Hill, 1968)	994)	, ,		

PHYS7450	Graduate electromagnetism (6 credits)	Academic Year	2019			
Offering Department	Physics	Quota				
Course Co-ordinator	Prof Z D Wang, Physics (zwang@hku.hk)					
Teachers Involved	(Prof Z D Wang, Physics)					
Course Objectives	The aim of this course is to provide students with the advanced level of comprehending on the theory of classic electromagnetic field, enabling them to master key analytical tools for solving real physics problems.					
Course Contents & Topics	This course will introduce and discuss the following topics: Boundary-value problems in electrostatics and Green Function method, Electrostatics of Media, Magnetostatics, Maxwell's equations and conservation laws, Gauge transformations, Electromagnetic waves and wave guides.					
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 analyse and solve various electrostatic and magnetostatic problems with Green's Function					
	CLO 2 comprehend and explain many electromagnetic phenomena					
	CLO 3 recognise and comprehend the important concepts of conservation laws and gauge transformations, which should be very helpful for doing research in future					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in PHYS4450					
Offer in 2019 - 2020	Y 1st sem Offer in 2020 - 2021 : Y	Examination	Dec			
Grade Descriptors (A+ to F)	A 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 wipresentational skills.	ide range of complex, familiar and	I unfamiliar situations. Apply highly effo	ective organizational and	
	В	learning outcomes. Show ev		edge and skills required for attaining at ities and logical thinking, and ability to a nd 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 evid of analytical and critical ab	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learnir of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply kn problems. Organization and presentational skills are minimally effective or ineffective.			
Course Type	Lecture-ba	ased 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	ents		30	CLO 1,2,3	
	Examinat	ion	3-hour written exam	70	CLO 1,2,3	
		D. Jackson: Classical Electrodynamics (John Wiley & Sons, 1999) D. Landau and E.M. Lifshitz: Classical Theory of Fields (Pergamon, 1982)				

PHYS7550	Graduat	te statistical m	echanics (6 credits)	Academic Yea	ır 2019		
Offering Department	Physics			Quota			
Course Co-ordinator	Prof J Wa	Prof J Wang, Physics (jianwang@hku.hk)					
Teachers Involved	(Prof J W	ang,Physics)					
Course Objectives	This cour	se intends to intro	duce some advanced topics in the	field of equilibrium statistical phys	ics.		
Course Contents & Topics	Quantum	Ensemble theory: the micro-canonical ensemble, the canonical ensemble, and the grand canonical ensemble. Quantum mechanical ensemble theory. Theory of simple gases, ideal Bose systems, ideal Fermi systems. Statistical mechanics of interacting systems. Some topics in the theory of phase transition may be selected.					
Course Learning			of this course, students should be a				
Outcomes	CLO 1 d	liscuss the various	s classical ensembles and quantum	ensembles			
	CLO 2 s	olve the statistical	I mechanics problems using ensem	ble theory			
			ction between classical statistical m	•	mechanics		
			ot of density matrix				
Pre-requisites (and Co-requisites and Impermissible combinations)		HYS4550					
Offer in 2019 - 2020		er in 2020 - 2021		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.						
Course Type	Lecture-b	ased course	·				
Course Teaching	Activitie	S	Details		No. of Hours		
& Learning Activities	Lectures				36		
•	Tutorials						
		/ Self study			12 80		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents		15	CLO 1,2,3,4		
	Examina		3-hour written exam	70	CLO 1,2,3,4		
	Test		3a	15	CLO 1,2,3,4		
Required/recommended reading and online materials	R.K. Path	ria: Statistical me	Course Coordinator chanics en: Equilibrium statistical physics	,			

PHYS7551	Graduate solid state physics (6 credits)	Academic Year	2019			
Offering Department	Physics	Quota				
Course Co-ordinator	Prof J Wang, Physics (jianwang@hku.hk)					
Teachers Involved						
Course Objectives	To provide students with an understanding of more advanced topics in selected areas of solid state physics.					
Course Contents	Bloch theory. Nearly free electrons and tight binding model. Band structure ca	lculations for realis	stic systems. The			

& Topics	semi-cla	semi-classical model of electron dynamics. Ab initio total energy calculations and other advanced topics.					
Course Learning	On succ	cessful completion of this	course, students should be a	able to:			
Outcomes	CLO 1 discuss various methods to calculate the band structures and the major approximations that have been used						
	CLO 2	discuss various minimizat	ion methods				
	CLO 3	discuss the concepts of d	ensity functional theory				
	CLO 4	explain the concept of firs	t principle calculation and va	rious approximations used			
Pre-requisites (and Co-requisites and Impermissible	Pass in	Pass in PHYS3551 and PHYS4351					
combinations) Offer in 2019 - 2020	N C	Offer in 2020 - 2021 : N		Examination			
Grade Descriptors	A		story at an advanced level of exte	ensive knowledge and skills required for			
(A+ to F)	A	learning outcomes. Show s	trong analytical and critical abilities	s and logical thinking, with evidence of or d unfamiliar situations. Apply highly effort	riginal thought, and ability		
	В	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	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.					
	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						
Course Type	Lecture-	-based course					
Course Teaching	Activiti	ies	Details		No. of Hours		
& Learning Activities	Lecture	s			36		
	Tutorial	ls			12		
	Reading / Self study				80		
Assessment Methods and Weighting	Method	ds	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignr	ments		15	CLO 1,2,3,4		
	Examin		3-hour written exam	70	CLO 1,2,3,4		
	Test			15	CLO 1,2,3,4		
Required/recommended reading and online materials	Lecture notes provided by Course Coordinator C. Kittel: Introduction to Solid State Physics (John Wiley, 1996) N.W. Ashcroft and D.N. Mermin: Solid State Physics (Holt, Rinehart and Winston, 1987)						

PHYS7650	Stellar a	atmospheres (6 cred	lits)		Academic Year	2019
Offering Department	Physics	•	,		Quota	
Course Co-ordinator	TBC, Phy	ysics ()				
Teachers Involved	(TBC,Phy	ysics)				
Course Objectives	TBC					
Course Contents & Topics	TBC					
Course Learning Outcomes	On succe	essful completion of this of	course, students should b	pe able to:		
Pre-requisites (and Co-requisites and Impermissible combinations)	TBC					
Offer in 2019 - 2020	N Of	fer in 2020 - 2021 : N			Examination	
Grade Descriptors (A+ to F)	A	Demonstrate thorough mas learning outcomes. Show s to apply knowledge to a w presentational skills.	ith evidence of origin	al thought, and ability		
	В	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.				
	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 using limited or barely effective organizational and presentational skills.				
	Fail	of analytical and critical a	dence of command of knowled bilities, logical and coherent t I presentational skills are minim	thinking. Show very little o		
Course Type	Lecture-b	pased course				
Course Teaching & Learning Activities	Activitie	S	Details			No. of Hours
Assessment Methods and Weighting	Methods	S	Details		ting in final e grade (%)	Assessment Methods to CLO Mapping
Required/recommended reading and online materials	TBC				·	

PHYS7750	Nanophy	ysics (6 credits)			Academic Year	2019
Offering Department	Physics	,			Quota	
Course Co-ordinator	Prof S J X	u, Physics (sjxu@hku.	.hk)			
Teachers Involved	(Prof S J)	(u,Physics)				
Course Objectives	physics, s wires and	uch as two-dimension nanotubes, zero-dime	fresh postgraduate studenal electron gas, quantum ensional electron systems	n Hall effects, one-dimer , single electron effects a	nsional electron and quantum do	system, quantur ts.
Course Contents & Topics	properties external fi and semic Quantum	of two-dimensional el elds. Quantum Hall E conductor nanowires. F dots and nanocrystals	d quantum size effect. Di lectron gas formed at het Effects. Physics of one-di Fundamental physics of z Erundamental principles Frmits, the making and ap	terostructures and within imensional electron syst ero-dimensional electror and applications of sca	novel graphene ems including on systems. Singl nning tunneling	e monolayers wit carbon nanotube e electron effect microscopy in th
Course Learning	On succes	ssful completion of this	s course, students should	be able to:		
Outcomes	CLO 1 re	call basic concepts an	d knowledge of dimensio	nality, density of states,	quantum size ef	fect
	CLO 4 de	pecially quantum Hall cognize the fundamer udy of nano physics escribe the basic phy miconductor nanowire	ntal principles and import ysics of one-dimension	ant applications of scan	ning tunneling r	nicroscopy in the
Pre-requisites and Co-requisites and Impermissible combinations)		HYS3551 and PHYS43	•	iai quantum uoto unu nai	rooryotalo, omgr	
Offer in 2019 - 2020	N Offe	er in 2020 - 2021 : N			Examination	
Grade Descriptors (A+ to F)	В	learning outcomes. Show to apply knowledge to a presentational skills. Demonstrate substantial of the skills is a presentational skills.	astery at an advanced level of strong analytical and critical at wide range of complex, famili- command of a broad range of evidence of analytical and critic	bilities and logical thinking, wit iar and unfamiliar situations. A knowledge and skills required	h evidence of origin Apply highly effectiv I for attaining at lea	al thought, and ability e organizational and st most of the course
	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.				
	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.					
Course Type	Lecture-ba	ased course				
Course Teaching	Activities	1	Details			No. of Hours
& Learning Activities	Lectures					36
	Tutorials					12
	Reading /	Self study				80
Assessment Methods and Weighting	Methods		Details		ing in final grade (%)	Assessment Methods to CLO Mappin
	Assignme	ents			10	CLO 1,2,3,4,5
	Essay				20	CLO 1,2,3,4,5
	Examinat	ion			70	CLO 1,2,3,4,5
Required/recommended			se Coordinator		-	, . , . , . , . , . , .
reading and online materials						

ENVS3006	Environr	nental radiation (6 credits)	Academic Year	2019			
Offering Department	Physics	· · · · · · · · · · · · · · · · · · ·	Quota				
Course Co-ordinator	Dr J K C L	eung, Physics (jkcleung@hku.hk)					
Teachers Involved	(Dr J K C I	.eung,Physics)					
Course Objectives	to detect t	rse, students will learn about various kinds of radiations in the enem, the methods to trace them and to assess their hazard to the in events of nuclear accidents or incidents.					
Course Contents & Topics	power pla environme	e will cover naturally occurring radiation sources and man-mants; transport models for radionuclides in the environment; not; radiation risk assessment and emergency preparedness ies; nuclear techniques in ecology; concept of radiation protections.	uclear accidents and i ; techniques for mea	ts impact to the suring low level			
Course Learning	On succes	sful completion of this course, students should be able to:					
Outcomes	CLO 1 re	alise sources and transport of radionuclides in the environment					
	CLO 2 ex	plain 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 ju	stify, optimize, and assess the risk of using radiation and nuclear	technologies				
	CLO 5 co	empare and contrast the environmental impacts from nuclear ene	ergy and other forms of	energy			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in Ch	IEM2041 or ENVS2001 or ENVS2002 or PHYS2265					
Offer in 2019 - 2020	N Offe	r in 2020 - 2021 : N	Examination				
Grade Descriptors	A	Demonstrate thorough mastery at an advanced level of extensive knowledg	e and skills required for att	aining all the course			

(A+ to F)		to apply knowledge to a presentational skills. Applinsightful conclusions.	strong analytical and critical abilities ar wide range of complex, familiar and u y highly effective lab skills and technic	unfamiliar situations. Apply highly effeques. Critical use of data and results	ective organizational and to draw appropriate and	
	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 r	incomplete command of knowledge as of some analytical and critical abilitie moderately effective organizational and that some erroneous use of data and re-	s and logical thinking, and ability to a presentational skills. Apply moderate	apply knowledge to most ely effective lab skills and	
	D	Show evidence of some or knowledge to solve proble	mited command of knowledge and skills oherent and logical thinking, but with lin ems. Apply limited or barely effective o Limited ability to use data and results to	nited analytical and critical abilities. Sh rganizational and presentational skills	now limited ability to apply	
	Fail	of analytical and critical problems. Organization an	vidence of command of knowledge and abilities, logical and coherent thinking and presentational skills are minimally effuse use of data and results and/or unable to	. Show very little or no ability to apple fective or ineffective. Apply minimally	oply knowledge to solve	
Course Type	Lecture w	ith laboratory compone	ent course			
Course Teaching	Activities		Details	Details		
& Learning Activities	Lectures				36	
	Laborato	ry			2	
	Field wor	·k			8	
	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 1,2,4,5	
	Examinat	tion	2-hour written exam	60	CLO 1,2,4,5	
	Laborato	ry reports		10	CLO 2,3	
	Presenta	tion		10	CLO 2,4,5	
reading and online materials	(Academi Robert C.	ic Press, 1997) . Morris: The Environme	esell: Environmental Radioactivental Case for Nuclear Power (For Principles, Practices and Pro	aragon House, 2000)	·	
Course Website						

ENVS3010	Sustain	nable energy and e	nvironment (6 credits)	Academic Yea	r 2019			
Offering Department	Physics		· · · · · · · · · · · · · · · · · · ·	Quota				
Course Co-ordinator	Prof A B	Djurisic, Physics (dale	k@hku.hk)					
Teachers Involved	(Prof A B	B Djurisic, Physics)						
Course Objectives	technolog technolog	this course, the students will learn about sustainability and environmental impact of different energy chnologies, including conventional energy sources as well as renewable and/or clean energy sources. The chnological challenges, potential for future development, and environmental impacts (community, regional, an obal) will be discussed.						
Course Contents & Topics	making t	The course will cover energy production and use, environmental impact of energy use, fossil fuels and methods making them more sustainable, clean fuels, electricity generation, renewable energy technologies (with empha on biomass, wind and solar energy), hydrogen, energy storage, and energy conservation.						
Course Learning			s course, students should be able to:	3,				
Outcomes	CLO 1	define the concept of	sustainable development					
	CLO 2	explain the challenge	s and potential for development of vari	ous energy technologies				
	CLO 3	compare the environn	nental impact of conventional and new	energy technologies				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in 0	CHEM2041 or ENVS20	001 or ENVS2002 or PHYS2260					
Offer in 2019 - 2020	Y 2n	d sem Offer in 2020	- 2021 : Y	Examination	May			
Grade Descriptors (A+ to F)	A	learning outcomes. Show	nastery at an advanced level of extensive know trong analytical and critical abilities and logic a wide range of complex, familiar and unfamili	al thinking, with evidence of origi	nal 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.						
	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 critical	evidence of command of knowledge and skills r I abilities, logical and coherent thinking. Show and presentational skills are minimally effective of	v very little or no ability to appl				
Course Type	Lecture-k	pased course						
Course Teaching	Activitie	es	Details		No. of Hours			
& Learning Activities	Lectures	3			36			
	Tutorials	3			12			
	Reading	/ Self study			80			
Assessment Methods and Weighting	Methods	s	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
					to one mapping			
	Assignm	nents	debate questions performance	10	CLO 1,2,3			

	Presentation		40	CLO 2,3
Required/recommended	Lecture notes provided by Course	Coordinator		
reading and	Godfrey Boyle: Renewable Energy	r: Power for a Sustainable Future (C	Oxford University Press, 20	003)
online materials	G. Boyle, B. Everett, and J. Ram	age: Energy Systems and Sustain	ability: Power for a Susta	inable Future (The
	Open University, 2003)			
	R. M. Dell and D. A. J. Rand: Clea	n Energy (The Royal Society of Che	emistry, 2004)	
Course Website	http://moodle.hku.hk			

ENTR2001	Profess	ional and leadership development (6 credits)	Academic Year	2019				
Offering Department	Faculty		Quota	24				
Course Co-ordinator	Dr R Law	, Faculty (rockylaw@hku.hk)						
Teachers Involved	(Ms J Llov	yd,CEDARS)						
Course Objectives	 Studen environ Studen Studen 	is course is to provide opportunity for: Students to develop an entrepreneurial mindset and be better prepared for entering into any entrepreneurial environment Students to further sharpen their communication skills, such as presentation and pitching of ideas Students to further enhance their networking skills, such as in social events Students to understand how different personalities and working / leadership styles fit into team work is course aims at increasing students' awareness of some important entrepreneurial skills and providing the						
Course Contents & Topics	This cour with platfo One of the	s course aims at increasing students' awareness of some important entrepreneurial skills and providing them platforms to hone essential skills necessary to succeed as a leader in operating an entrepreneurial venture of the course components will also allow students to self-reflect and develop practical sense on how different sonalities and work styles can help build leadership capacity as well as foster stronger team collaboration.						
Course Learning	-	ssful completion of this course, students should be able to:	g					
Outcomes	CLO 1 ac CLO 2 ga CLO 3 sh ne CLO 4 re	CLO 1 acquire basic knowledge about how different personalities and working / leadership styles fit into tea close gain insight into the fundamentals of starting and operating a business by meeting industry practition close sharpen their communication and career preparation skills in CV and cover letter writing, intended networking, presentation, negotiation, group discussion, case analysis and problem solving close recognize and adapt work style differences to establish stronger relationships at workplace in a starting close to the control of the control						
Pre-requisites (and Co-requisites and Impermissible combinations)		ompany 1 undergraduate course						
Offer in 2019 - 2020	Y 1st	sem Offer in 2020 - 2021 : Y	Examination	No Exam				
Grade Descriptors (A+ to F)	A Candidate has consistently demonstrated a thorough understanding and skills required for attaining all the course learning outcomes. S/he has shown the ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. S/he has							
(AT IOF)	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.							
	В	learning outcomes. S/he has shown the ability to apply knowledge to fami						
	C	learning outcomes. S/he has shown the ability to apply knowledge to fami effective organizational and presentation skills. Candidate demonstrated general but incomplete understanding and skills outcomes. Some of the responses are well organized, clear but with in improvement to achieve a more satisfactory level. S/he has demonstrated skills. Candidate demonstrated partial but limited understanding and skills require Solutions to questions and problems contain unstructured but relevant obs	liar and unfamiliar situations. S s required for attaining most o sufficient elaboration – there is moderately effective organizati d for attaining some of the cour servations. Candidate has show	/he has demonstrated of the course learning as significant room for onal and presentation ase learning outcomes				
	С	learning outcomes. Ś/he has shown the ability to apply knowledge to fami effective organizational and presentation skills. Candidate demonstrated general but incomplete understanding and skills outcomes. Some of the responses are well organized, clear but with in improvement to achieve a more satisfactory level. S/he has demonstrated skills. Candidate demonstrated partial but limited understanding and skills require	liar and unfamiliar situations. So serquired for attaining most of sufficient elaboration — there is moderately effective organization of or attaining some of the courservations. Candidate has show I and presentation skills. In or demonstration of sufficient	/he has demonstrated if the course learning is significant room for ional and presentation is elearning outcomes in marginal interest in				
	C D Fail	learning outcomes. Ś/he has shown the ability to apply knowledge to fami effective organizational and presentation skills. Candidate demonstrated general but incomplete understanding and skills outcomes. Some of the responses are well organized, clear but with in improvement to achieve a more satisfactory level. S/he has demonstrated skills. Candidate demonstrated partial but limited understanding and skills require Solutions to questions and problems contain unstructured but relevant obsthe subject. S/he has demonstrated limited or barely effective organizationa Candidate showed little or no evidence of basic familiarity with the subject.	liar and unfamiliar situations. So serquired for attaining most of sufficient elaboration — there is moderately effective organization of or attaining some of the courservations. Candidate has show I and presentation skills. In or demonstration of sufficient	/he has demonstrated if the course learning is significant room for ional and presentation is elearning outcomes in marginal interest in				
Course Teaching	C D Fail	learning outcomes. S/he has shown the ability to apply knowledge to fami effective organizational and presentation skills. Candidate demonstrated general but incomplete understanding and skills outcomes. Some of the responses are well organized, clear but with in improvement to achieve a more satisfactory level. S/he has demonstrated skills. Candidate demonstrated partial but limited understanding and skills require Solutions to questions and problems contain unstructured but relevant obsthe subject. S/he has demonstrated limited or barely effective organizational Candidate showed little or no evidence of basic familiarity with the subject, and course requirement. Organizational and presentation skills are minimal assed course	liar and unfamiliar situations. So serquired for attaining most of sufficient elaboration — there is moderately effective organization of or attaining some of the courservations. Candidate has show I and presentation skills. In or demonstration of sufficient	/he has demonstrate of the course learning s significant room fo onal and presentation see learning outcomes who marginal interest in				
Course Teaching	C D Fail Lecture-b	learning outcomes. S/he has shown the ability to apply knowledge to fami effective organizational and presentation skills. Candidate demonstrated general but incomplete understanding and skills outcomes. Some of the responses are well organized, clear but with in improvement to achieve a more satisfactory level. S/he has demonstrated skills. Candidate demonstrated partial but limited understanding and skills require Solutions to questions and problems contain unstructured but relevant obsthe subject. S/he has demonstrated limited or barely effective organizational Candidate showed little or no evidence of basic familiarity with the subject, and course requirement. Organizational and presentation skills are minimal assed course	liar and unfamiliar situations. So serquired for attaining most of sufficient elaboration — there is moderately effective organization of or attaining some of the courservations. Candidate has show I and presentation skills. In or demonstration of sufficient	/he has demonstrate of the course learning s significant room fo onal and presentation se learning outcomes wn marginal interest in effort to basic project				
Course Teaching	C D Fail Lecture-b Activities	learning outcomes. S/he has shown the ability to apply knowledge to fami effective organizational and presentation skills. Candidate demonstrated general but incomplete understanding and skills outcomes. Some of the responses are well organized, clear but with in improvement to achieve a more satisfactory level. S/he has demonstrated skills. Candidate demonstrated partial but limited understanding and skills require Solutions to questions and problems contain unstructured but relevant obtained the subject. S/he has demonstrated limited or barely effective organizational Candidate showed little or no evidence of basic familiarity with the subject and course requirement. Organizational and presentation skills are minimal assed course	liar and unfamiliar situations. So serquired for attaining most of sufficient elaboration — there is moderately effective organization of or attaining some of the courservations. Candidate has show I and presentation skills. In or demonstration of sufficient	/he has demonstrated of the course learning a significant room fo onal and presentation se learning outcomes on marginal interest in effort to basic projection.				
Course Teaching	D Fail Lecture-b Activities Lectures	learning outcomes. S/he has shown the ability to apply knowledge to fami effective organizational and presentation skills. Candidate demonstrated general but incomplete understanding and skills outcomes. Some of the responses are well organized, clear but with in improvement to achieve a more satisfactory level. S/he has demonstrated skills. Candidate demonstrated partial but limited understanding and skills require Solutions to questions and problems contain unstructured but relevant obsethe subject. S/he has demonstrated limited or barely effective organizational Candidate showed little or no evidence of basic familiarity with the subject, and course requirement. Organizational and presentation skills are minimal assed course	liar and unfamiliar situations. So serquired for attaining most of sufficient elaboration — there is moderately effective organization of or attaining some of the courservations. Candidate has show I and presentation skills. In or demonstration of sufficient	/he has demonstrated of the course learning is significant room for onal and presentation is elearning outcomes on marginal interest in a effort to basic project. No. of Hours 37 12 43				
Course Type Course Teaching & Learning Activities	C Fail Lecture-b Activities Lectures Tutorials Project w	learning outcomes. S/he has shown the ability to apply knowledge to fami effective organizational and presentation skills. Candidate demonstrated general but incomplete understanding and skills outcomes. Some of the responses are well organized, clear but with in improvement to achieve a more satisfactory level. S/he has demonstrated skills. Candidate demonstrated partial but limited understanding and skills require Solutions to questions and problems contain unstructured but relevant obsethe subject. S/he has demonstrated limited or barely effective organizational Candidate showed little or no evidence of basic familiarity with the subject, and course requirement. Organizational and presentation skills are minimal assed course	liar and unfamiliar situations. So serquired for attaining most of sufficient elaboration — there is moderately effective organization of or attaining some of the courservations. Candidate has show I and presentation skills. In or demonstration of sufficient	/he has demonstrated of the course learning is significant room fo onal and presentation se learning outcomes on marginal interest in a effort to basic project. No. of Hours 37 12				
Course Teaching & Learning Activities Assessment Methods	C Fail Lecture-b Activities Lectures Tutorials Project w	learning outcomes. S/he has shown the ability to apply knowledge to fami effective organizational and presentation skills. Candidate demonstrated general but incomplete understanding and skills outcomes. Some of the responses are well organized, clear but with in improvement to achieve a more satisfactory level. S/he has demonstrated skills. Candidate demonstrated partial but limited understanding and skills require Solutions to questions and problems contain unstructured but relevant obsethe subject. S/he has demonstrated limited or barely effective organizational Candidate showed little or no evidence of basic familiarity with the subject, and course requirement. Organizational and presentation skills are minimal assed course Details	liar and unfamiliar situations. So serquired for attaining most of sufficient elaboration — there is moderately effective organization of or attaining some of the courservations. Candidate has show I and presentation skills. In or demonstration of sufficient	/he has demonstrated if the course learning is significant room for onal and presentation is elearning outcomes on marginal interest in a effort to basic project. No. of Hours 37 12 43				
Course Teaching & Learning Activities Assessment Methods	C Pail Lecture-b Activities Lectures Tutorials Project w Reading	learning outcomes. S/he has shown the ability to apply knowledge to fami effective organizational and presentation skills. Candidate demonstrated general but incomplete understanding and skills outcomes. Some of the responses are well organized, clear but with in improvement to achieve a more satisfactory level. S/he has demonstrated skills. Candidate demonstrated partial but limited understanding and skills require Solutions to questions and problems contain unstructured but relevant obsethe subject. S/he has demonstrated limited or barely effective organizational Candidate showed little or no evidence of basic familiarity with the subject and course requirement. Organizational and presentation skills are minimal assed course Details Ork / Self study Include in class and home assignments	liar and unfamiliar situations. Soes required for attaining most of sufficient elaboration — there is moderately effective organization of the courservations. Candidate has shown and presentation skills. In or demonstration of sufficient by effective or ineffective.	/he has demonstrated of the course learning is significant room for onal and presentation are learning outcomes on marginal interest in a effort to basic project. No. of Hours 37 12 43 42 Assessment Methods to CLO				
Course Teaching & Learning Activities Assessment Methods	C D Fail Lecture-b Activities Lectures Tutorials Project w Reading Methods	learning outcomes. Ś/he has shown the ability to apply knowledge to fami effective organizational and presentation skills. Candidate demonstrated general but incomplete understanding and skills outcomes. Some of the responses are well organized, clear but with in improvement to achieve a more satisfactory level. S/he has demonstrated skills. Candidate demonstrated partial but limited understanding and skills require Solutions to questions and problems contain unstructured but relevant obsthe subject. S/he has demonstrated limited or barely effective organizational Candidate showed little or no evidence of basic familiarity with the subject, and course requirement. Organizational and presentation skills are minimal assed course Solutions Details Include in class and home assignments Experiential learning activities and reflective journal	liar and unfamiliar situations. S. s required for attaining most of sufficient elaboration — there is moderately effective organization of the courservations. Candidate has show and presentation skills. In or demonstration of sufficient by effective or ineffective. Weighting in final course grade (%)	/he has demonstrated of the course learning s significant room for onal and presentation se learning outcomes on marginal interest in effort to basic project No. of Hours 37 12 43 42 Assessment Methods to CLO Mapping				
Course Teaching & Learning Activities Assessment Methods	C Fail Lecture-b Activities Lectures Tutorials Project w Reading Methods	learning outcomes. Ś/he has shown the ability to apply knowledge to fami effective organizational and presentation skills. Candidate demonstrated general but incomplete understanding and skills outcomes. Some of the responses are well organized, clear but with in improvement to achieve a more satisfactory level. S/he has demonstrated skills. Candidate demonstrated partial but limited understanding and skills require Solutions to questions and problems contain unstructured but relevant obsthe subject. S/he has demonstrated limited or barely effective organizational Candidate showed little or no evidence of basic familiarity with the subject, and course requirement. Organizational and presentation skills are minimal assed course Solutions Details Include in class and home assignments Experiential learning activities and reflective journal Include Job Application Review &	liar and unfamiliar situations. S. s required for attaining most o sufficient elaboration – there is moderately effective organizati d for attaining some of the courservations. Candidate has show I and presentation skills. nor demonstration of sufficiently effective or ineffective. Weighting in final course grade (%)	/he has demonstrate of the course learnings significant room for onal and presentations are learning outcomes on marginal interest in the effort to basic project. No. of Hours 37 12 43 42 Assessment Methods to CLO Mapping CLO 1,2,3,4				
Course Teaching	C D Fail Lecture-b Activities Lectures Tutorials Project w Reading Methods Assignme Essay Project re Business Organizat Group Dy	learning outcomes. S/he has shown the ability to apply knowledge to fami effective organizational and presentation skills. Candidate demonstrated general but incomplete understanding and skills outcomes. Some of the responses are well organized, clear but with in improvement to achieve a more satisfactory level. S/he has demonstrated skills. Candidate demonstrated partial but limited understanding and skills require Solutions to questions and problems contain unstructured but relevant obsthe subject. S/he has demonstrated limited or barely effective organizational Candidate showed little or no evidence of basic familiarity with the subject, and course requirement. Organizational and presentation skills are minimal assed course Details Details Include in class and home assignments Experiential learning activities and reflective journal Include Job Application Review & Mock Interview and Group Presentation and Administrative Communication by Kitty Locker and Donna tional Behavior by Stephen P. Robbins and Timothy A. Judge mamics by Donelson R. Forsyth	liar and unfamiliar situations. S s required for attaining most o sufficient elaboration – there is moderately effective organizati d for attaining some of the courservations. Candidate has show I and presentation skills. nor demonstration of sufficient y effective or ineffective. Weighting in final course grade (%) 40 10 50 Kienzler	/he has demonstrate of the course learnings significant room for onal and presentations are learning outcomes on marginal interest in the effort to basic project. No. of Hours 37 12 43 42 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4				
Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended reading and	C Fail Lecture-b Activities Lectures Tutorials Project w Reading Methods Assignme Essay Project re Business Organizat Group Dy Talk Like	learning outcomes. S/he has shown the ability to apply knowledge to fami effective organizational and presentation skills. Candidate demonstrated general but incomplete understanding and skills outcomes. Some of the responses are well organized, clear but with in improvement to achieve a more satisfactory level. S/he has demonstrated skills. Candidate demonstrated partial but limited understanding and skills require Solutions to questions and problems contain unstructured but relevant obsthe subject. S/he has demonstrated limited or barely effective organizational Candidate showed little or no evidence of basic familiarity with the subject, and course requirement. Organizational and presentation skills are minimal assed course Details Details Include in class and home assignments Experiential learning activities and reflective journal Include Job Application Review & Mock Interview and Group Presentation and Administrative Communication by Kitty Locker and Donnational Behavior by Stephen P. Robbins and Timothy A. Judge	liar and unfamiliar situations. S s required for attaining most o sufficient elaboration – there is moderately effective organizati d for attaining some of the cour servations. Candidate has show I and presentation skills. nor demonstration of sufficient y effective or ineffective. Weighting in final course grade (%) 40 10 50 Kienzler	/he has demonstrate of the course learning significant room for conal and presentation and presentation are learning outcome on marginal interest of effort to basic project. No. of Hours 37 12 43 42 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4 CLO 1,2,3,4				

ENTR3001	Science-based innovation development (6 credits)	Academic Year	2019
Offering Department	Faculty	Quota	20
Course Co-ordinator	Dr M Kotaka, Biomedical Sciences (masayo@hku.hk)		
Teachers Involved	(Dr A C Koon,Biomedical Sciences) (Dr M Kotaka,Biomedical Sciences)		
Course Objectives	1. Stimulate students to contemplate how business opportunities can be general 2. Teach students the process of translating scientific ideas to commercial challenges therein. 3. Help students to understand the different regulatory requirements for science opportunities, including the different stages of clinical trial required for biomedical. Inspire students to identify potential business ideas from science and technologies action plan for a start-up company.	products and/or s ce and technology al-related products	services and the based business / services.
Course Contents & Topics	Topics will include identification of business opportunities from science and t translation of science into a commercial product, understanding the challenges products, understanding the regulatory requirements for technology-based products.	s of translating so	
Course Learning	On successful completion of this course, students should be able to:		
Outcomes	CLO 1 demonstrate an understanding on how science and technology can gene	erate business opi	ortunities

	CLO 2 a	cquire knowledge of the	process and stages involved in trar	nslating a scientific idea	into a commercial	
	CLO 3 id		ncountered in translating scientific id	deas into product and u	nderstand how to	
		enerate solutions to thos				
	p		ding of the different regulatory req ifferent stages of clinical trials require			
		lemonstrate the ability to ssessments	critically evaluate cases of science-ba	ased business success o	r failures in written	
	d		ence and technology research to ider asible action plan to bring the scie r digital aid			
Pre-requisites (and Co-requisites and Impermissible combinations)		IMT1611 and ENTR2001	·			
Offer in 2019 - 2020	Y 2n	d sem Offer in 2020 - 2	2021 : Y	Examination	No Exam	
Grade Descriptors (A+ to F)	A	outcomes. S/he has shown demonstrated highly effective	demonstrated a thorough understanding and the ability to apply knowledge to a wide range or organizational and presentation skills.	of complex, familiar and unfami	iar situations. S/he has	
	В	B 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.				
	С	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.				
	D	Solutions to questions and the subject. S/he has demo	artial but limited understanding and skills require problems contain unstructured but relevant ob nstrated limited or barely effective organizations	servations. Candidate has sho al and presentation skills.	wn marginal interest in	
	Fail		no evidence of basic familiarity with the subject ganizational and presentation skills are minima		t effort to basic project	
Course Type	Lecture-k	pased course	•			
Course Teaching	Activitie	es	Details		No. of Hours	
& Learning Activities	Lectures	;			36	
	Tutorials	;			12	
	Project v	vork			40	
	Reading	/ Self study			40	
Assessment Methods and Weighting	Methods	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignm	ents	Project report, Presentations, Discussions and student performance in tutorials	100	CLO 1,2,3,4,5,6	
Required/recommended reading and online materials	Winning Regulato	at New Products: Creating Affairs for Biomaterials	Guide to Startups and Corporate Vening Value Through Innovation by Robers and Medical Devices edited by Stepl	rt G. Cooper	M. Ezzell Jr	
	Online A		arvard Business Review, June 2008			
Additional Course Information	Further t		bed in the assessment section, parti	cipation and engagemer	t in the class and	

ENTR3002	Customer analysis and strategic marketing (6 credits)	Academic Year	2019			
Offering Department	Faculty	Quota	20			
Course Co-ordinator	Dr R Law, Faculty (rockylaw@hku.hk)					
Teachers Involved						
Course Objectives	This course is to provide opportunity for: 1. Students to master techniques to identify customers' needs and market 2. Students to learn how to define strategies to satisfy customers' needs a 3. Students to learn how to develop systematic approaches for commercianalyzing the current market condition and customers' need. 4. Students to evaluate local and international cases on disruptive/market 5. Students to synthesize and implement their own approaches to inverse proposal to commercialize such an innovation.	nd to capture market sh cializing an innovation f driven innovation.	rom the result of			
Course Contents & Topics	This course focuses on data collection and analysis of market and custon commercial opportunities could be identified together with systematic app will learn about practical way of data collection and analysis and about h made wisely. Local and international case studies on disruptive/market dr evaluated.	proaches addressing the ow data-driven busines	em. The student s decision will b			
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 drive	n innovation				
	CLO 5 to integrate principles discussed in this course via synthesizing a to commercialize an innovation	nd implementing systen	natic approaches			
	CLO 6 to draft a business proposal					
Pre-requisites	Pass in IIMT1611 and ENTR2001					

(and Co-requisites and Impermissible						
combinations)						
Offer in 2019 - 2020	Y 2nd	d sem Offer in 2020 - 2	021 : Y		Examination	No Exam
Grade Descriptors (A+ to F)	Candidate has consistently demonstrated a thorough understanding and skills required for attaining all the course learning 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					
	B 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.					
	С	outcomes. Some of the res	sponses are well organize	erstanding and skills require d, clear but with insufficient e has demonstrated moderat	elaboration - there	is significant room for
	D	Solutions to questions and	problems contain unstructu	ng and skills required for atta red but relevant observation ective organizational and pre	s. Candidate has sh	
	Fail			rity with the subject, nor dem on skills are minimally effective		ent effort to basic project
Course Type	Lecture-b	ased course				
Course Teaching	Activities		Details			No. of Hours
& Learning Activities	Lectures					36
	Tutorials					12
	Project work					48
	Reading	/ Self study				52
Assessment Methods and Weighting	Methods		Details		hting in final se grade (%)	Assessment Methods to CLO Mapping
	Assignme	ents			20	CLO 1,2,3,4
	Presenta	tion			30	CLO 1,2,3,4,5,6
	Project re	eports	report		50	CLO 1,2,3,4,5,6
Required/recommended reading and online materials	Business	Start-Up by Eric Reis Model Generation by Ale by Design: How Design T		rganizations and Inspire	es Innovation by	Tim Brown
Course Website		odle.hku.hk	J 2	Jp	,	

ENTR4966	Entrepre	eneurship inter	rnship (6 credits)	Academic Yea	r 2019	
Offering Department	Faculty	-		Quota	20	
Course Co-ordinator	Dr R Law,	Faculty (rockylaw	v@hku.hk)			
Teachers Involved	(All acade	mic staff in Facult	y of Science,)			
Course Objectives	1. To prace	ctice what they leadent.	portunity for students: arned related to entrepreneurship throu erience in industries for the preparation	,		
Course Contents & Topics	University	or outside the Ur	e will work as an intern for at least 16 niversity in a company (preferably tech culty or obtained by students themselves	nology based startup compa		
	various tas 2. Outside	sks as instructed be the university: Th	e student will be supervised by a staff me by the Supervisor. ne student will be supervised under a st nber of the Faculty/School /Department	aff member of the external ag	gency (the Extern	
Course Learning Outcomes			f this course, students should be able to bly knowledge gained in coursework in a			
Julcomes			ulture of a real organization and challeng		Aurehin	
					eursnip	
	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	Pass in El	NTR3001 and EN	TR3002			
(and Co-requisites and Impermissible		must be in their Ye	ear 3 study or beyond, as well as minori	ng in Science Entrepreneursh	nip.	
(and Co-requisites and Impermissible combinations)				ng in Science Entrepreneursh Examination	nip. No Exam	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (Pass /Pass with distinction /Fail)		nmer Offer in 20 Able to apply knowle assigned by supervithe job. Successfully	ear 3 study or beyond, as well as minori	Examination sfully handles and carries out the wo ommunication with supervisor(s), col escription regarding working hours,	No Exam rk required in the job leagues, and clients written and oral repo	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (Pass /Pass with distinction /Fail)	Y Sun	Able to apply knowle assigned by supervi the job. Successfully and evaluation by s of "Distinction". Very limited or no at by supervisor(s). Fai	ear 3 study or beyond, as well as minori 220 - 2021 : Y edge to solve problems in the workplace. Success isor(s). Establishes effective collaboration and cc y fulfills the requirements set out in the Course D supervisor(s), etc. Students demonstrating excell- bility to solve problems in the workplace. Fails to ills to establish effective collaboration or communi the requirements set out in the Course Descrip	Examination sfully handles and carries out the wo mmunication with supervisor(s), col escription regarding working hours, ent performance in the above woul handle or carry out the work require cation with supervisor(s), other colle	No Exam rk required in the job of leagues, and clients is written and oral repord be awarded a grad d in the job or assigne agues, or clients in the	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (Pass /Pass with distinction /Fail) Course Type	Y Sun Pass	Able to apply knowle assigned by supervithe job. Successfully and evaluation by s of "Distinction". Very limited or no at by supervisor(s). Fai job. Fails to satisfy evaluation by supervisor by supervisor sup	ear 3 study or beyond, as well as minori 220 - 2021 : Y edge to solve problems in the workplace. Success isor(s). Establishes effective collaboration and cc y fulfills the requirements set out in the Course D supervisor(s), etc. Students demonstrating excell- bility to solve problems in the workplace. Fails to ills to establish effective collaboration or communi the requirements set out in the Course Descrip	Examination sfully handles and carries out the wo mmunication with supervisor(s), col escription regarding working hours, ent performance in the above woul handle or carry out the work require cation with supervisor(s), other colle	No Exam rk required in the job of leagues, and clients is written and oral report d be awarded a grad d in the job or assigneagues, or clients in the and oral report, or	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (Pass /Pass with distinction /Fail) Course Type Course Teaching	Y Sun Pass	nmer Offer in 20 Able to apply knowle assigned by supervithe job. Successfully and evaluation by s of "Distinction". Very limited or no at by supervisor(s). Fal job. Falls to satisfy evaluation by superv	ear 3 study or beyond, as well as minori 220 - 2021 : Y edge to solve problems in the workplace. Success isor(s). Establishes effective collaboration and cc y fulfills the requirements set out in the Course D supervisor(s), etc. Students demonstrating excell- bility to solve problems in the workplace. Fails to ills to establish effective collaboration or communi the requirements set out in the Course Descrip	Examination sfully handles and carries out the wo mmunication with supervisor(s), col escription regarding working hours, ent performance in the above woul handle or carry out the work require cation with supervisor(s), other colle	No Exam rk required in the job of leagues, and clients in written and oral report d be awarded a grad d in the job or assigne agues, or clients in the	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (Pass /Pass with distinction /Fail) Course Type Course Teaching	Y Sun Pass Fail	Able to apply knowle assigned by supervithe job. Successfully and evaluation by sof "Distinction". Very limited or no at by supervisor(s). Fai job. Fails to satisfy evaluation by supervisor(s).	ear 3 study or beyond, as well as minoring as a study or beyond, as well as minoring as a study or beyond, as well as minoring as a study of the stabilishes effective collaboration and consumers of the stabilishes effective collaboration and consumers of the stabilishes effective collaboration and consumers of the stabilishes of the stabilishes of the stabilishes effective collaboration or communities the requirements set out in the Course Description of the stabilishes of the stabilishes effective collaboration or communities of the stabilishes of the stabi	Examination In the stully handles and carries out the wood momunication with supervisor(s), colescription regarding working hours, ent performance in the above would handle or carry out the work required ication with supervisor(s), other colleption regarding working hours, written to work at least 160 hours	No Exam rk required in the job of leagues, and clients is written and oral report d be awarded a grad d in the job or assigneagues, or clients in the and oral report, or	
and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (Pass /Pass with distinction /Fail) Course Type Course Teaching	Y Sun Pass Fail Internship Activities Internship	Able to apply knowle assigned by supervithe job. Successfully and evaluation by sof "Distinction". Very limited or no at by supervisor(s). Fai job. Fails to satisfy evaluation by supervisor(s).	ear 3 study or beyond, as well as minori 220 - 2021 : Y edge to solve problems in the workplace. Success isor(s). Establishes effective collaboration and collaboration are described. Details it is expected that students are	Examination In the stully handles and carries out the wood momunication with supervisor(s), colescription regarding working hours, ent performance in the above would handle or carry out the work required ication with supervisor(s), other colleption regarding working hours, written to work at least 160 hours	No Exam rk required in the job leagues, and clients written and oral repord be awarded a grad d in the job or assigne agues, or clients in the and oral report, or No. of Hours	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (Pass /Pass with distinction /Fail) Course Type Course Teaching	Y Sun Pass Fail Internship Activities Internship	Able to apply knowle assigned by supervite job. Successfully and evaluation by so of "Distinction". Very limited or no at by supervisor(s). Fal job. Fails to satisfy evaluation by supervisor work.	ear 3 study or beyond, as well as minori 220 - 2021 : Y edge to solve problems in the workplace. Success isor(s). Establishes effective collaboration and collaboration are described. Details it is expected that students are	Examination In the stully handles and carries out the wood momunication with supervisor(s), colescription regarding working hours, ent performance in the above would handle or carry out the work required ication with supervisor(s), other colleption regarding working hours, written to work at least 160 hours	No Exam rk required in the job leagues, and clients written and oral repo d be awarded a grace d in the job or assigne eagues, or clients in the nand oral report, of No. of Hours 160	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (Pass /Pass with distinction	Y Sun Pass Fail Internship Activities Internship Reading /	Able to apply knowle assigned by supervite job. Successfully and evaluation by so of "Distinction". Very limited or no at by supervisor(s). Fai job. Fails to satisfy evaluation by supervisor work.	ear 3 study or beyond, as well as minori 220 - 2021 : Y edge to solve problems in the workplace. Success isor(s). Establishes effective collaboration and co y fulfills the requirements set out in the Course D supervisor(s), etc. Students demonstrating excell billity to solve problems in the workplace. Fails to ills to establish effective collaboration or communi the requirements set out in the Course Descrip visor(s), etc. Details it is expected that students are (or the equivalent of 4 weeks full)	Examination In the stully handles and carries out the wood momunication with supervisor(s), colescription regarding working hours, ent performance in the above would handle or carry out the work required ication with supervisor(s), other colleption regarding working hours, written to work at least 160 hours	No Exam rk required in the job of leagues, and clients is written and oral report d be awarded a grad d in the job or assigneragues, or clients in the len and oral report, or the len and oral report or the len and	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (Pass /Pass with distinction /Fail) Course Type Course Teaching & Learning Activities Assessment Methods	Y Sun Pass Fail Internship Activities Internship Reading / Assessme	Able to apply knowle assigned by supervithe job. Successfully and evaluation by s of "Distinction". Very limited or no at by supervisor(s). Fai job. Fails to satisfy evaluation by supervisor (s). Work Self study	ear 3 study or beyond, as well as minori 220 - 2021 : Y edge to solve problems in the workplace. Success isor(s). Establishes effective collaboration and co y fulfills the requirements set out in the Course D supervisor(s), etc. Students demonstrating excell billity to solve problems in the workplace. Fails to ills to establish effective collaboration or communi the requirements set out in the Course Descrip visor(s), etc. Details it is expected that students are (or the equivalent of 4 weeks full Presentation	Examination In the stully handles and carries out the wood memorication with supervisor(s), colescription regarding working hours, ent performance in the above would handle or carry out the work required ication with supervisor(s), other colleption regarding working hours, writt to work at least 160 hours litime) Weighting in final	No Exam In rk required in the job of leagues, and clients is written and oral report die be awarded a grad din the job or assigner agues, or clients in the len and oral report, or len and oral report, or len and oral report, or len and l	

	Supervisor's feedback	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 ma supervisor(s) and/or the correspon	aterials appropriate to the individual ding Faculty members.	internship assignment b	y the internship
Course Website	http://moodle.hku.hk			
Additional Course Information		at least 160 hours, supervised by a F report of no more than 2000 words		ation about their

ENTR4999	Entrepre	neurship project	t (6 credits)	Academic Ye	ar 2019	
Offering Department	Faculty			Quota	20	
Course Co-ordinator	Dr R Law,	Faculty (rockylaw@	hku.hk)			
Teachers Involved	(All acade	mic staff in Faculty o	f Science,)			
Course Objectives	 Apply engained fro proposals. Studen 	This course is to provide opportunity for students to: 1. 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. 2. Students to further develop leadership and teamwork experience via collaboration in multi-disciplinary environments.				
Course Contents & Topics	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 thereafter.					
Course Learning	On succes	sful completion of th	is course, students should be able	to:		
Outcomes	CLO 1 to	integrate and apply	theoretical knowledge in a real-life	setting		
			ools to analyze real-life entrepreneu	•		
	CLO 3 to	further improve pres	sentation, problem-solving and colla	borative skills in tackling real	-life problems	
	CLO 4 to	build a team, with m	embers from different specialized a	reas, that is ready for busine	ss venture	
	CLO 5 to	prepare a viable bus	siness plan that is ready for fund rai	sing activities		
Pre-requisites and Co-requisites and Impermissible combinations)		NTR3001 and ENTR: nust be in their Year	3002 3 study or beyond, as well as mino	ring in Science Entrepreneurs	ship.	
Offer in 2019 - 2020	N Offe	er in 2020 - 2021 : Y		Examination		
Grade Descriptors (A+ to F)	A Candidate has consistently demonstrated a thorough understanding and skills required for attaining all the course learning 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. B Candidate frequently demonstrated a substantial understanding and skills required for attaining at least most of the course					
	С	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.				
	D Fail	Solutions to questions a the subject. S/he has de Candidate showed little	d partial but limited understanding and skills and problems contain unstructured but relev emonstrated limited or barely effective organi or no evidence of basic familiarity with the	vant observations. Candidate has sh izational and presentation skills. subject, nor demonstration of sufficie	own marginal interest i	
	D :		. Organizational and presentation skills are r	ninimally effective or ineffective.		
Course Type	-	sed course				
Course Teaching & Learning Activities	Activities		Details		No. of Hours	
k Learning Activities	Meeting w	vith supervisor	Supervisor meet students in the end of this course for briefi	ng and coaching purpose.	15	
	Reading /	Self study	Students will be working on their projects with guidance from the supervisor to build a business proposal		120	
	Assessme	ant	Presentation		5	
Assessment Methods	Methods	JIIL .	Details	Weighting in final	Assessment	
nd Weighting	Wethous		Details	course grade (%)	Methods to CLO Mappin	
	Dissertation		Research report	60	CLO 1,2,3,4,5	
	Oral prese	entation		40	CLO 1,2,3,4,5	
Required/recommended reading and	Students v	will be briefed with ma	aterials appropriate to the project by	y the project supervisor(s).		
online materials Course Website	http://moo	dle hku hk				
Additional Course			regularly with the project superviso	or(e)		
Information	Students a	•	ten report or a business proposal	()	rds, together with	

SCNC1111	Scientific method and reasoning (6 credits)	Academic Year	2019
Offering Department	Faculty	Quota	
Course Co-ordinator	Dr K F Lam, Statistics & Actuarial Science (hrntlkf@hku.hk)		
Teachers Involved	(Dr K F Lam, Statistics & Actuarial Science) (Dr R K W Lui, Faculty of Science) (Dr W M Y Cheung, Faculty of Science)		
Course Objectives	The objectives are to give students a holistic view of the science discipline in	terms of its natur	re, concepts and

Cauras Cantanta	introduce	to students mathematica	to equip students with basic skills on and statistical methods for science states of sciences.			
Course Contents		e nature and methodolog				
& Topics	- Demarcation between science and non-science - Shared features of the sciences					
	- Snared reatures of the sciences - Scientific method					
			storical development of science			
		uantitative reasoning	d from			
		matics with topics selecte tion of mathematics.	d IIOIII			
		,	of science - an introduction,			
		natical modelling - an intro				
	- Guessti	•	, ,			
	- Differen	ce equations,				
	- Linear a	lgebra and matrices,				
		s and differential equatior	ns, and/or			
	- Fractals	and Chaos.				
	b. Statisti					
	- Probabi	listic methods				
		al inference				
		nce intervals estimation				
		esis testing				
		n making with statistics				
		al modelling, and use and				
Course Learning		· · · · · · · · · · · · · · · · · · ·	ourse, students should be able to:			
Outcomes		escribe key aspects of sc				
		-	of the foundation of mathematics and	d statistics		
		· · · · · · · · · · · · · · · · · · ·	nat underlies scientific problems	ath was life and asian	atifia muahlamaa im	
		ppiy logical and quanti nathematical terms, and to	tative reasoning to re-formulate b	oth real life and scier	ntific problems in	
	11	iatricinatical terms, and t	o interpret trien solutions			
Pre-requisites	NII		•			
•	NIL (This cou	ırse is compulsorv for all		ffered by the Faculty of	Science. Student	
and Co-requisites and Impermissible	(This cou	urse is compulsory for all ke this course in their firs	I students taking a Science major o	ffered by the Faculty of	Science. Student	
and Co-requisites and Impermissible combinations)	(This cou should ta		I students taking a Science major o t year.)	ffered by the Faculty of	Science. Student	
and Co-requisites and Impermissible combinations) Offer in 2019 - 2020	(This cou should ta	ke this course in their first t sem 2nd sem Offer i Demonstrate thorough mast	I students taking a Science major o t year.) n 2020 - 2021 : Y ery of extensive knowledge and skills required	Examination If for attaining all the course le	Dec May earning outcomes. Show	
(and Co-requisites and Impermissible combinations) Offer in 2019 - 2020	(This coushould ta	ke this course in their first t sem 2nd sem Offer i Demonstrate thorough mast strong analytical and critical	I students taking a Science major o t year.) n 2020 - 2021 : Y ery of extensive knowledge and skills required abilities and logical thinking, and ability to app	Examination If for attaining all the course let ly knowledge to a wide range of	Dec May earning outcomes. Short of familiar and unfamilia	
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SCNC1112	Fundamentals of modern science (6 credits)	Academic Year	2019
Offering Department	Faculty	Quota	
Course Co-ordinator	Dr J C S Pun, Physics (jcspun@hku.hk)		
Teachers Involved	(Dr E K M Leung,Faculty of Science) (Dr H Y Au-Yeung,Chemistry) (Dr J C S Pun,Physics) (Dr J D Gaitan-Espitia,Biological Sciences) (Dr L Ashton,Biological Sciences) (Dr M H Lee,Earth Sciences)		
Course Objectives	This course aims to provide students an overview of the giant web of kno course adopts an integrated approach and encompasses physics, astron biology, and focuses on the general principles and unifying concepts of s	omy, earth sciences	, chemistry, and

		developments and tuced and highlighted	the modern frontiers, and the interco	illiecteuriess of different sci	ience disciplines w	
Course Contents			nifying concepts of science			
& Topics		mental structure of r				
•	- Structure of matter					
	- The quantum world					
		tary particles and sta	indard model			
	\ <i>'</i>	and molecules	adia tabla			
		and atoms: The peri al bonds and chemic				
			carbon, molecular cluster			
		ence and nanotechn				
	(4) DNA/0		0,7			
	- Molecule					
		cs and DNA; Genetic	cs and inheritance			
	\ <i>'</i>	and systems				
	` '	iism and environmen iin and evolution of li				
		and environment				
	0,	and Beyond				
			ere and hydrosphere			
	- Earth's r	motion in space				
		the Sun, and the so	lar system			
Course Learning	- Cosmolo		his course students should be all t	٥٠		
Course Learning Outcomes			his course, students should be able to ading of the historical development		sence and enirit of	
Jacounica			ods, and the role of science in the ad			
			miliar with the fundamental scientific		or unio	
			ty of different scientific disciplines ar		and interdisciplina	
		erspectives on scien	·			
			y appraise received ideas and establi	shed knowledge		
	CLO 5 de	evelop curiosity in so	cience and an appreciation of science	es as related to different Sci	ence Majors and a	
	а	form of life-long lear	ning			
Pre-requisites	NIL					
(and Co-requisites			or all students taking a Science ma	jor offered by the Faculty o	f Science. Studen	
and Impermissible	should tal	ke this course in thei	r first year.)			
combinations)	Y 1st	som 2ndsom C	offer in 2020 2021 : V	Evenination	Dog May	
Offer in 2019 - 2020 Grade Descriptors	A ISI		offer in 2020 - 2021 : Y mastery of extensive knowledge and skills re	Examination	Dec May	
(A+ to F)	 ^	strong analytical and o	critical abilities and logical thinking, with evide	nce of original thought, and ability	to apply knowledge to	
()			r, familiar and unfamiliar situations. Apply highl riate and insightful conclusions Apply highly ef			
	В		ial command of a broad range of knowledge			
			ow evidence of analytical and critical abilities a			
			situations. Apply effective lab skills and techi ective organizational and presentational skills	niques. Correct use of data of res	uits to draw appropria	
	conclusions. 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 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 and skills required for attaining some of the course learning outcomes.				
	D	Demonstrate partial bu		equired for attaining some of the co	ills. ourse learning outcome	
	D	Demonstrate partial bu Show evidence of som	e coherent and logical thinking, but with limite	equired for attaining some of the co d analytical and critical abilities. Sh	ills. ourse learning outcome ow limited ability to app	
	D	Demonstrate partial bu Show evidence of som knowledge to solve pro appropriate conclusion	e coherent and logical thinking, but with limite oblems. Apply partially effective lab skills and s. Apply limited or barely effective organization	equired for attaining some of the co d analytical and critical abilities. Sh techniques. Limited ability to use that and presentational skills.	ills. ourse learning outcome ow limited ability to app data and results to dra	
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SCNC1113	The big history of our planet: a scientific perspective on everything that has ever happened (6 credits)	Academic Year	2019
Offering Department	Faculty	Quota	50
Course Co-ordinator	Dr W M Y Cheung, Faculty (willmyc@hku.hk)		
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 Universe, the synthesis of different chemical substances, through the evolution of various species on Earth, to the establishment of modern human society, the course aims to: (1) discuss the process of scientific discovery, and how our current body of knowledge about Nature was established; (2) develop students' understanding of the multi-disciplinary nature of science; (3) develop students' understanding of the importance of science and technology to our society, in formulating policies in the society, and solving the future problems of our planet; (4) increase scientific literacy. Course Contents Part I: From the Cosmos to the Atom & Topics Main theme: How fundamental interactions between the building blocks of matter shape the Universe today as we know it: Topics include: Big bang, nucleosynthesis, cosmic expansion, cooling of the universe, star formation, and thermal 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 diversified biosphere on earth today; 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 development of intelligence and accumulation of knowledge; how science, technology, human society and environment influence one another; Topics include: Neural network and the emergence of intelligence, historical development of modern science, the role of science in human civilisation and the contemporary world. Part IV: Looking into the Future Main theme: Outlook on the future of science, technology, human society and environment; key challenges to be faced by humankind that could be addressed by science and technology; Topics include: Students will attend one of several parallel modules on topics that suit their interests, such asnanotechnology, climate change, energy crisis, bioethics and artificial intelligence. Course Learning On successful completion of this course, students should be able to: 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 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 CLO 3 understand how different science disciplines fit and emerge from one another as a collective effort of the humankind to understand Nature 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 CLO 5 evaluate some of the major challenges faced by humankind, and discuss solutions from a multi-disciplinary perspective CLO 6 test claims and engage in historical analysis based on theories and practices from multiple disciplines Pre-requisites Level 3 or above in at least one science subject at the pre-university level (HKDSE Physics, Chemistry, Biology, (and Co-requisites Combined/Integrated Science or equivalent) and Impermissible This course is not offered to students in the 6901 BSc or 6119 BEd&BSc programmes. combinations) Offer in 2019 - 2020 Ν Offer in 2020 - 2021 : Y Examination Demonstrate thorough mastery of extensive knowledge and skills required for attaining all the course learning outcomes. Show **Grade Descriptors** Α strong analytical and critical abilities and logical thinking, and ability to apply knowledge to a wide range of familiar and unfamiliar (A+ to F) situations. Carry out computations carefully and correctly. 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. Carry out computations mostly in a careful and correct way, but commit some minor В computational errors. 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. Commit a number of minor computational errors. Apply moderately effective organizational and presentational 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. Commit some substantial computational errors. Apply limited or barely effective organizational and D 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. Commit serious computational errors. Organization and presentational skills are minimally effective or ineffective. Fail Course Type Lecture-based course Course Teaching **Activities** Details No. of Hours & Learning Activities Lectures 36 12 **Tutorials** Reading / Self study 100 **Assessment Methods** Methods Details Weighting in final Assessment and Weighting course grade (%) Methods to CLO Mapping About 3 reading assignments will be given. Students will then be CLO 40 Assignments assessed in various forms such as 1,2,3,4,5,6 drawing mind maps, short quizzes or reflective journals. CLO Presentation **Tutorial participation** 10 1,2,3,4,5,6 Project reports 30 CLO 1,3,4,5,6 20 CLO 1,2,3,4,6 Test Required/recommended Steven Weinberg: The First Three Minutes: A Modern View of the Origin of the Universe (Basic Books) reading and Charles Darwin: The Origin of Species

online materials	Eric R. Kandel: In Search of Memory: The Emergence of a New Science of Mind (W. W. Norton & Company)
	Fred Spier: Big history and the future of humanity (Wiley-Blackwell)
	David Christian, Cynthia Brown and Craig Benjamin: Big History: Between Nothing and Everything (McGraw-Hill
	Humanities/Social Sciences/Languages)
	The Big History Project website: https://www.bighistoryproject.com/

	Sustain	able food production (6 credits)		Academic Year	2019	
Offering Department	Faculty	IN 1811 1 10 1		Quota	32	
Course Co-ordinator		I-Nezami, Biological Sciences (elnezami@hku.hk)				
eachers Involved		sa Lewis,UBC Faculty of Land and Food Systems)				
Course Objectives		rse is designed to provide students with the opportunity	ty to experi	ence the inner-working	s of a sustainabl	
		farming operation, and to make connections betwee	, ,	•		
		ties surrounding the farm. Students will participate in				
		from the UBC Faculty of Land and Food Systems,	•	group discussions, fiel	d trips on and o	
Course Contents		and in a variety of seasonal, hands-on farming activiti Millan building, home of the UBC Faculty of Land		Evetome will be the e	ito of the plane	
R Topics		, guest speaker lectures, and morning group discussi				
a 10p.00		ne majority of farming activities, including afternoon				
	Saturday	s. Students will have a chance to explore the UBC	campus su	stainability hot-spots,	including the LF	
		garden, the world-class CIRS green building, Place				
		nd the wiggle worm project in the Student Union Bui Vancouver Farmers' Market and to Granville Island				
		g systems and the regionally grounded food system of		arket to provide a con	iipaialive view	
	marketing	g systems and the regionally grounded lood system of	ontoxt.			
	The mair	approach to learning with this course is student-ce	ntered lear	ning and hands-on exp	perience. To me	
		earning objectives, students are expected to attend a				
		ons and the group oral presentation, and to complete	e a series o	of reflective journals or	n each of the fo	
Course Learning		rse themes-soils, biodiversity, seeds, marketing. essful completion of this course, students should be ab	alo to:			
Outcomes		onnect underlying agroecosystem concepts and soil		damentals with princin	les and practice	
Julio 11100		f sustainable farming	Science iui	damentais with philoip	nes and practice	
		bserve and compare multiple models of agricultural fo	od producti	on in an urban and can	npus farm setting	
		dentify multiple strategies for creating on-farm biodiver				
		emonstrate a basic understanding of composting fund				
		emonstrate the ability to perform a select set of basic	c crop main	tenance, harvest, was	hing, and packin	
		echniques in a sustainable campus farm setting	a a d fa a d a a	.fati , muata a a la		
Dun un musicita a		emonstrate best practices with post-harvest handling		· ·	Ctudonto u	
Pre-requisites and Co-requisites		are expected to have passed at least 30 credits of led to pass an interview in order to be enrolled in the course		or level 2 science cour	ses. Students w	
and Impermissible	also ricco	to pass an interview in order to be emolica in the cou	uisc.			
combinations)						
Offer in 2019 - 2020	N Of	fer in 2020 - 2021 : Y		Examination		
Grade Descriptors	Α	Clear understanding of the basics from sustainable farming to	marketing st	rategies used by sustainable	e farming operations	
(A+ to F)		Ability to perform crop maintenance, harvest, washing, and pact solid team-based skills for performance of fieldwork, and distin	nct performan	ce in different assessment o	components. Ability t	
		synthesize the lessons learned during the course and articulate individual learning objectives for further studies in agriculture				
					studies in agriculture	
	В	food and human health. Clear understanding of the basics from sustainable farming to	marketing st			
	В	Clear understanding of the basics from sustainable farming to Ability to perform crop maintenance, harvest, washing, and pact	king in a susta	rategies used by sustainabl inable campus farm setting.	e farming operations Ability to demonstra	
		Clear understanding of the basics from sustainable farming to Ability to perform crop maintenance, harvest, washing, and paci solid team-based skills for performance of fieldwork, and distinct	king in a susta performance	rategies used by sustainabl inable campus farm setting. in different assessment comp	le farming operations Ability to demonstrations	
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	С	Clear understanding of the basics from sustainable farming to Ability to perform crop maintenance, harvest, washing, and pact solid team-based skills for performance of fieldwork, and distinct Understanding of the basics from sustainable farming to marke perform crop maintenance, harvest, washing, and packing in a team-based skills for performance of fieldwork, and satisfactory	king in a susta performance ting strategies sustainable c performance ii	rategies used by sustainabl inable campus farm setting. in different assessment com used by sustainable farming ampus farm setting. Satisfac n different assessment comp	le farming operations Ability to demonstration oonents. g operations. Ability to ctory demonstration of onents.	
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Course Teaching & Learning Activities Assessment Methods	C Fail Field can Activitie Lectures Field wo Presenta Reading Assessm	Clear understanding of the basics from sustainable farming to Ability to perform crop maintenance, harvest, washing, and pact solid team-based skills for performance of fieldwork, and distinct Understanding of the basics from sustainable farming to marke perform crop maintenance, harvest, washing, and packing in a team-based skills for performance of fieldwork, and satisfactory Knowing some of the basics of sustainable farming. Active partidifferent assessment components. Fail to follow the basics of sustainable farming as demonstrated mps S Details rk ation Group discussion / Project / Self study The first propert First propert Group of trip report	king in a susta performance ting strategies sustainable c performance in cipation in tear	rategies used by sustainabl inable campus farm setting. In different assessment compused by sustainable farming used by sustainable farming ampus farm setting. Satisfact different assessment compen-based fieldwork, and satisfory performance in assignment compensations.	le farming operation Ability to demonstrationents. g operations. Ability ottory demonstration onents. factory performance ents and/or fieldwork No. of Hours 20 50 10 50 30 Assessmen Methods to CLO	
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Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended reading and	Fail Field can Activitie Lectures Field wo Presenta Reading Assessm Methods	Clear understanding of the basics from sustainable farming to Ability to perform crop maintenance, harvest, washing, and pact solid team-based skills for performance of fieldwork, and distinct Understanding of the basics from sustainable farming to marke perform crop maintenance, harvest, washing, and packing in a team-based skills for performance of fieldwork, and satisfactory Knowing some of the basics of sustainable farming. Active partidifferent assessment components. Fail to follow the basics of sustainable farming as demonstrated apps S Details To Betails To be announced by UBC for Land and Food Systems Students will divided into gard. Each group will subm pages report (not including references). Please references). Please references.	Faculty of groups of it a 7-10 ing the fer to ments.	rategies used by sustainabl inable campus farm setting. In different assessment compused by sustainable farming used by sustainable farming ampus farm setting. Satisfact of different assessment compon-based fieldwork, and satisfory performance in assignment weighting in final course grade (%)	le farming operation: Ability to demonstrationents. g operations. Ability to demonstrationents. g operations. Ability to demonstration conents. factory demonstration conents. factory performance ents and/or fieldwork. No. of Hours 20 50 10 50 30 Assessment Methods to CLO Mapping CLO 1,2,4,5	
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Enrolment of this course is not conducted via the online course selection system. Students will be enrolled manually by the Faculty after approval has been obtained from the course coordinator.

This course is taught by staff in UBC and the end of trip report is graded by Dr H S El-Nezami.

Remarks:

Students will divided into groups of 3-4. Each group will submit a 7-10 pages report (not including the references). Please use Times New Roman (12 points), single space and 2 cm margins from all sides. The report should summarize the group HACCP plan, issues, problems and approaches and suggestions to address any farm related food safety issues. The marking criteria are the scientific quality and clear identification of the issues listed above. In addition each group will be presenting 12-15 minutes on the topic of their report.

SCNC2122	Marine life science: a North East Pacific perspective (6 credits) Academic Year				2019	
Offering Department	Faculty			Quota	32	
Course Co-ordinator	Dr T Ver	ngatesen, Biological Sci	ences (rajan@hku.hk)			
Teachers Involved	(Prof G /	engatesen,Biological Sci A Williams,Biological Sc S S Wu,Biological Scien Kwok,Earth Sciences)	ciences)			
Course Objectives	Marine Life Science is an integrated study of how the oceans influence large and small scale patterns of marine biology through biophysical interactions. By studying the temperate cold waters of the NE Pacific Ocean, students will learn marine habitats as habitable planet, to appreciate the dynamics of marine biodiversity, the complex interactions between the physical and biological components, fishery, and the services the coastal oceans provide to human. This course will provide an excellent opportunity for students to experience the diversity of marine life or the other side of the Pacific.					
Course Contents & Topics	Lectures from both HKU and UBC teachers will introduce 'marine life science'; with a focus on biodiversity, abundance and distribution of species, productivity, coastal pollution, fisheries, aquaculture and climate change. The course will also introduce the commercial aspects of marine life, i.e. eel-grass, aquaculture and climate change mitigation through management of coastal ecosystems. All these lectures will be discussed through a series of field observations, presentations from guest lecturers and group discussions. There will be an excellent opportunity to touch and learn about Canada's wonderful marine life diversity in the Vancouver Aquarium, and northern Vancouver Fish Hatchery. Students will be learning Canada's coastal plankton biodiversity through vising the Marina (Reed point marina) and the Sea-grass habitat. There will also be several opportunities to explore the intertidal zone, exposed and protected coastal habitats, sandy beaches and estuaries in the Vancouver Island. Marine biodiversity survey techniques and methods of studying marine life in the field will be emphasized. Students will be exposed to a different learning environment involving not only HKU teachers and students but also UBC teachers and students, bringing diverse range of expertise, cultures, and learning opportunities from both sides of the Pacific Ocean to focus on the diversity, dynamic interactions and threats to marine life.					
Course Learning			s course, students should be able to			
Outcomes		•	of marine life science and the marine			
	1	warming and ocean aci threats for marine comm	s, causes, and effects of marine idification, and invasive species, as nunities and ecosystem services between coastal marine biodiversity	s well as describe the con-	sequences of these	
	1	the North Pacific coasta	•			
Pre-requisites (and Co-requisites and Impermissible combinations)		•	passed at least 30 credits of level n order to be enrolled in the course.	1 and/or level 2 science co	ourses. Students will	
Offer in 2019 - 2020	N O	offer in 2020 - 2021 : Y		Examination		
Grade Descriptors (A+ to F)	A	tropical Hong Kong is dif their particular environme why the diversity of marin	owledge in basics of marine science and cle fferent from the North Pacific coastal areas. ents. Showing strong abilities, and logical thin he life and their habitats are so important to h hange, pollution and habitat change will affec	Ability to explain how marine orciking, with evidence of original thouman society. Independent critiqu	panisms have adapted to ught, to examine reasons e on how human induced	
	В	Clear understanding of the environments. Knowing the human society. Knowing	he basics of marine science. Ability to expla he common views on the reasons why the di I the common views on how human induce life, its diversity and their ecosystem services	in how marine organisms have a iversity of marine life and their ha ed threats such as climate chan	dapted to their particular bitats are so important to	
	С	coastal ecosystem servic Knowing the common vie Knowing the common vie	limited command of knowledge and unders es. Develop little ability to explain how marining was on the reasons why the diversity of marine ews on how human induced threats such as and their ecosystem services.	e organisms have adapted to theine life and their habitats are so im	r particular environments. portant to human society.	
	D Knowing 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 have adapted to their particular environments.					
Course Type	Field car					
Course Teaching	Activiti	· ·	Details		No. of Hours	
& Learning Activities	Lecture		10 sessions x 2.5 hours			
G	Field work		Field observation and work: abo	25 36		
	Present		Group discussion / Project: 1 group project with presentation		10	
	Reading	g / Self study			70	
Assessment Methods and Weighting	Method	ls	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
			0 1 / 1 /00 1			
	Assignn	nents	Group project work (30-mins presentation)	25	CLO 2	
	Assignn Report	nents		25 50		

Required/recommended reading and online materials	Reference reading materials will be put on Moodle.
Course Website	http://www.scifac.hku.hk/news/bsc/ubc-summer-course
Additional Course	Please note: Students have to cover their own travel costs and course fees charged by the hosting institution
Information	(prices to be announced).
	This course will be offered subject to a minimum enrollment number and availability of teachers.
	Enrolment of this course is not conducted via the online course selection system. Students will be enrolled
	manually by the Faculty after approval has been obtained from the course coordinator.

SCNC3111	Frontier	s of science ho	nours seminar course (6 credits)	Academic Yea	r 2019	
Offering Department	Faculty			Quota	120	
Course Co-ordinator		Lui, Faculty (lui201				
Teachers Involved	(Dr E J Pickett,Faculty of Science) (Dr E K M Leung,Faculty of Science) (Dr R K W Lui,Faculty of Science) (Dr W M Y Cheung,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 chosen major To foster intellectual discussions between our research professors and students To observe how research is done and note the thinking processes and paths that lead to scientific discoveries To enhance students' awareness of the importance of science to solve some of the problems facing the society To collaborate with and learn from peers from different academic backgrounds in a scientific setting To develop essential written and spoken communication skills To serve as a potential mentor-mentee matching platform for faculty members and students To develop an awareness of research ethics					
Course Contents & Topics	Professors latest rese Physics, a for conduct Scientific	To develop an awareness of research ethics Professors from different departments will be featured in the honours seminar course, and they will discuss the latest research with students. The topics will span the areas of Biological Sciences, Chemistry, Earth Sciences Physics, as well as Mathematics/Statistics & Actuarial science. In addition, the following topics to prepare student for conducting and communicating research will also be introduced: Introduction to Different Search Engines to Scientific Journals and/or Decoding a Scientific Paper and/or Effective Communication for Scientists (Writing, Oracad Paster Propagations)				
Course Learning Outcomes	and Poster Presentations). 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 some of our research professors CLO 2 identify how professors with different scientific training solve their research problems CLO 3 apply literature search skills to identify and develop a research topic CLO 4 practice and master scientific 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)		,	I12 and a level 2 science course. will participate in ORF/SRF must take this o	course.		
Offer in 2019 - 2020	Y 1st	sem Offer in 202	0 - 2021 : 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 strong analytical and critical abilities and logical thinking, and ability to apply knowledge to a wide range of familiar and ur 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 learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to 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 I outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge 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 of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability 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 outcome 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.				familiar and unfamil ast most of the cour y knowledge to famil of the course learning oly knowledge to mo rse learning outcome y limited ability to appararning outcomes. La	
Course Type		ased course	Detelle		No. of Hours	
Course Teaching & Learning Activities	Activities	5	Details	Details		
A Loaining Activities	Lectures Tutorials				36 12	
		Self study			100	
Assessment Methods and Weighting	Methods	•	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents	A series of writing and reflection assignments will be given	40	CLO 1,2,4	
	Presentat	iion	Students will give a 30-minute group presentation during the last week of the instruction	40	CLO 3,4,5,6	
	Project re	ports	In-class formative assessment: activities for students to work in groups	20	CLO 1,2,4,5	
Required/recommended reading and online materials	TBC (sugg	gested by the profe	ssors)			

STAT1600	Statistics: ideas and concepts (6 credits) Academic				r 2019		
Offering Department	Statistics & Actuarial Science Quota						
Course Co-ordinator	Dr C W Kv						
Teachers Involved	`	(Dr C W Kwan,Statistics & Actuarial Science) (Dr Y K Chung,Statistics & Actuarial Science)					
Course Objectives	The course aims at providing a broad overview of statistics for students who aspire to major in Statistics or Risk Management. It focuses on the roles of statistics as a scientific tool with applications to a wide spectrum of disciplines, and as a science of reasoning which has revolutionized modern intellectual endeavours. It lays a panoramic foundation for a formal study of statistics at the university level.						
Course Contents & Topics	 Data collection: observational studies versus designed experiments Data presentation: tables; graphs; frequency distributions; correlations; trends Probability: randomness; probability models; distributions; measures of central tendency and dispersion Inference: estimation; tests of significance and hypotheses; confidence intervals; regression; prediction Further issues: controversies; misuse of statistics; ethics. 						
Course Learning	On succes	ssful completion of this o	course, students should be able to:				
Outcomes			tistics as a tool for scientific reasonin	g			
		esent data in a useful a	•				
			nd perspectives of statistical modellin	g and inference			
			and bad statistical practices				
			tatistics or Risk Management with a				
Pre-requisites (and Co-requisites and Impermissible combinations)	Not for students who have passed in any of the following courses: STAT1602, STAT1603, STAT3902.						
Offer in 2019 - 2020	Y 1st		in 2020 - 2021 : Y	Examination	Dec May		
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the coulearning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ab to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational a 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.					
	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.						
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, class test(s) and project(s))	60	CLO 1,2,3,4,5		
	Examinat		One 2-hour written examination	40	CLO 1,2,3,4,5		
Required/recommended reading and online materials	Utts, J.M. (2014). Seeing Through Statistics (4th edition). Cengage Learning. Heckard, R.F. and Utts, J.M. (2012). Statistics (International edition, 4th edition). Cengage Learning. Albright, S. C., Winston, W. L. and Zappe, C. J. (2009). Data Analysis and Decision Making with Microsoft Excel Cengage Learning.						
	Moore, D. S. and Notz, W. I. (2006). Statistics: Concepts and Controversies. Freeman: New York.						
Course Website	http://moo	dle.hku.hk					

STAT1601	Elementary statistical methods (6 credits)	Academic Year	2019				
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 experiment/survey are often concerned with situations involving variability and uncertainty. They are used to estimate the true value of a certain quantity or to test the acceptability of a certain new hypothesis. Valid methods of analysing the data are thus essential to any successful investigation. The course aims to present the fundamentals of statistical methods widely used by researchers. Microsoft Excel might be used to carry out some statistical analysis. There is no demand of sophisticated technical mathematics.						
Course Contents & Topics	The course will introduce and study the following topics: Presentation of data, Measures of Central Tendency, Measures of Variability and Uncertainty, Basic Probability Laws, Common Probability Distributions such as Uniform, Binomial, Poisson, Hyper-geometric, Geometric and Normal distributions, Random Sampling, Distribution of the Mean, Normal Sampling Theorem, Point Estimation, Confidence Intervals, Sample Size Determination, Hypothesis Testing, Inferences for Mean and Proportion, Chi- squared tests, Simple Regression and Correlation						
Course Learning Outcomes	e Learning On successful completion of this course, students should be able to:						

	CLO 7 write appropriate conclusions based on the statistical results								
	CLO 8 understand the basic principles of simple linear regression and correlation and their applications to practical problems								
Pre-requisites	Level 2 or above in HKDSE Mathematics or equivalent; and								
(and Co-requisites	Not for students with Level 2 or above in HKDSE Mathematics Extended Module 1 or 2; and								
and Impermissible	Not for students who have passed or already enrolled in any of the following courses: STAT2901, STAT1602,								
combinations)	STAT2601, STAT1603, ECON1280								
Offer in 2019 - 2020	N O	ffer in 2020 - 2021 : 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.								
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	Method	•	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 2-hour written examination	75	CLO 1,2,3,4,5,6,7,8				
Required/recommended reading and online materials	Chiu W. K.: Basic Statistics (Pearson (Asia), 2007) Larson, R. & Farber, B.: Elementary Statistics, Picturing the World (Prentice Hall, 2008, 4th ed.) Berk, K.N. & Carey, P.: Data Analysis with Microsoft EXCEL (Duxbury press, Update Office 2007) Freund, J. E. & Perles, B. M.: Statistics - A First Course (Prentice Hall, 2004, 8th ed.)								
Course Website	http://moodle.hku.hk								
Additional Course	Calculator: CASIO fx-50FH (This model has SD-MODE, REG-MODE, nCr and Normal Probability Function which								
Information	is very suitable for this course.)								

STAT1602	Business	s statistics	(6 credits)			Academic Year	2019	
Offering Department	Statistics 8	& Actuarial So	ience			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	The discipline of statistics is concerned with situations involving uncertainty and variability. Variability greatly affects the interpretation of data. Thus statistics forms an important descriptive and analytical tool. This elementary course, which is taught without much technical mathematics, presents many standard situations of data analysis and interpretation with emphases on business examples. The statistical tests of these situations are presented. Microsoft Excel might be used to carry out some statistical analysis.							
Course Contents & Topics	Measures Binomial, N Point Estin Means and	The course will introduce and discuss the following topics: Presentation of Data, Measures of Central Tendency, Measures of Variability and Uncertainty, Elementary Probability Rules and Basic Probability Distributions such as Binomial, Normal, Poisson, Hyper-geometric and Geometric, Random Sampling, the Normal Sampling Theorem, Point Estimation, Confidence Intervals and Sample Size Determination, Hypothesis Testing involving Inferences for Means and Proportions as well as the Chi-square tests, Simple Regression and Correlation, Elementary Time Series and Index Numbers						
Course Learning	On succes	ssful completi	on of this cours	e, students shou	ld be able to:			
Outcomes	CLO 1 understand the methods for describing sets of data							
	CLO 2 perform statistical analysis with calculator and Microsoft Excel, draw conclusions from data using numerical summaries							
	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 statistical problem							
	CLO 7 gain familiarity with the fundamental concepts of statistical inference as they apply to a variety of problems							
	CLO 8 understand the basic principles of simple linear regression and correlation and their applications to practical problems in today's society							
Pre-requisites (and Co-requisites and Impermissible combinations)	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).							
Offer in 2019 - 2020	Y 1st s	sem 2nd se	m Offer in 20	20 - 2021 : Y		Examination	Dec May	
Grade Descriptors (A+ to F)	A	learning outco	nes. Show strong edge to a wide ra	analytical and critica	abilities and logical	edge and skills required for at thinking, with evidence of origin situations. Apply highly effective	al thought, and abilit	
	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the cour learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to fami 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							

	fa	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.						
	of	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to ap problems. Organization and presentational skills are minimally effective or ineffective.					
Course Type	Lecture-base	ed course					
Course Teaching	Activities		Details		No. of Hours		
& Learning Activities	Lectures				36		
	Tutorials				12		
	Reading / Self study				100		
Assessment Methods and Weighting	Methods		Details	Details Weighting in final course grade (%)			
	Assignments		Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3,4		
	Examination		One 2-hour written examination	75	CLO 1,2,3,4,5,6,7,8		
Required/recommended reading and online materials	Gerald Keller: Managerial Statistics (Cengage Learning, 2009, 8th edition) Freund, J. E. & Perles, B. M.: Modern Elementary Statistics (Prentice Hall, 2006, 12th ed.) Berk, K.N. & Carey, P.: Data Analysis with Microsoft EXCEL (Duxbury press, Update Office 2007) Bowerman, B.L. & O'Connell, E.S.: Business Statistics in Practice (McGraw-Hill International Edition, 2008, 5th ed.)						
Course Website	http://moodle.hku.hk						

STAT1603	Introduc	Academic Year	r 2019					
Offering Department	Statistics	Quota						
Course Co-ordinator	Dr K P Wa	Dr K P Wat, Statistics & Actuarial Science (watkp@hku.hk)						
Teachers Involved		at,Statistics & Actua						
		Jing,Statistics & Act	,					
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	Probability 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 succes	ssful completion of t	his course, students should be able to:					
Outcomes	CLO 1 cc	mpute different mea	asures of central tendency and dispersio	n				
			probability theory and techniques to sol	<u> </u>				
	pc	pulation	ct confidence intervals and use hypoth					
		se linear regression ovironment	and correlation methods to solve prob	lems in science and in so	cial and business			
Pre-requisites (and Co-requisites and Impermissible combinations)	(Pass or a	Not for students who have passed or already enrolled in any of these courses: STAT1601, STAT1602, STAT2601,						
Offer in 2019 - 2020			ffer in 2020 - 2021 : Y	Examination	Dec May			
Grade Descriptors	Α		mastery at an advanced level of extensive kno					
(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							
	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 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.							
Course Type	Lecture-ba	ased course						
Course Teaching	Activities		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		Coursework (assignments, tutorials, and class test(s))	25	CLO 1,2,3,4			
	Examination		One 2-hour written examination 75		CLO 1,2,3,4			
Required/recommended								
reading and online materials	Hogg, R. Y Freund, J.	Miller, I. and Miller, M. (2014). John E. Freund's Mathematical Statistics with Applications (8th Edition). Pearson. 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	Probabi	ity and statistics I (6	6 credits)	Academic Yea	r 2019			
Offering Department	Statistics	& Actuarial Science	•	Quota				
Course Co-ordinator	Dr K P Wa	at, Statistics & Actuarial S	Science (watkp@hku.hk)	<u>'</u>	'			
Teachers Involved	(Dr K P W	at,Statistics & Actuarial	Science)					
Course Objectives	forms an i	the discipline of statistics is concerned with situations in which uncertainty and variability play an essential role and sums an important descriptive and analytical tool in many practical problems. Against a background of motivating roblems this course develops relevant probability models for the description of such uncertainty and variability.						
Course Contents & Topics	Discrete in binomial, general Probability Joint distr	Sample spaces; Operations of events; Probability and probability laws; Conditional probability; Independence; Discrete random variables; Cumulative distribution function (cdf); Probability mass function (pmf); Bernoulli, pinomial, geometric, and Poisson distributions; Continuous random variables; Cumulative distribution function (cdf); Probability density function (pdf); Exponential, Gamma, and normal distributions; Functions of a random variable; joint distributions; Marginal distributions; Independent random variables; Functions of jointly distributed random variables; Expected value; Variance and standard deviation; Covariance and correlation.						
Course Learning	On succes	On successful completion of this course, students should be able to:						
Outcomes	CLO 1	understand the basic	concepts in probability theory					
	CLO 2	gain some insights to	statistics and inference					
	CLO 3	solve real-world prob	lem by using probability calculation	าร				
	CLO 4	pursue their further s	tudies in statistics					
Pre-requisites (and Co-requisites and Impermissible combinations)	thereafter; Pass in M. Pass in M. Not for stu	Pass or already enrolled in MATH2014, or (MATH2101 and MATH2211), for students admitted in 2014 or thereafter; or Pass in MATH1013, or already enrolled in this course, for students admitted in 2013 or before; or Pass in MATH1851 and MATH1853, for students admitted in 2013 or before; and Not for students who have passed in STAT1603, or already enrolled in this course; Not for students who have passed in STAT2901, or already enrolled in this course; and						
Offer in 2019 - 2020		sem 2nd sem Offer i	n 2020 - 2021 : 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. 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 actitical 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						
Causea Tura		problems. Organization and	ilities, logical and coherent thinking. Shor presentational skills are minimally effective		y knowledge to solve			
Course Type Course Teaching		ased course	Deteile		No of Harries			
& Learning Activities	Activities Lectures		Details		No. of Hours			
. Learning Activities	Tutorials				36 12			
		Self study			100			
Assessment Methods and Weighting	Methods	Sell Study	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignme	ents	Coursework (assignments, tutorials, and class test(s))	30	CLO 1,2,3			
	Examinat	ion	One 2-hour written examination	70	CLO 1,2,3			
Required/recommender reading and online materials	Ross, S.M Miller, I. a Prentice H Hogg, R.\	eGroot, M.H. and Schervish, M.J. (2014). Probability and Statistics (4th edition). Boston: Addison-Wesley. oss, S.M. (2014). A First Course in Probability (9th edition). Upper Saddle River: Prentice Hall. liller, I. and Miller, M. (2014). John E. Freund's Mathematical Statistics with Applications (8th edition). Bost rentice Hall. ogg, R.V., McKean J.W., and Craig, A.T. (2013). Introduction to Mathematical Statistics (7th edition). Bost rentice Hall.						
	Hogg, R.							

STAT2602	Probability and statistics II (6 credits)	Academic Year	2019
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	(Dr Z Liu,Statistics & Actuarial Science) This course builds on STAT2601, introducing further the concepts and methods of statistics. Emphasis is on the						
oddise Objectives	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.						
		•	9				
Course Contents & Topics	1. Overview: random sample; sampling distributions of statistics; moment generating function; large-sample theory laws of large numbers and Central Limit Theorem; likelihood; sufficiency; factorisation criterion; 2. Estimation: estimator; bias; mean squared error; standard error; consistency; Fisher information; Cramer-Rac Lower Bound; efficiency; method of moments; maximum likelihood estimator; 3. Hypothesis testing: types of hypotheses; test statistics; p-value; size; power; likelihood ratio test; Neymar Pearson Lemma; generalized likelihood ratio test; Pearson chi-squared test; Wald tests; 4. Confidence interval: confidence level; confidence limits; equal-tailed interval; construction based on hypothesis tests.						
Course Learning		essful completion of this c	ourse, students should be able to:				
Outcomes			of statistics and its relation to proba	ability theory			
	CLO 2	relate a real-life problem t	o a formal framework for statistical	inference			
	CLO 3	conduct standard parame	tric statistical inference by means o	of estimation and hypothes	sis testing		
	CLO 4	reckon the general applica	ability of statistics in a broad range	of subject areas			
Pre-requisites (and Co-requisites and Impermissible combinations)		STAT2601; and udents who have passed	in STAT3902, or already enrolled in	n this course.			
Offer in 2019 - 2020	Y 1st	t sem 2nd sem Offer i	n 2020 - 2021 : Y	Examination	Dec 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						
			de range of complex, familiar and unfamili	iar situations. Apply highly effe	ective organizational and		
	В	presentational skills. Demonstrate substantial cor learning outcomes. Show ev	de range of complex, familiar and unfamili mmand of a broad range of knowledge and idence of analytical and critical abilities and I ns. Apply effective organizational and preser	I skills required for attaining at logical thinking, and ability to ap	least most of the cours		
	В	presentational skills. Demonstrate substantial corlearning outcomes. Show evand some unfamiliar situation Demonstrate general but in outcomes. Show evidence of	mmand of a broad range of knowledge and idence of analytical and critical abilities and l	skills required for attaining at logical thinking, and ability to an national skills. ills required for attaining most logical thinking, and ability to a	least most of the course oply knowledge to familia		
		presentational skills. Demonstrate substantial cor learning outcomes. Show evand some unfamiliar situation. Demonstrate general but ir outcomes. Show evidence of familiar situations. Apply more permonstrate partial but limit Show evidence of some coh	mmand of a broad range of knowledge and idence of analytical and critical abilities and ins. Apply effective organizational and preser accomplete command of knowledge and sk of some analytical and critical abilities and iderately effective organizational and present led command of knowledge and skills requirement and logical thinking, but with limited ar	skills required for attaining at logical thinking, and ability to an attaining skills. iills required for attaining most logical thinking, and ability to a tational skills. red for attaining some of the conalytical and critical abilities. Sh	least most of the course oply knowledge to familia t of the course learning apply knowledge to most		
	C	presentational skills. Demonstrate substantial cor learning outcomes. Show evand some unfamiliar situation. Demonstrate general but in outcomes. Show evidence of familiar situations. Apply modure of the strength outcomes.	mmand of a broad range of knowledge and idence of analytical and critical abilities and Ins. Apply effective organizational and presern complete command of knowledge and sk of some analytical and critical abilities and Iderately effective organizational and present led command of knowledge and skills required.	skills required for attaining at logical thinking, and ability to an attaining skills. ills required for attaining most logical thinking, and ability to a tational skills. red for attaining some of the conalytical and critical abilities. Shonal and presentational skills. equired for attaining the course very little or no ability to approach to the course of the co	least most of the course poply knowledge to familia tof the course learning apply knowledge to most ourse learning outcomes ow limited ability to apply learning outcomes. Laci		
	C D Fail	presentational skills. Demonstrate substantial cor learning outcomes. Show evand some unfamiliar situation Demonstrate general but in outcomes. Show evidence of familiar situations. Apply mod Demonstrate partial but limit Show evidence of some coh knowledge to solve problems. Demonstrate little or no evid of analytical and critical ab problems. Organization and passed course	mmand of a broad range of knowledge and idence of analytical and critical abilities and Ins. Apply effective organizational and preser accomplete command of knowledge and sk of some analytical and critical abilities and Iderately effective organizational and present ted command of knowledge and skills requirent and logical thinking, but with limited ars. Apply limited or barely effective organization ence of command of knowledge and skills required in the command of knowledge and skills represented in the command of knowledge and skills representational skills are minimally effective organizational skills are min	skills required for attaining at logical thinking, and ability to an attaining skills. ills required for attaining most logical thinking, and ability to a tational skills. red for attaining some of the conalytical and critical abilities. Shonal and presentational skills. equired for attaining the course very little or no ability to approach to the course of the co	least most of the course oply knowledge to familia t of the course learning apply knowledge to most ourse learning outcomes ow limited ability to apply learning outcomes. Lack pply knowledge to solve		
Course Teaching	C D Fail Lecture-b Activitie	presentational skills. Demonstrate substantial cor learning outcomes. Show ever and some unfamiliar situation. Demonstrate general but irroutcomes. Show evidence of familiar situations. Apply more personal partial but limit show evidence of some cohe knowledge to solve problems. Demonstrate little or no evid of analytical and critical abproblems. Organization and passed course	mmand of a broad range of knowledge and idence of analytical and critical abilities and Ins. Apply effective organizational and present complete command of knowledge and skip from analytical and critical abilities and Iderately effective organizational and present ted command of knowledge and skills requirent and logical thinking, but with limited ars. Apply limited or barely effective organization ence of command of knowledge and skills required in the control of command of knowledge and skills revisitely.	skills required for attaining at logical thinking, and ability to an attaining skills. ills required for attaining most logical thinking, and ability to a tational skills. red for attaining some of the conalytical and critical abilities. Shonal and presentational skills. equired for attaining the course very little or no ability to approach to the course of the co	least most of the course pply knowledge to familia of the course learning apply knowledge to most pourse learning outcomes ow limited ability to apply knowledge to solve the course learning outcomes. Lack ply knowledge to solve the course learning outcomes. Lack ply knowledge to solve the course the course learning outcomes. Lack ply knowledge to solve the course the course the course learning outcomes.		
Course Type Course Teaching & Learning Activities	C D Fail Lecture-b Activitie Lectures	presentational skills. Demonstrate substantial cor learning outcomes. Show ever and some unfamiliar situation. Demonstrate general but irroutcomes. Show evidence of familiar situations. Apply more personal properties of some content of s	mmand of a broad range of knowledge and idence of analytical and critical abilities and Ins. Apply effective organizational and preser accomplete command of knowledge and sk of some analytical and critical abilities and Iderately effective organizational and present ted command of knowledge and skills requirent and logical thinking, but with limited ars. Apply limited or barely effective organization ence of command of knowledge and skills required in the command of knowledge and skills represented in the command of knowledge and skills representational skills are minimally effective organizational skills are min	skills required for attaining at logical thinking, and ability to an attaining skills. ills required for attaining most logical thinking, and ability to a tational skills. red for attaining some of the conalytical and critical abilities. Shonal and presentational skills. equired for attaining the course very little or no ability to approach to the course of the co	least most of the course pply knowledge to familia to f the course learning apply knowledge to most purse learning outcomes ow limited ability to apply knowledge to solve the course learning outcomes. Lack ply knowledge to solve the course learning outcomes. And the course learning outcomes are learning outcomes. Lack ply knowledge to solve the course learning outcomes. And the course learning outcomes are learning outcomes. And the course learning outcomes are learning outcomes.		
Course Teaching	C D Fail Lecture-b Activitie Lectures Tutorials	presentational skills. Demonstrate substantial cor learning outcomes. Show ev and some unfamiliar situation. Demonstrate general but ir outcomes. Show evidence of familiar situations. Apply moo Demonstrate partial but limit Show evidence of some coh knowledge to solve problems. Demonstrate little or no evid of analytical and critical ab problems. Organization and passed course	mmand of a broad range of knowledge and idence of analytical and critical abilities and Ins. Apply effective organizational and preser accomplete command of knowledge and sk of some analytical and critical abilities and Iderately effective organizational and present ted command of knowledge and skills requirent and logical thinking, but with limited ars. Apply limited or barely effective organization ence of command of knowledge and skills required in the command of knowledge and skills represented in the command of knowledge and skills representational skills are minimally effective organizational skills are min	skills required for attaining at logical thinking, and ability to an attaining skills. ills required for attaining most logical thinking, and ability to a tational skills. red for attaining some of the conalytical and critical abilities. Shonal and presentational skills. equired for attaining the course very little or no ability to approach to the course of the co	least most of the course poply knowledge to familia to f the course learning apply knowledge to most purse learning outcomes ow limited ability to apply knowledge to solve the course learning outcomes. Lack ply knowledge to solve the course of the course		
Course Teaching & Learning Activities	C D Fail Lecture-b Activitie Lectures Tutorials Reading	presentational skills. Demonstrate substantial cor learning outcomes. Show even and some unfamiliar situation. Demonstrate general but irroutcomes. Show evidence of familiar situations. Apply moon Demonstrate partial but limit Show evidence of some coh knowledge to solve problems. Demonstrate little or no evid of analytical and critical abproblems. Organization and passed course.	mmand of a broad range of knowledge and idence of analytical and critical abilities and Ins. Apply effective organizational and preser icomplete command of knowledge and sk of some analytical and critical abilities and Iderately effective organizational and present led command of knowledge and skills requirement and logical thinking, but with limited ars. Apply limited or barely effective organizatic ence of command of knowledge and skills relities, logical and coherent thinking. Show presentational skills are minimally effective of Details	I skills required for attaining at logical thinking, and ability to an attaining at logical thinking, and ability to a stational skills. It is an attaining some of the conalytical and critical abilities. Shonal and presentational skills. It is a stational skills. It is a stational skills. It is a stational skills or in a stational skills. It is a stational skills. It is a stational skills. It is a stational skills or in a stational skills. It is a stational skills or in a stational skills. It is a stational skills or in a stational skills. It is a stational skills or in a stational skills. It is a stational skills or in a stational skills. It is a stational skills or in a stational skills or in a stational skills. It is a stational skills or in a stational skills or in a stational skills. It is a stational skills or in a stational skills or in a stational skills or in a stational skills.	least most of the course ply knowledge to familia to f the course learning apply knowledge to mosurse learning outcomes ow limited ability to apply knowledge to solve the course learning outcomes. Lack ply knowledge to solve the course of t		
Course Teaching & Learning Activities Assessment Methods	C D Fail Lecture-b Activitie Lectures Tutorials	presentational skills. Demonstrate substantial cor learning outcomes. Show even and some unfamiliar situation. Demonstrate general but irroutcomes. Show evidence of familiar situations. Apply moon Demonstrate partial but limit Show evidence of some coh knowledge to solve problems. Demonstrate little or no evid of analytical and critical abproblems. Organization and passed course.	mmand of a broad range of knowledge and idence of analytical and critical abilities and Ins. Apply effective organizational and preser accomplete command of knowledge and sk of some analytical and critical abilities and Iderately effective organizational and present ted command of knowledge and skills requirent and logical thinking, but with limited ars. Apply limited or barely effective organization ence of command of knowledge and skills required in the command of knowledge and skills represented in the command of knowledge and skills representational skills are minimally effective organizational skills are min	skills required for attaining at logical thinking, and ability to an attaining skills. ills required for attaining most logical thinking, and ability to a tational skills. red for attaining some of the conalytical and critical abilities. Shonal and presentational skills. equired for attaining the course very little or no ability to approach to the course of the co	least most of the course poply knowledge to familia to f the course learning apply knowledge to most purse learning outcomes ow limited ability to apply knowledge to solve the course learning outcomes. Lack ply knowledge to solve the course of the course		
Course Teaching & Learning Activities Assessment Methods	C D Fail Lecture-b Activitie Lectures Tutorials Reading Methods Assignm	presentational skills. Demonstrate substantial cor learning outcomes. Show ever and some unfamiliar situation. Demonstrate general but irroutcomes. Show evidence of familiar situations. Apply more demonstrate partial but limits. Show evidence of some condition of some condition of analytical and critical absproblems. Organization and coased course. Self study.	mmand of a broad range of knowledge and idence of analytical and critical abilities and Ins. Apply effective organizational and preser icomplete command of knowledge and ski of some analytical and critical abilities and I derately effective organizational and present ted command of knowledge and skills requirement and logical thinking, but with limited are s. Apply limited or barely effective organizational and present indicated in the command of knowledge and skills rejuited in the command of knowledge and skills representational skills are minimally effective of the command of knowledge and skills rejuites, logical and coherent thinking. Show presentational skills are minimally effective of the command of knowledge and skills rejuites. Details Details Coursework (assignments, tutorials and a class test)	I skills required for attaining at logical thinking, and ability to ap ntational skills. ills required for attaining most logical thinking, and ability to a tational skills. red for attaining some of the consultational skills. red for attaining some of the consultational and critical abilities. Shonal and presentational skills. equired for attaining the course of very little or no ability to apor ineffective. Weighting in final course grade (%)	least most of the course pply knowledge to familia of the course learning apply knowledge to most pourse learning outcomes ow limited ability to appl learning outcomes. Lac ply knowledge to solve the course of th		
Course Teaching & Learning Activities Assessment Methods and Weighting	Fail Lecture-b Activitie Lectures Tutorials Reading Methods Assignm Examina	presentational skills. Demonstrate substantial cor learning outcomes. Show ever and some unfamiliar situation. Demonstrate general but irroutcomes. Show evidence of familiar situations. Apply more demonstrate partial but limits. Show evidence of some condet with the some condeted in the source of analytical and critical aborated course. See the source of source o	mmand of a broad range of knowledge and idence of analytical and critical abilities and Ins. Apply effective organizational and preser recomplete command of knowledge and ski of some analytical and critical abilities and Iderately effective organizational and present ted command of knowledge and skills requirement and logical thinking, but with limited as Apply limited or barely effective organizational and present ted command of knowledge and skills rejuited to the command of knowledge and skills rejuited in the command of knowledge and skills rejuite	I skills required for attaining at logical thinking, and ability to ap ntational skills. ills required for attaining most logical thinking, and ability to a tational skills. red for attaining some of the consultational and critical abilities. Shonal and presentational skills. equired for attaining the course of the cour	least most of the course ply knowledge to familia to f the course learning apply knowledge to most ourse learning outcomes ow limited ability to apply knowledge to solve to solve the course learning outcomes. Lack ply knowledge to solve the course should be countered to solve the course should be course		
Course Teaching	Fail Lecture-b Activitie Lectures Tutorials Reading Methods Assignm Examina Berry, D.	presentational skills. Demonstrate substantial cor learning outcomes. Show even and some unfamiliar situation. Demonstrate general but irroutcomes. Show evidence of familiar situations. Apply moon Demonstrate partial but limit Show evidence of some coh knowledge to solve problems. Demonstrate little or no evid of analytical and critical abproblems. Organization and problems. Organization and problems. Organization and problems. See the study.	mmand of a broad range of knowledge and idence of analytical and critical abilities and Ins. Apply effective organizational and preser icomplete command of knowledge and ski of some analytical and critical abilities and I derately effective organizational and present ted command of knowledge and skills requirement and logical thinking, but with limited are s. Apply limited or barely effective organizational and present indicated in the command of knowledge and skills rejuited in the command of knowledge and skills representational skills are minimally effective of the command of knowledge and skills rejuites, logical and coherent thinking. Show presentational skills are minimally effective of the command of knowledge and skills rejuites. Details Details Coursework (assignments, tutorials and a class test)	I skills required for attaining at logical thinking, and ability to an attain skills. Ills required for attaining most logical thinking, and ability to a tational skills. red for attaining some of the consultational skills. red for attaining some of the consultational skills. sequired for attaining the course of the co	least most of the course pply knowledge to familiar of the course learning apply knowledge to most purse learning outcomes ow limited ability to appl learning outcomes. Laciply knowledge to solve No. of Hours 36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4		
Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended reading and	Fail Lecture-te Activitie Lectures Tutorials Reading Methods Assignm Examina Berry, D Bickel, P. Saddle R. Hogg, R.' Miller, I.	presentational skills. Demonstrate substantial cor learning outcomes. Show ev and some unfamiliar situation. Demonstrate general but irroutcomes. Show evidence of familiar situations. Apply monous properties of some coherent partial but limit show evidence of some coherent permonstrate partial but limit show evidence of some coherent permonstrate little or no evid of analytical and critical abproblems. Organization and problems. Organization and problems of some coherent permonstrate little or no evid of analytical and critical abproblems. Organization and problems. Organization and problems. Organization and problems. Organization and problems. As a course set in the company of the com	mmand of a broad range of knowledge and idence of analytical and critical abilities and Ins. Apply effective organizational and preser icomplete command of knowledge and ski of some analytical and critical abilities and I derately effective organizational and present ted command of knowledge and skills requirement and logical thinking, but with limited ars. Apply limited or barely effective organizational of knowledge and skills reliable. In the command of knowledge and skills repose of	skills required for attaining at logical thinking, and ability to an attaining most logical thinking, and ability to a substitute of the control of the cont	least most of the course poply knowledge to familia of the course learning apply knowledge to most ourse learning outcomes ow limited ability to apply learning outcomes. Lacoply knowledge to solve the course learning outcomes. Lacoply knowledge to solve the course of the course of the course of the course outcomes. Lacoply knowledge to solve the course of the course outcomes outcomes. Lacoply knowledge to solve the course outcomes of the course outcomes outc		

STAT2603	Data management with SAS (6 credits)	Academic Year	2019
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 data 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 wannipulation. Data transformation. File manipulation. File management. presentation and graphics. Basic data analysis. Structured query language.	vith different da	ta types. Data
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 access online help and document CLO 2 use Data Step to create data files CLO 3 summarize data by PROC MEANS, PROC FREQ, and PROC UNIVARI. CLO 4 work with numeric, character, and date variables and functions in Data Step CLO 5 perform conditional processing in Data Step CLO 6 SAS data sets by Data Step and PROC TRANSPOSE; subset and means of the process of th	otep with arrays in Data lerge data sets by t; produce high-res	/ Data Step and
Pre-requisites (and Co-requisites	Pass in STAT1600 or MATH1821, or already enrolled in this course	. , , ,	

and Impermissible combinations)								
Offer in 2019 - 2020	N O	ffer in 2020 - 2021 : N	Examination					
Grade Descriptors (A+ to F)	A	learning outcomes. She	mastery at an advanced level of extensive know strong analytical and critical abilities and logic a wide range of complex, familiar and unfamil	cal thinking, with evidence of or	iginal thought, and ability			
	В	learning outcomes. Sho	al command of a broad range of knowledge and ow evidence of analytical and critical abilities and tuations. Apply effective organizational and prese	logical thinking, and ability to ap				
	С	outcomes. Show evide	but incomplete command of knowledge and skence of some analytical and critical abilities and by moderately effective organizational and present	logical thinking, and ability to a				
	D	Demonstrate partial bu Show evidence of some	t limited command of knowledge and skills requi e coherent and logical thinking, but with limited an blems. Apply limited or barely effective organizati	red for attaining some of the conalytical and critical abilities. Sh				
	Fail	Demonstrate little or no of analytical and critic	o evidence of command of knowledge and skills r al abilities, logical and coherent thinking. Show and presentational skills are minimally effective of	equired for attaining the course wery little or no ability to ap				
Course Type	Lecture-l	based course						
Course Teaching	Activitie	es	Details	Details				
& 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 1,2,3,4,5,6			
	Examina	ation	One 2-hour written examination	60	CLO 1,2,3,4,5,6			
Required/recommended reading and online materials	SAS: SA Bailer, J. Delwiche Cody, R edition)	Cody, R.P.: Learning SAS by Example: A Programmer's Guide (North Carolina: SAS Institute Inc., 2007) SAS: SAS Certification Prep Guide: Base Programming for SAS 9. Third Edition. (SAS Institute Inc., 2011) Bailer, J.: Statistical Programming in SAS. North Carolina: (SAS Institute Inc., 2010) Delwiche, L. and Slaughter, S.: The Little SAS Book: A Primer. Fifth Edition. (SAS Institute Inc, 2012) Cody, R. P.: Cody's Data Cleaning Techniques Using SAS System (North Carolina: SAS Institute, 2008, 2nd						
Course Website	http://mo	odle.hku.hk						

STAT2604		Introduction to R programming and elementary data analysis (6 credits) Academic Year 2019							
Offering Department	Statistics	& Actuarial Science	Quota	50					
Course Co-ordinator	Dr Z Liu,	Dr Z Liu, Statistics & Actuarial Science (zhhliu@hku.hk)							
Teachers Involved	(Dr Z Liu	Statistics & Actuarial Science)							
Course Objectives	language elementa work with	rse is designed to provide a first-level introduction to the popular as R. This course focuses on learning the basic programming skills in ary statistical analysis. The programming skills involved can be apply h different data types, manipulation and transformation of data, and production of professional summary reports with high-quality gra	R with examples a lied to input and ou random sampling,	nd applications in tput of data sets					
Course Contents & Topics	2. The R 3. Probal continuou 4. Descri summary 5. Simple	1. R basics: first steps; language essentials. 2. The R environment: session management; the graphics subsystem; R programming; data entry. 3. Probability and distributions: random sampling; probability calculations and combinatorics; discrete distributions continuous distributions; the built-in distributions in R. 4. Descriptive statistics and graphics: summary statistics for a single group; graphical display of distributions summary statistics by groups; graphics for grouped data; graphical display of tables. 5. Simple linear regression: residuals and fitted values; prediction and confidence bands; correlation.							
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 combinations)		already enrolled in STAT1600 or MATH1821.							
Offer in 2019 - 2020	Y 2n	d sem Offer in 2020 - 2021 : Y	Examination	May					
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive knowledge at learning outcomes. Show strong analytical and critical abilities and logical thinking to apply knowledge to a wide range of complex, familiar and unfamiliar situation presentational skills.	, with evidence of origina	al thought, and ability					
	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 atta Show evidence of some coherent and logical thinking, but with limited analytical ar knowledge to solve problems. Apply limited or barely effective organizational and p	nd critical abilities. Show resentational skills.	limited ability to apply					
	Fail	Demonstrate little or no evidence of command of knowledge and skills required for	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						

Course Type	Lecture-based course	ecture-based course						
Course Teaching	Activities	Activities Details						
& 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))	50	CLO 1,2,3,4,5,6,7				
	Examination	One 2-hour computer lab-based examination	50	CLO 1,2,3,4,5,6,7				
Required/recommended reading and online materials		atistics with R (Second Edition), Sprin arning materials that fit well the conf		ails provided by the				
Course Website	http://moodle.hku.hk							

STAT2605	Demogr	aphic and soc	io-economic statistics (6 credits)	Academic Y	'ear 2019			
Offering Department	Statistics	& Actuarial Science	ce	Quota				
Course Co-ordinator	Ms L M S	Kwan, Statistics 8	& Actuarial Science (lucykwan@hku.hk)					
Teachers Involved	(Ms L M S	(Ms L M S Kwan,Statistics & Actuarial Science)						
Course Objectives	evidence- aims to p adopted s	The course covers the major methods for studying demographic and socio-economic statistics, with a quantitative evidence-based approach to understand the socio-economic well-being of residents in a territory. The course aims to provide students with 1) essential underlying principles and the pertinent methods behind internationally adopted statistical indicators; and 2) skills in the statistical descriptions and further analysis for application to						
Course Contents & Topics	Demographics Socio-economics pertaining Sources, Examples	planning, policy-making and commercial endeavours of a territory. 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 methods 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 Outcomes		On successful completion of this course, students should be able to:						
	CLO 2 fu Ko CLO 3 pr	rther appraise an ong, neighbouring	ret major official & other publicly dissemin d analyse the socio-economic well-being economies or comparable economies ation by extrapolating or referencing from tistics reporting	of a territory with particul				
Pre-requisites		•	E Mathematics or Level 2 or above in Hk	CDSE Mathematics Exter	nded Module 1 or 2 c			
(and Co-requisites and Impermissible combinations)	èquivalen	t); and	BIOL2102, ECON1280, STAT1601, STA					
Offer in 2019 - 2020	Y 2nd	d sem Offer in 2	020 - 2021 : Y	Examination	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 ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.						
	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 c	r no evidence of command of knowledge and skills ritical abilities, logical and coherent thinking. Sho tion and presentational skills are minimally effective	ow very little or no ability to a				
Course Type	Lecture-b	ased course						
Course Teaching	Activities	S	Details		No. of Hours			
& Learning Activities	Lectures							
	Tutorials							
	Reading	/ Self study			100			
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignments		Coursework (assignments and tutorials)	35	CLO 1,2,3,4			
	Examinat	tion	One 2-hour written examination	65	CLO 1,2,3,4			

STAT2901	Probability and statistics: foundations of actuarial science (6 credits)	2019					
Offering Department	Statistics & Actuarial Science	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	The purpose of this course is to develop knowledge of the fundamental too	ols in probability a	and statistics for				

	Students will have a thorough command of probability topics and the supporting calculations. 1. General probability							
Course Contents		•						
& Topics	- Basic elements of probability in set notation							
		exclusive events						
		and multiplication rules						
		dence of events torial probability						
		nal probability and exped	rtations					
		eorem / Law of total pro						
	- Random	•	bability					
			ons (including binomial, negative bi	nomial geometric hyper	geometric Poisson			
			beta, Pareto, lognormal, gamma,					
	distribution		, , , , , , , , , , , ,	,				
	- Probabili	ty functions and probabi	lity density functions					
	- Cumulati	ve distribution functions						
	- Mode, m	edian, percentiles and m	noments					
		and measures of disper	rsion					
		mit theorem						
		ng distributions and intro						
Course Learning		•	ourse, students should be able to:					
Outcomes			atical theory underlying the modern	•				
			listic analysis for problems involving					
			pability and statistics to solve actuar					
Pre-requisites		- '	arSc) students] or already enrolled in					
and Co-requisites			olled in this course [for students out					
and Impermissible			sed or enrolled in any of these co	ourses: STAT1601, STA	111602, STAT1603			
combinations)	STAT260		004 - V	F	Maria			
Offer in 2019 - 2020		sem Offer in 2020 - 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.							
	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 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.							
	of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to suproblems. Organization and presentational skills are minimally effective or ineffective.							
Course Type	Lecture-ba	ased course						
Course Teaching	Activities	1	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, and a class test)	25	CLO 1,2,3			
			One 3-hour written examination	75	CLO 1,2,3			
Required/recommended eading and online materials	Hassett, M Hogg R.V River.	eller, W. (1968). An Introduction to Probability Theory and Its Applications. Wiley, New York. assett, M. and Stewart, D. (2006). Probability for Risk Management (2nd Edition). ACTEX Publication: Winsted. ogg R.V. and Tanis E.A. (2009). Probability and Statistical Inference (8th Edition). Prentice Hall: Upper Saddle						
				cal Statistics with Applic	ations (7th Edition)			

STAT2902	Financi	Financial mathematics (6 credits)					Academic Year	2019
Offering Department	Statistics	Statistics & Actuarial Science					Quota	
Course Co-ordinator	Prof K C	Yuen, Sta	tistics & Actua	rial Science	(kcyuen@hk	ku.hk)		
Teachers Involved	(Prof K C	C Yuen,Sta	tistics & Actua	arial Science	:)			
Course Objectives						incial mathematics we cations of these conc		
Course Contents & Topics	amortizat mortgage	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 estate 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	On successful completion of this course, students should be able to:							
Outcomes	CLO 1 understand basic concepts of financial mathematics							
	CLO 2 understand and formulate elementary financial problems							
	CLO 3	CLO 3 apply compound interest theory to tackle some practical financial problems						
	CLO 4	CLO 4 show an understanding of the term structure of interest rates						
CLO 5 show an understanding of simple stochastic models for investment returns								
Pre-requisites (and Co-requisites			, or already en no have passe			ly enrolled in this cou	rse.	

and Impermissible combinations)						
Offer in 2019 - 2020	Y 2nd	sem Offer in 2020 - 2	021 : Y	Examination	May	
Grade Descriptors (A+ to F)	A	learning outcomes. Show st	tery at an advanced level of extensive rong analytical and critical abilities and I de range of complex, familiar and unfa	ogical thinking, with evidence of ori	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.				
	С	outcomes. Show evidence of	ncomplete command of knowledge and of some analytical and critical abilities a derately effective organizational and pre-	and logical thinking, and ability to a		
	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 critical ab	ence of command of knowledge and ski illities, logical and coherent thinking. S presentational skills are minimally effecti	Show very little or no ability to ap		
Course Type	Lecture-ba	sed course				
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures			36		
	Tutorials		tutorials/example classes		12	
	Reading /	Self study	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	
	Examinati	on	One 3-hour written examination	n 75	CLO 1,2,3,4,5	
Required/recommended reading and online materials		n, S. A.: Mathematics o	rest (Irwin: Illinois, 2008, 3rd edit f Investment and Credit (ACTE		Books: Connecticut,	
Course Website	latter //wa a a a	dle.hku.hk				

STAT3600	Linear statistical ana	alysis (6 credits)	Academic Year	r 2019		
Offering Department	Statistics & Actuarial Scie	ence	Quota			
Course Co-ordinator	Prof T W K Fung, Statistic	Prof T W K Fung, Statistics & Actuarial Science (wingfung@hku.hk)				
Teachers Involved	(Dr W T Li, Statistics & Ac	tuarial Science)				
	(Prof T W K Fung,Statistic					
Course Objectives	The analysis of variability is mainly concerned with locating the sources of the variability. Many statistical techniques investigate these sources through the use of 'linear' models. This course presents the theory an practice of these models.					
Course Contents	(1) Simple linear regress	sion: least squares method, analysis	of variance, coefficient of determi	nation, hypothesi		
& Topics	tests and confidence intervals for regression parameters, prediction. (2) Multiple linear regression: least squares method, analysis of variance, coefficient of determination, reduced vs full models, hypothesis tests and confidence intervals for regression parameters, prediction, polynomial regression. (3) One-way classification models: one-way ANOVA, analysis of treatment effects, contrasts. (4) Two-way classification models: interactions, two-way ANOVA for balanced data structures, analysis of treatment effects, contrasts, randomised complete block design. (5) Universal approach to linear modelling: dummy variables, 'multiple linear regression' representation of one-way and two-way (unbalanced) models, ANCOVA models, concomitant variables. (6) Regression diagnostics: leverage, residual plot, normal probability plot, outlier, studentized residual, influential observation, Cook's distance, multicollinearity, model transformation.					
Course Learning		of this course, students should be a				
Outcomes						
	CLO 1 understand linear regression model with one or multiple independent variables CLO 2 understand ANOVA models for one and two factors					
	CLO 2 understand ANC	N/Δ models for one and two factors.				
			d continuous independent variables			
Pre-requisites	CLO 3 understand gen	OVA models for one and two factors eral linear model with categorical an	d continuous independent variables	i		
(and Co-requisites and Impermissible	CLO 3 understand general Pass in STAT2602; and		·	<u> </u>		
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and Weighting			course grade (%)	Methods to CLO Mapping			
	Assignments	Coursework (assignments, tutorials and a test)	25	CLO 1,2,3			
	Examination	One 2-hour written examination	75	CLO 1,2,3			
Required/recommended reading and online materials	Hill/Irwin; 5th edition) Berry, D. A. & Lindgren, B. W.: Sta Draper, N. R. & Smith, H.: Applied Krzanowski, W. J.: An Introduction	Michael H Kutner, Christopher J. Nachtsheim, John Neter, William Li: Applied Linear Statistical Models (McGraw-					
Course Website	http://moodle.hku.hk						

Course Co-ordinator Teachers Involved Course Objectives This course mathemati statistical results to further	S Lee, Statistics & Actua se covers the advanced ically-oriented approachmethodologies and the wheir studies or to develope their studies; information inequality; esis testing: uniformly not information inequality; esis testing: uniformly not information in their studies of thei	In theory of point estimation, interval, the course provides a solid and underlying concepts and theory. It is a paragraph to pa a career in statistical research. It is approach: loss function; risl opproach: prior and posterior distribution all families; likelihood; sufficiency; large-sample theory of maximum limost powerful test; monotone likeling est. Course, students should be able to: of classical developments in mathet to the essentials of statistical inferent for future research studies in statistical and critical abilities and logical range of complex, familiar and unfamily mand of a broad range of knowledge and siderately effective organizational and presencomplete command of knowledge and slites and official abilities and official abiliti	d rigorous treatment of in is suitable in particular for it is suitable in particular for its suitable in particular for attaining at logical thinking, and ability to ap its suitable in particular for attaining most logical thinking, and ability to a policial thinking, and ability to a policial thinking, and ability to a policial thinking, and ability to a particular for attaining most logical thinking, and ability to a particular for attaining most logical thinking, and ability to a particular for attaining most logical thinking, and ability to a particular for attaining most logical thinking, and ability to a particular for attaining most logical thinking, and ability to a particular for attaining most logical thinking, and ability to a particular for attaining most logical thinking, and ability to a particular for attaining most logical thinking, and ability to a particular for attaining most logical thinking, and ability to a particular for attaining most logical thinking.	nferential problems, or students intending sibility; minimaxity; minimaxity; mpleteness; UMVU d test; large-sample attaining all the course iginal thought, and ability active organizational and least most of the course to the course learning t of the course learning			
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Grade Descriptors (A+ to F) B C D Fail Course Type Course Teaching & Learning Activities Lectures Tutorials	Demonstrate thorough mas learning outcomes. Show st to apply knowledge to a wipresentational skills. Demonstrate substantial collearning outcomes. Show evand some unfamiliar situation Demonstrate general but ir outcomes. Show evidence of familiar situations. Apply mo	stery at an advanced level of extensive kn trong analytical and critical abilities and logi- ride range of complex, familiar and unfami- mmand of a broad range of knowledge and vidence of analytical and critical abilities and ons. Apply effective organizational and prese noomplete command of knowledge and sl of some analytical and critical abilities and detrately effective organizational and presen ited command of knowledge and skills requ	owledge and skills required for cal thinking, with evidence of ori liar situations. Apply highly effed skills required for attaining at logical thinking, and ability to ap national skills. its required for attaining most logical thinking, and ability to a	attaining all the course iginal thought, and ability ective organizational and least most of the course oply knowledge to familiar t of the course learning			
(A+ to F) B C D Fail Course Type Course Teaching & Learning Activities Lectures Tutorials	learning outcomes. Show st to apply knowledge to a wipresentational skills. Demonstrate substantial collearning outcomes. Show evand some unfamiliar situation Demonstrate general but ir outcomes. Show evidence of familiar situations. Apply mo	trong analytical and critical abilities and logi- ride range of complex, familiar and unfamily mmand of a broad range of knowledge and vidence of analytical and critical abilities and ons. Apply effective organizational and prese noomplete command of knowledge and sl of some analytical and critical abilities and oderately effective organizational and presen tited command of knowledge and skills requ	cal thinking, with evidence of ori liar situations. Apply highly effer d skills required for attaining at logical thinking, and ability to ap ntational skills. kills required for attaining most logical thinking, and ability to a	iginal thought, and ability active organizational and least most of the course apply knowledge to familiar t of the course learning			
C D Fail Course Type Course Teaching & Learning Activities Lectures Tutorials	Demonstrate substantial con learning outcomes. Show ev and some unfamiliar situatio Demonstrate general but in outcomes. Show evidence familiar situations. Apply mo	vidence of analytical and critical abilities and ons. Apply effective organizational and prese ncomplete command of knowledge and sl of some analytical and critical abilities and derately effective organizational and presen ited command of knowledge and skills requ	logical thinking, and ability to ap ntational skills. kills required for attaining most logical thinking, and ability to a	oply knowledge to familiar tof the course learning			
Course Type Course Teaching & Learning Activities Lectures Tutorials	outcomes. Show evidence of familiar situations. Apply mo	of some analytical and critical abilities and oderately effective organizational and presen ited command of knowledge and skills requ	logical thinking, and ability to a				
Course Type Course Teaching & Learning Activities Lectures Tutorials	Demonstrate partial but limit		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.				
Course Teaching & Learning Activities Lectures Tutorials	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.						
Course Teaching & Learning Activities Lectures Tutorials		presentational skills are minimally effective		oply knowledge to solve			
& Learning Activities Lectures Tutorials	ased course						
Tutorials		Details		No. of Hours			
				36			
Reading /				12			
	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			
Examinati	ion	One 2-hour written examination	75	CLO 1,2,3			
reading and Bickel, P. Upper Sad Freund, J. Hogg, R. V Pace, L. & Singapore.	· · · · · · · · · · · · · · · · · · ·						
Course Website http://mood	& Salvan, A.: Principle , 1997).	tials of Statistical Inference: from a	idao University Press: Car	mbridge 2005)			

STAT3603	Stochastic processes (6 credits)	Academic Year	2019			
Offering Department	Statistics & Actuarial Science Quota					
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.					
Course Contents & Topics	Introduction to probability theory, conditional probability and expectation, Mar classification of states in a Markov chain, calculation of limiting probabilities					

			tion of inter-arrival time and waiting ti				
	formula,	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			course, students should be able to:				
Outcomes			nethod to calculate the mean and pro	bability			
			als of Markov chains, the Poisson pro		on		
	CLO 3	understand how stocha	stic models can be applied to the stu	dy of real-life phenomena	l		
Pre-requisites (and Co-requisites and Impermissible combinations)	Not for st	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 2019 - 2020	Y 1st	sem Offer in 2020 - 2	2021 : Y	Examination	Dec		
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 wide range of complex, familiar and unfamili	al thinking, with evidence of or	iginal 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	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 artical 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.						
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	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents	Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3		
	Examina		One 2-hour written examination	75	CLO 1,2,3		
Required/recommended reading and online materials	S. M. Ros	ss: Introduction to Proba	bility Models (9th edition)				
Course Website	http://moo	odle.hku.hk					

STAT3604	Design	and analysis of e	experiments (6 credits)	Academic Year	2019	
Offering Department	Statistics	s & Actuarial Science	·	Quota		
Course Co-ordinator	TBC, Sta	FBC, Statistics & Actuarial Science ()				
Teachers Involved	(Dr Z Liu	,Statistics & Actuarial	I Science)			
Course Objectives	basic pri	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-basec analysis of experiment.				
Course Contents & Topics	randomis	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 succ	essful completion of the	his course, students should be able to:			
Outcomes	CLO 1 c	develop a conceptual	understanding of experimental design			
	a	sign and the understandi	ng to use them			
		CLO 3 select appropriate experimental designs for different problems				
	CLO 4 select appropriate statistical model and to know how to validate the model					
(and Co-requisites and Impermissible combinations)		Pass in STAT2602 or STAT3611 or STAT3902				
Offer in 2019 - 2020	N O	ffer in 2020 - 2021 : Y		Examination		
Grade Descriptors (A+ to F)	A	learning outcomes. She	n mastery at an advanced level of extensive know now strong analytical and critical abilities and logical o a wide range of complex, familiar and unfamiliar	thinking, with evidence of original	al 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.				
	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.					
	. 4				knowledge to solve	
Course Type					knowledge to solve	
Course Type Course Teaching & Learning Activities		problems. Organization based course			No. of Hours	

	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	D. C. Montgomery: Design and Analysis of Experiments (Wiley, 1997, 4th edition) D. R. Cox: Planning of Experiments (Wiley, 1958) A. L. Edwards: Experimental Design in Psychological Research (Harper & Row, 1985, 5th edition) G. A. Ferguson & Y. Takane: Statistical Analysis in Psychology and Education (McGraw Hill, 1989, 6th edition) C. R. Hicks & K. V. Turner Jr.: Fundamental Concepts in the Design of Experiments (Oxford, 1999, 5th edition) 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 c	control and manage	ement (6 credits)	Academic Yea	r 2019	
Offering Department	Statistics 8	& Actuarial Science		Quota		
Course Co-ordinator	TBC, Statis	stics & Actuarial Science	ce ()			
Teachers Involved						
Course Objectives	course pro presents a reliability, a six-sigma,	The successful control of quality in production is a matter of primary importance to a company's prosperity. This ourse provides an overview of quality compromise which involves both the producer and the consumer. It resents a variety of statistical solutions including control charts, acceptance and sequential sampling plans, eliability, and life-testing. Contemporary quality management systems such as total quality control, zero defects ix-sigma, and ISO-9000 will be introduced. The student is brought to the frontier of today's quality control and ranagement ideas.				
Course Contents & Topics	control, va sampling testing. El	Probability distributions and their applications, process variability, sampling and statistical inference. Process 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	course, students should be able to:			
Outcomes	CLO 1 a	ppreciate the practicalit	ls in general			
			specific statistical methods can bene	•	tions	
			modern systems of quality manager			
Pre-requisites (and Co-requisites and Impermissible combinations)	course) or	Pass in BIOL2102 or (ECON1280 and any University level 2 course) or (STAT1601 and any University level) or (STAT1602 and any University level) or STAT2602 or (STAT1603 and any University level) or STAT3902				
Offer in 2019 - 2020	N Offe	er in 2020 - 2021 : N		Examination		
Grade Descriptors (A+ to F)	B C D	learning outcomes. Show se to apply knowledge to a water presentational skills. Demonstrate substantial collearning outcomes. Show e and some unfamiliar situation. Demonstrate general but in outcomes. Show evidence familiar situations. Apply me Demonstrate partial but lim Show evidence of some coknowledge to solve problem.	stery at an advanced level of extensive kn throng analytical and critical abilities and logical wide range of complex, familiar and unfamil ommand of a broad range of knowledge and vidence of analytical and critical abilities and ons. Apply effective organizational and prese incomplete command of knowledge and should of some analytical and critical abilities and oderately effective organizational and presen ited command of knowledge and skills requi- herent and logical thinking, but with limited and ans. Apply limited or barely effective organizations.	cal thinking, with evidence of origiliar situations. Apply highly effect of skills required for attaining at le logical thinking, and ability to applinational skills. Situational skills. The properties of the countries of the c	nal thought, and ability ive organizational and ast most of the course y knowledge to familiar of the course learning ply knowledge to most rise learning outcomes.	
		of analytical and critical a	dence of command of knowledge and skills i bilities, logical and coherent thinking. Show dipresentational skills are minimally effective	w very little or no ability to appl		
		of analytical and critical a problems. Organization and ased course	bilities, logical and coherent thinking. Show d presentational skills are minimally effective	w very little or no ability to appl	y knowledge to solve	
Course Teaching	Activities	of analytical and critical a problems. Organization and ased course	bilities, logical and coherent thinking. Show	w very little or no ability to appl	y knowledge to solve	
Course Teaching	Activities Lectures	of analytical and critical a problems. Organization and ased course	bilities, logical and coherent thinking. Show d presentational skills are minimally effective	w very little or no ability to appl	No. of Hours	
Course Type Course Teaching & Learning Activities	Activities Lectures Tutorials	of analytical and critical a problems. Organization and ased course	bilities, logical and coherent thinking. Show d presentational skills are minimally effective	w very little or no ability to appl	No. of Hours 36 12	
Course Teaching	Activities Lectures Tutorials	of analytical and critical a problems. Organization and ased course	bilities, logical and coherent thinking. Show d presentational skills are minimally effective	w very little or no ability to appl	No. of Hours	
Course Teaching & Learning Activities Assessment Methods	Activities Lectures Tutorials Reading / Methods Assignment	of analytical and critical a problems. Organization and ased course Self study	Details Details Coursework (assignments, tutorials, and a class test)	w very little or no ability to applor ineffective. Weighting in final course grade (%)	No. of Hours 36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3	
Course Teaching & Learning Activities Assessment Methods and Weighting	Activities Lectures Tutorials Reading / Methods Assignment Examination	of analytical and critical a problems. Organization and ased course Self study	Details Details Coursework (assignments, tutorials, and a class test) One 2-hour written examination	Weighting in final course grade (%) 25 75	No. of Hours 36 12 100 Assessment Methods to CLO Mapping	
Course Teaching & Learning Activities Assessment Methods and Weighting	Activities Lectures Tutorials Reading / Methods Assignmen Examination D. C. Monta J. Banks: F E. L. Grant I. D. Hill: A G. B. Weth	of analytical and critical a problems. Organization and ased course Self study Self study an: Quality Control and tgomery: Statistical Quality Co t & R. S. Leavenworth: an Introduction to Sampherill: Sampling Inspect	Details Details Coursework (assignments, tutorials, and a class test)	Weighting in final course grade (%) 25 75 5or, 1986, 5th edition) 3rd edition) k: McGraw-Hill, 1988, 6th e ineering Inspection Monogrethuen, 1977, 2nd edition)	No. of Hours 36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3 CLO 1,2,3	

STAT3606	Business logistics (6 credits)	Academic Year	2019
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)		

Course Objectives		Modern business corporations are increasingly using logistics as a management tool, for example, in capital budgeting problems, production planning, scheduling, transportations and deciding location for a new factory. This					
			applications of logistics.	•	,		
Course Contents & Topics	logistic p	n this course, students will apply the analytical skills with aid of computer techniques in solving the business ogistic problems. Topics include optimization techniques applied in allocation of resources, financial planning transportation, assignment, inventory control and queuing problems.					
Course Learning		on successful completion of this course, students should be able to:					
Outcomes	CLO 1 s	olve linear programmin	ng with Graphical approach, Simplex	method and hands-on Exc	cel Solving function		
	а	pproximation.	twork flow problems using least-c	ost approach, MODI m	ethod and Vogel's		
			ory and its applications				
		CLO 4 evaluate the cost and effectiveness of service systems					
Pre-requisites (and Co-requisites and Impermissible combinations)	course) o	ss in BIOL2102 or (ECON1280 and any University level 2 course) or (STAT1601 and any University level 2 urse) or (STAT1602 and any University level 2 urse) or STAT2601 or (STAT1603 and any University level 2 urse) or STAT2901; and of the forstudents who have passed MATH3901, or have already enrolled in this course.					
Offer in 2019 - 2020		t sem Offer in 2020 -	•	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.						
	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.						
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 test)	25	CLO 1,2,3,4		
	Assignin		,				
	Examina		One 2-hour written examination	75	CLO 1,2,3,4		
Required/recommended reading and online materials	Examina B. Rende Wayne L. H. Taha: F.S. Hillie	er, R. Stair, M. Hanna: (. Winston: Operations I An Introduction to Ope er and G, J. Lieberman	,	nt, 10th edition, Pearson ning on International Edition arch	CLO 1,2,3,4		

STAT3607	Statistic credits)	s in clinical medicine and bio-medical research (6	Academic Year	2019		
Offering Department	Statistics 8	& Actuarial Science	Quota			
Course Co-ordinator	Prof G Yin	, Statistics & Actuarial Science (gyin@hku.hk)	· ·			
Teachers Involved	(Prof G Yir	n,Statistics & Actuarial Science)				
Course Objectives	the clinica designs. I size and p	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	The conte	The contents of the course include contingency tables, regression models, survival analysis, categorical data analysis, Bayesian designs, dose-finding methods, sample size and power calculation, phase I, II and III trial designs, hypothesis testing, adaptive designs.				
Course Learning	On successful 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	CLO 4 solve medical problems by using various statistical tests				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in S1	AT2602 or STAT3902				
Offer in 2019 - 2020	N Offe	er in 2020 - 2021 : Y	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 thinki to apply knowledge to a wide range of complex, familiar and unfamiliar situat presentational skills.	ng, with evidence of origin	al thought, and ability		
	В	Demonstrate substantial command of a broad range of knowledge and skills re learning outcomes. Show evidence of analytical and critical abilities and logical than some unfamiliar situations. Apply effective organizational	ninking, and ability to apply			
	С	Demonstrate general but incomplete command of knowledge and skills requoutcomes. Show evidence of some analytical and critical abilities and logical the familiar situations. Apply moderately effective organizational and presentational states.	ninking, and ability to appl			

	Show evidence of some of knowledge to solve problem.	imited command of knowledge and skills requi coherent and logical thinking, but with limited ar ems. Apply limited or barely effective organizati	nalytical and critical abilities. Shonal and presentational skills.	ow limited ability to apply	
	of analytical and critical	vidence of command of knowledge and skills n abilities, logical and coherent thinking. Show nd presentational skills are minimally effective of	v very little or no ability to ap		
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 1,2,3,4	
	Examination	One 2-hour written examination	75	CLO 1,2,3,4	
reading and online materials	P. Armitage: Statistical Methods P. Armitage: Sequential Medica D. Altman: Practical Statistics fo N. E. Breslow & N. E. Day: Stati (Lyon: IARC, 1980) D. R. Cox & E. J. Snell: The Ana	J. Aitchison & J. Dunsmore: Statistical Prediction Analysis (Cambridge University Press, 1976) P. Armitage: Statistical Methods in Medical Research (Oxford: Blackwell, 1971) P. Armitage: Sequential Medical Trials (Oxford: Blackwell, 1975, 2nd edition) D. Altman: Practical Statistics for Medical Research (London: Chapman & Hall, 1991) N. E. Breslow & N. E. Day: Statistical Methods in Cancer Research Volume 1 - The analysis of case-control studies			
Course Website	http://moodle.hku.hk				
Additional Course Information	Other references: E. K. Harris & A. Albert: Survivorship Analysis for Clinical Studies (New York: Marcel Dekker, 1991) B. Jones & M. G. Kenward: Design and Analysis of Cross-Over Trials (London: Chapman and Hall, 1990) B. J. T. Morgan: Analysis of Quantal Response Data (London: Chapman and Hall, 1992) S. J. Pocock: Clinical Trials. A Practical Approach (Chickestes: John Wiley & Sons, 1991) P. McCullagh & J. A. Nelder: Generalised Linear Models (London: Chapman and Hall, 1989, 2nd edition)				

STAT3608	Statisti	ical genetics (6 credit	ts)	Academic Year	2019	
Offering Department	Statistics	s & Actuarial Science		Quota		
Course Co-ordinator	Prof T W	/ K Fung, Statistics & Actu	arial Science (wingfung@hku.hk)			
Teachers Involved	(Prof T V	V K Fung,Statistics & Actu	ıarial Science)			
Course Objectives	genetic e	This course aims to provide students with a fundamental knowledge of DNA profiling in human identification and genetic epidemiology in gene mapping and to understand how statistical theory and methods are applied to solve forensic DNA and genetic problems.				
Course Contents & Topics	This cou equilibriu and kins 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		,	ourse, students should be able to:			
Outcomes	CLO 1 ι	understand the fundament	tal principles in statistical DNA forer	nsics and genetic epidemiolo	gy	
	r	mapping	possible limitations of statistical m	ethodology in human identif	ication and gene	
			s to specific problems in the field			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in S	Pass in STAT2602 or STAT3902				
	N Offer in 2020 - 2021 : Y Examination					
Offer in 2019 - 2020	N O	fter in 2020 - 2021 : Y		Examination		
	A	Demonstrate thorough mas learning outcomes. Show st to apply knowledge to a wi presentational skills.	tery at an advanced level of extensive kn rong analytical and critical abilities and logi ide range of complex, familiar and unfamil	owledge and skills required for att cal thinking, with evidence of origin liar situations. Apply highly effective	al thought, and ability ve organizational and	
Offer in 2019 - 2020 Grade Descriptors (A+ to F)		Demonstrate thorough mas learning outcomes. Show st to apply knowledge to a wi presentational skills. Demonstrate substantial col learning outcomes. Show ev	rong analytical and critical abilities and logic	owledge and skills required for att cal thinking, with evidence of origin liar situations. Apply highly effective d skills required for attaining at lea- logical thinking, and ability to apply	al thought, and ability ve organizational and st most of the course	
Grade Descriptors	A	Demonstrate thorough mas learning outcomes. Show st to apply knowledge to a wip presentational skills. Demonstrate substantial con learning outcomes. Show ev and some unfamiliar situation Demonstrate general but in outcomes. Show evidence of	rong analytical and critical abilities and logi- ide range of complex, familiar and unfamil mmand of a broad range of knowledge and idence of analytical and critical abilities and	owledge and skills required for att cal thinking, with evidence of origin liar situations. Apply highly effective d skills required for attaining at lea- logical thinking, and ability to apply ntational skills. tills required for attaining most of logical thinking, and ability to apply	al thought, and ability ve organizational and st most of the course knowledge to familiar the course learning	
Grade Descriptors	В	Demonstrate thorough mas learning outcomes. Show st to apply knowledge to a wip presentational skills. Demonstrate substantial con learning outcomes. Show evand some unfamiliar situation Demonstrate general but if outcomes. Show evidence of familiar situations. Apply mo Demonstrate partial but limit Show evidence of some coh	rong analytical and critical abilities and logicide range of complex, familiar and unfamily mmand of a broad range of knowledge and ridence of analytical and critical abilities and ns. Apply effective organizational and prese complete command of knowledge and shofts some analytical and critical abilities and	owledge and skills required for attact thinking, with evidence of origin liar situations. Apply highly effective diskills required for attaining at least logical thinking, and ability to apply national skills. It is required for attaining most of logical thinking, and ability to apply tational skills. It is required for attaining most of logical thinking, and ability to apply tational skills. It is the course of the co	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.	
Grade Descriptors	A B C	Demonstrate thorough mas learning outcomes. Show st to apply knowledge to a wi presentational skills. Demonstrate substantial con learning outcomes. Show evand some unfamiliar situation Demonstrate general but in outcomes. Show evidence of familiar situations. Apply mo Demonstrate partial but limit Show evidence of some coh knowledge to solve problem: Demonstrate little or no evid of analytical and critical ab	rong analytical and critical abilities and logicide range of complex, familiar and unfamily mmand of a broad range of knowledge and ridence of analytical and critical abilities and ns. Apply effective organizational and presencomplete command of knowledge and shof some analytical and critical abilities and derately effective organizational and presented command of knowledge and skills requirement and logical thinking, but with limited a	owledge and skills required for attact thinking, with evidence of origin liar situations. Apply highly effective diskills required for attaining at least logical thinking, and ability to apply national skills. Wills required for attaining most of logical thinking, and ability to apply tational skills. The properties of the cours nalytical and critical abilities. Show ional and presentational skills. The required for attaining the course least wery little 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	
Grade Descriptors (A+ to F)	A B C D Fail	Demonstrate thorough mas learning outcomes. Show st to apply knowledge to a wi presentational skills. Demonstrate substantial con learning outcomes. Show evand some unfamiliar situation Demonstrate general but in outcomes. Show evidence of familiar situations. Apply mo Demonstrate partial but limit Show evidence of some coh knowledge to solve problem: Demonstrate little or no evid of analytical and critical ab	rong analytical and critical abilities and logical range of complex, familiar and unfamiliar and of a broad range of knowledge and idence of analytical and critical abilities and ns. Apply effective organizational and prese complete command of knowledge and slof some analytical and critical abilities and derately effective organizational and presented command of knowledge and skills requierent and logical thinking, but with limited as. Apply limited or barely effective organization end command of knowledge and skills requierent and logical thinking, but with limited as. Apply limited or barely effective organization end command of knowledge and skills reluce of command of knowledge and skills reluces the command of knowledge and skill reluces the command of knowledge and skill reluces the command of knowled	owledge and skills required for attact thinking, with evidence of origin liar situations. Apply highly effective diskills required for attaining at least logical thinking, and ability to apply national skills. Wills required for attaining most of logical thinking, and ability to apply tational skills. The properties of the cours nalytical and critical abilities. Show ional and presentational skills. The required for attaining the course least wery little 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	
Grade Descriptors (A+ to F) Course Type	A B C D Fail	Demonstrate thorough mas learning outcomes. Show st to apply knowledge to a wip presentational skills. Demonstrate substantial con learning outcomes. Show evand some unfamiliar situation Demonstrate general but if outcomes. Show evidence of familiar situations. Apply mo Demonstrate partial but limit Show evidence of some coh knowledge to solve problem: Demonstrate little or no evid of analytical and critical ab problems. Organization and based course	rong analytical and critical abilities and logical de range of complex, familiar and unfamiliar and of a broad range of knowledge and idence of analytical and critical abilities and ns. Apply effective organizational and prese complete command of knowledge and slof some analytical and critical abilities and derately effective organizational and presented command of knowledge and skills requierent and logical thinking, but with limited as. Apply limited or barely effective organization encode of command of knowledge and skills requierent and logical thinking, but with limited as. Apply limited or barely effective organization encode of command of knowledge and skills reliables, logical and coherent thinking. Sho	owledge and skills required for attact thinking, with evidence of origin liar situations. Apply highly effective diskills required for attaining at least logical thinking, and ability to apply national skills. Wills required for attaining most of logical thinking, and ability to apply tational skills. The properties of the cours nalytical and critical abilities. Show ional and presentational skills. The required for attaining the course least wery little 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	
Grade Descriptors (A+ to F) Course Type Course Teaching	A B C D Fail	Demonstrate thorough mas learning outcomes. Show st to apply knowledge to a wip presentational skills. Demonstrate substantial con learning outcomes. Show evand some unfamiliar situation Demonstrate general but if outcomes. Show evidence of familiar situations. Apply mo Demonstrate partial but limit Show evidence of some coh knowledge to solve problem: Demonstrate little or no evid of analytical and critical ab problems. Organization and based course	rong analytical and critical abilities and logicide range of complex, familiar and unfamiliar mmand of a broad range of knowledge and idence of analytical and critical abilities and ns. Apply effective organizational and presencomplete command of knowledge and should be some analytical and critical abilities and derately effective organizational and presented command of knowledge and skills requierent and logical thinking, but with limited as. Apply limited or barely effective organizational conference of command of knowledge and skills relitities, logical and coherent thinking. Show presentational skills are minimally effective	owledge and skills required for attact thinking, with evidence of origin liar situations. Apply highly effective diskills required for attaining at least logical thinking, and ability to apply national skills. Wills required for attaining most of logical thinking, and ability to apply tational skills. The properties of the cours nalytical and critical abilities. Show ional and presentational skills. The required for attaining the course least wery little or no ability to apply	al thought, and ability re organizational and st most of the course knowledge to familiar the course learning ly knowledge to most see learning outcomes. limited ability to apply ming outcomes. Lack knowledge to solve	
Grade Descriptors (A+ to F) Course Type Course Teaching	A B C D Fail Lecture-I Activitie	Demonstrate thorough mas learning outcomes. Show st to apply knowledge to a wip presentational skills. Demonstrate substantial con learning outcomes. Show evand some unfamiliar situation Demonstrate general but if outcomes. Show evidence of familiar situations. Apply mo Demonstrate partial but limit Show evidence of some coh knowledge to solve problem. Demonstrate little or no evid of analytical and critical ab problems. Organization and based course	rong analytical and critical abilities and logicide range of complex, familiar and unfamiliar mmand of a broad range of knowledge and idence of analytical and critical abilities and ns. Apply effective organizational and presencomplete command of knowledge and should be some analytical and critical abilities and derately effective organizational and presented command of knowledge and skills requierent and logical thinking, but with limited as. Apply limited or barely effective organizational conference of command of knowledge and skills relitities, logical and coherent thinking. Show presentational skills are minimally effective	owledge and skills required for attact thinking, with evidence of origin liar situations. Apply highly effective diskills required for attaining at least logical thinking, and ability to apply national skills. Wills required for attaining most of logical thinking, and ability to apply tational skills. The properties of the cours nalytical and critical abilities. Show ional and presentational skills. The required for attaining the course least wery little 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 see learning outcomes. Ilimited ability to apply ming outcomes. Lack knowledge to solve	
Grade Descriptors (A+ to F) Course Type Course Teaching	A B C D Fail Lecture- Activitic Lectures Tutorials	Demonstrate thorough mas learning outcomes. Show st to apply knowledge to a wip presentational skills. Demonstrate substantial con learning outcomes. Show evand some unfamiliar situation Demonstrate general but if outcomes. Show evidence of familiar situations. Apply mo Demonstrate partial but limit Show evidence of some coh knowledge to solve problem. Demonstrate little or no evid of analytical and critical ab problems. Organization and based course	rong analytical and critical abilities and logicide range of complex, familiar and unfamiliar mmand of a broad range of knowledge and idence of analytical and critical abilities and ns. Apply effective organizational and presencomplete command of knowledge and should be some analytical and critical abilities and derately effective organizational and presented command of knowledge and skills requierent and logical thinking, but with limited as. Apply limited or barely effective organizational conference of command of knowledge and skills relitities, logical and coherent thinking. Shoup resentational skills are minimally effective	owledge and skills required for attact thinking, with evidence of origin liar situations. Apply highly effective diskills required for attaining at least logical thinking, and ability to apply national skills. Wills required for attaining most of logical thinking, and ability to apply tational skills. The properties of the cours nalytical and critical abilities. Show ional and presentational skills. The required for attaining the course least wery little 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 see learning outcomes. limited ability to apply arrning outcomes. Lack knowledge to solve No. of Hours 36	
Grade Descriptors	A B C D Fail Lecture- Activitic Lectures Tutorials	Demonstrate thorough mas learning outcomes. Show st to apply knowledge to a wip presentational skills. Demonstrate substantial cor learning outcomes. Show ever and some unfamiliar situation. Demonstrate general but in outcomes. Show evidence of familiar situations. Apply mo Demonstrate partial but limit Show evidence of some cohe knowledge to solve problem. Demonstrate little or no evid of analytical and critical abproblems. Organization and based course	rong analytical and critical abilities and logicide range of complex, familiar and unfamiliar mmand of a broad range of knowledge and idence of analytical and critical abilities and ns. Apply effective organizational and presencomplete command of knowledge and should be some analytical and critical abilities and derately effective organizational and presented command of knowledge and skills requierent and logical thinking, but with limited as. Apply limited or barely effective organizational conference of command of knowledge and skills relitities, logical and coherent thinking. Shoup resentational skills are minimally effective	owledge and skills required for attacel thinking, with evidence of origin liar situations. Apply highly effective skills required for attaining at least logical thinking, and ability to apply national skills. Skills required for attaining most of logical thinking, and ability to apply tational skills. Skills irred for attaining some of the coursnalytical and critical abilities. Show ional and presentational skills. The equired for attaining the course least were very little or no ability to apply or ineffective. Weighting in final course grade (%)	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. Ilimited ability to apply mining outcomes. Lack knowledge to solve No. of Hours 36 12	

	Examination	One 2-hour written examination	75	CLO 1,2,3
Required/recommended	Klug, W. S. and Cummings, M. R.:	: Essentials of Genetics (Prentice Ha	all, 2002)	
reading and	Ott, J.: Analysis of Human Genetic	Linkage (The Johns Hopkins Unive	ersity Press, 1999, 3rd ed.)	
online materials	Ziegler, A. and Konig, I.R.: A Statistical Approach to Genetic Epidemiology (Wiley-VCH, 2006)			
	Evett, I. W. and Weir, B. S.: Interpr	reting DNA Evidence (Sinauer Asso	ciates, Inc. Publishers, 199	98)
	Fung, W. K. and Hu, Y. Q.: Statisti	ical DNA Forensics: Theory, Method	ls and Computation (Wiley	, Sussex, 2008)
Course Website	http://moodle.hku.hk			

STAT3609	The stat	tistics of investment	risk (6 credits)	Academic Ye	ar 2019	
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 Wat, Statistics & Actuarial Science)				
Course Objectives	Most inve	estments involve some ty. Whilst prediction of t	risk. The decision to invest or not he future is difficult, there are stati	stical modelling techniqu	es which provide a	
	rates, cor	rational framework for investment decisions, particularly those relating to stock markets and the markets for interest rates, commodities and currencies. Building upon research, both in Hong Kong and abroad, this course presents the prevailing statistical theories for prices and price-change in these vital markets.				
Course Contents & Topics		Concept of market efficiency, mean-variance portfolio theory, capital asset pricing model, arbitrage pricing theory, portfolio performance and management, behavioural finance.				
Course Learning	On succe	On successful completion of this course, students should be able to:				
Outcomes		easure risk and return of	•			
		1 7	in constructing optimal investment			
			icing models and evaluate investme			
		xplain the concepts of n orms of market efficiency	narket efficiency and apply approp	riate testing procedures	to assess different	
Pre-requisites		TAT2602, or already enr				
(and Co-requisites	,		ersity level 2 course) or STAT3611 o			
and Impermissible			in FINA2320, or have already enrol	led in this course; and		
combinations)		Sc(Actuarial Science) stu			D	
Offer in 2019 - 2020	1	sem Offer in 2020 - 20		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.					
	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	of analytical and critical ab problems. Organization and	ence of command of knowledge and skills re ilities, logical and coherent thinking. Show presentational skills are minimally effective o	very little or no ability to ap		
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	1	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents	Coursework (assignments, tutorials and class test(s))	40	CLO 1,2,3,4	
	Examination					
	Examinal	tion	One 2-hour written examination	60	CLO 1.2.3.4	
Required/recommended reading and online materials	Bodie, Z., Elton, E. Analysis (Luenberg Defusco, Institute In Fabozzi, Cointegra	Kane, A., Marcus, A. J., J., Gruber, M. J., Brown 8th Edition). John Wiley. er, D. G. (2009). Investm R. A., McLeavey, D. W. nvestment Series (2nd Ed. F. J., Focardi, S. M., andtion. New Jersey: Wiley.	and Jain, R. (2014). Investments (A., S. J., and Goetzmann, W. N. (2021). Investment Science (International Edition). Pinto, J. E., and Runkle D. E. (2021). Pinto, J. E., (2021). Wiley. Kolm, P. N. (2006). Financial Mo	sia Global Edition). McGri 11). Modern Portfolio The Oxford University Press. 207). Quantitative Investr delling of the Equity Mar	ory and Investment ment Analysis, CFA	

STAT3610	Risk management and insurance (6 credits)	cademic Year	2019		
Offering Department	Statistics & Actuarial Science	luota			
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 as basic financial planning through insurance products, to students. It allows students to understand the statistical, financial and legal principles underlying the techniques for managing the insurable risks faced by organisations and individuals. This course aims at students who have minimal background in quantitative methods, it involves very minimal quantitative calculations.				
Course Contents & Topics	The course introduces and explains: - risk in our society, - insurance and risk, - introduction to risk management,				

		ental legal principles, a rance, their contractual	nd analysis of insurance contracts, provisions.			
	- individual health insurance coverages.					
Course Learning	On succe	ssful completion of this	s course, students should be able to:			
Outcomes		nderstand the general rinciple	risks faced by organisations and in	dividuals and the generic	risk management	
		emonstrate knowledge dustry	and understanding of the underlying	financial and legal princip	les of the insurance	
	CLO 3 ui	nderstand how risk car	be managed through insurance			
	CLO 4 co	ompare and contrast di	ifferent types of commercial and perso	onal insurance products		
	CLO 5 pl	lan for and arrange the	ir own personal insurance needs			
Pre-requisites (and Co-requisites and Impermissible combinations)	course) o		280 and any University level 2 cours University level 2 course) or STAT26 (ce students)			
Offer in 2019 - 2020	Y 2nd	d sem Offer in 2020 -	- 2021 : Y	Examination	May	
Grade Descriptors (A+ to F)	A					
	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.					
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	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	Assignments		Coursework (assignments, tutorials, and a class test)	25	CLO 1,3	
	Examina	tion	One 2-hour written examination	75	CLO 1,2,3,4,5	
Required/recommended reading and online materials		Rejda, G. E.: Principles of Risk Management and Insurance (Pearson Addison Wesley, 10th edition) Trieschmann, J., Hoyt, R. E. and Sommer, D.: Risk Management and Insurance (South-Western, 2005, 12th				
Course Website	http://mod	odle.hku.hk				

STAT3611	Compute	er-aided data analysis (6 credits)	Academic Year	2019		
Offering Department	Statistics 8	& Actuarial Science	Quota			
Course Co-ordinator	DrEKFL	am, Statistics & Actuarial Science (hrntlkf@hku.hk)				
Teachers Involved						
Course Objectives	scientific s several v statistics. statistics.	age of statistical analyses and methods are presented using data studies. Measuring uncertainty, describing patterns of variable ariables are essential aspects of scientific investigations. This computer-oriented but non-mathematical course develops. The course makes extensive use of computers through the use of a programming language is required.	ility and the inter-relat that require good ur the important concepts	ionship betweer nderstanding of and methods o		
Course Contents & Topics	Data explo past exper	oration, formulation of testable hypotheses, the evaluation of elience.	vidence and forecasting	g on the basis o		
Course Learning	On succes	sful completion of this course, students should be able to:				
Outcomes	CLO 1 su	mmarize and describe the quantitative and qualitative data using	some simple statistical	measures		
	va	scribe the patterns of variability and the inter-relationship beriables				
	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 (and Co-requisites and Impermissible combinations)	course) or	IOL2102 or (ECON1280 and any University level 2 course) or (STAT1602 and any University level 2 course) or (STAT1603 ar udents who have passed in or have already enrolled in any of	nd any University levél 2	course); and		
Offer in 2019 - 2020	N Offe	er in 2020 - 2021 : N	Examination			
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive knowledglearning 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.	nking, with evidence of origina	al thought, and ability		
	В	· · · · · · · · · · · · · · · · · · ·				
	С					
	D	Demonstrate partial but limited command of knowledge and skills required for Show evidence of some coherent and logical thinking, but with limited analytic knowledge to solve problems. Apply limited or barely effective organizational ar	r attaining some of the course al and critical abilities. Show l			
	Fail	Demonstrate little or no evidence of command of knowledge and skills require	d for attaining the course lear	ning outcomes. Lack		

		critical abilities, logical and coherent thinking. Show ation and presentational skills are minimally effective or		ply knowledge to solve
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
	D. G. Kleinbaum, L. L. Ku (Duxbury Press, 1988, 2nd	ars from the Statisticians (Marcel Dekker) upper, & K. E. Muller: Applied Regression edition) son, & D. Stephan: Statistics for Managers	•	
Course Website	http://moodle.hku.hk			
Additional Course Information	Other reference: J. T. McClave & F. H. Dietr M. R. Middleton: Data Anal J. Neter, W. Wasserman, & P. Newbold: Statistics for B I. Olkin, L. J. Gleser, & C. D.	ich II: Statistics (Maxwell Macmillian, 5th ed ysis Using Microsoft EXCEL 5.0 (Duxbury) & G. A. Whitmore: Applied Statistics (Allyn a Business and Economics (Prentice-Hall, Inte Derman: Probability Models and Applications to Applied Statistics (Harper)	.) nd Bacon) rnational Editions, 3rd ec	

STAT3612	Statistic	al machine lear	ning (6 credits)	Academic Yea	ır 2019	
Offering Department		& Actuarial Science		Quota		
Course Co-ordinator	Dr A J Zha	ang, Statistics & Ad	ctuarial Science <i>(ajzhang</i> @ <i>hku.hl</i>	k)		
Teachers Involved	(Dr A J Zh	nang,Statistics & Ad	ctuarial Science)			
Course Objectives	prediction methodolo essential	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. The course materials are presented with lots of examples and reproducible codes.				
Course Contents & Topics	Data scie	Data science, data exploration, generalized linear models, variable selection, basis expansion, regularization cross-validation, tree-based methods, kernel methods, neural networks, dimension reduction, principal component analysis, cluster analysis, stochastic optimization, interpretable machine learning.				
Course Learning	On succes	ssful completion of	this course, students should be a	able to:		
Outcomes	CLO 1 ge	et familiar with the v	workflow of a data science or mad	chine learning project		
	CLO 3 id CLO 4 ev	naracteristics, stren entify and use approvaluate the quality of	gths and weaknesses ropriate techniques for a particula of the resulting model in terms of	prediction accuracy and model exp		
		. , ,	ramming for solving data-scientific	·		
Pre-requisites and Co-requisites and Impermissible combinations)	Pass in S Not for stu Not for BS	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.				
Offer in 2019 - 2020	Y 1st	sem Offer in 202	0 - 2021 : Y	Examination	No Exam	
Grade Descriptors (A+ to F)	В	learning outcomes. S to apply knowledge presentational skills. Demonstrate substar learning outcomes. S	how strong analytical and critical abilities to a wide range of complex, familiar an atial command of a broad range of know thow evidence of analytical and critical abi	ensive knowledge and skills required for a s and logical thinking, with evidence of orig d unfamiliar situations. Apply highly effec ledge and skills required for attaining at le ilities and logical thinking, and ability to app	inal thought, and abilitive organizational areast most of the cours	
	С	outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most				
	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. 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.					
Course Type	Lecture-ba	ased course				
ourse Teaching	Activities	5	Details	Details		
Learning Activities	Lectures					
	Tutorials					
	Reading / Self study				100	
Assessment Methods and Weighting	Methods	·	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin	

	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. (2013).	An Introduction to Statisti	cal Learning with
reading and	Applications in R, Springer, New Y	ork.		
online materials	2. Hastie, T., Tibshirani, R. and Friedman, J. (2009). The Elements of Statistical Learning: Data Mining, Inference,			
	and Prediction. Second Edition, Sp			
	3. Geron, A. (2017). Hands-On	<u> </u>	arn and TensorFlow: Con	cepts, Tools, and
	Techniques to Build Intelligent Sys			
	4. Chollet, F. and Allaire, J.J. (2018	Deep Learning with R. Manning.		
Course Website	http://moodle.hku.hk			

STAT3613	Marketin	g analytics (6 credi	ts)	Academic Year	2019	
Offering Department	Statistics 8	Actuarial Science	·	Quota	50	
Course Co-ordinator	Dr C W Kv	van, Statistics & Actuaria	al Science (cwkwan@hku.hk)			
Teachers Involved	(Dr C W K	wan,Statistics & Actuaria	al Science)			
Course Objectives	This cours	e is designed to provid	e an overview and practical applica	tion of trends, technology	and methodology	
			cess including problem formulation,			
			asis will be put on statistical techniqu			
			market response models, cons	umer preference analysi	is and conjoint	
			variety of marketing case studies.	1 00 00 00 10 11 11		
Course Contents			ket response models, Survey resea		or segmentation,	
& Topics			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		•		SAS procedures or R pack	kages	
		derstand marketing dec				
		,	is, factor analysis, multidimensional	٠ .	, ,	
		sitioning and new produ	confirmatory factor analysis, and dis	criminant analysis in mark	tet segmentation,	
Dro roquioitos		<u> </u>	0 and any University level 2 course) or (STAT1601 and only	University level 2	
Pre-requisites (and Co-requisites			niversity level 2 course) or STAT260			
and Impermissible		STAT 1002 and any 0	Tilversity level 2 course) of STAT200	or or (STAT 1003 and any	Offiversity level 2	
combinations)	course) or	31A12301				
Offer in 2019 - 2020	Y 1st	sem Offer in 2020 - 20	121 · V	Examination	Dec	
Grade Descriptors	Α					
(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					
(71.101)	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				
		outcomes, show evidence of some analytical and critical anilless and togical militarity, 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. Lar				
	of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve					
			presentational skills are minimally effective or	ineffective.		
Course Type	_	sed course	I=			
Course Teaching	Activities		Details		No. of Hours	
& Learning Activities	Lectures				36	
	Tutorials	0 15 1 1			12	
		Self study			100	
Assessment Methods	Methods		Details	Weighting in final	Assessment	
and Weighting				course grade (%)	Methods	
					to CLO Mapping	
	Assignme	nts	Coursework (assignments, a	50	CLO 1,2,3	
	class test and a group project)			50	010400	
5		Examination One 2-hour written examination 50 CLO 1,2,3				
			.E.: Analysing multivariate data (Tho			
reading and			earch: An Applied Orientation (Pearso			
online materials			Multivariate Statistical Analysis (Pren			
Course Website			Marketing Engineering (Prentice Hall,	ZUUS, ZIIU EU.)		
	http://moodle.hku.hk					

STAT3614	Business forecasting (6 credits)	Academic Year	2019		
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 aspecindividual companies. Numerous statistical techniques have been develope forecasts for the business decision-maker. This course considers a wide ra proven useful to practitioners. The course will involve the use of computer process.	d in the past dec nge of such techi	ades to provide niques that have		
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 understand forecasting methods: moving averages and smoothing methods, decomposition and winter's				

	methods, simple and multiple linear regression							
	CLO 3 develop hands-on skills of analyzing business data with computer software, EXCEL, and its add-ing functions							
Pre-requisites (and Co-requisites and Impermissible combinations)	course) or Not for stu	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, STAT4601, ECON2280.						
Offer in 2019 - 2020	N Offe	er in 2020 - 2021 : N		Examination				
Grade Descriptors (A+ to F)	A	learning outcomes. Show s to apply knowledge to a v presentational skills.	stery at an advanced level of extensive kno strong analytical and critical abilities and logic wide range of complex, familiar and unfamili	al thinking, with evidence of or ar situations. Apply highly effe	iginal thought, and ability ective organizational and			
	В	learning outcomes. Show e	ommand of a broad range of knowledge and vidence of analytical and critical abilities and long. Apply effective organizational and preser	logical 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.							
	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.							
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	Coursework (assignments, tutorials, and a class test)	40	CLO 1			
	Examinati	on	One 2-hour written examination	60	CLO 1,2,3			
Required/recommended reading and online materials	P. E. Gay	ynor & R. C. Kirkpatr s (McGraw-Hill, 1994)	G. Reitsch: Business Forecasting (Fick: Introduction to Time-series May Business & Economic Forecasting	odelling and Forecastin				
Course Website	http://moo		Ţ.	,				
Additional Course Information		able to CompSc stude or before choosing this	nts having taken STAT1301. Stude course.	ents should obtain appro	val from the course			

STAT3615	Practical mathematics for investment (6 credits)				r 2019		
Offering Department	Statistic	Statistics & Actuarial Science Quota					
Course Co-ordinator	Dr A G	Benchimol, Statistics &	Actuarial Science (benchi@hku.h.	k)			
Teachers Involved	(Dr A G	Benchimol, Statistics &	Actuarial Science)				
Course Objectives		ain focus of this course ts are also considered.	is built on the concepts on finan	icial mathematics. Practical ap	plications of thes		
Course Contents & Topics	schedul	les and sinking funds; <code>y</code>	d compound interest; annuities ce yield rates; bonds and related sed a structure of interest rates.				
Course Learning	On succ	cessful completion of th	is course, students should be able	to:			
Outcomes	CLO 1	solve practical problem	ns relating to annuities certain, sim	ple and compound interest			
	CLO 2	carry out discounted ca	ash flow analysis				
	CLO 3	apply amortization sch	edules and sinking funds to the pra	actical problems such as real es	state mortgage		
Pre-requisites (and Co-requisites and Impermissible combinations)	STAT26	601 or (STAT1603 and a	University level 2 course) or (S any University level 2 course) or S sed in STAT2902, or have already	TAT2901; and	ievei z course) (
Offer in 2019 - 2020	Y 2	nd sem Offer in 2020	- 2021 : Y	Examination	May		
Grade Descriptors (A+ to F)	A	learning outcomes. Sho	mastery at an advanced level of extensive wstrong analytical and critical abilities and a wide range of complex, familiar and ur	d logical thinking, with evidence of orig	inal thought, and abili		
	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.					
	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.						
					v limited ability to app		
	Fail	knowledge to solve prob Demonstrate little or no of analytical and critica		nizational and presentational skills. kills required for attaining the course le Show very little or no ability to app	earning outcomes. La		
Course Type		knowledge to solve prob Demonstrate little or no of analytical and critica	lems. Apply limited or barely effective orga evidence of command of knowledge and s il abilities, logical and coherent thinking.	nizational and presentational skills. kills required for attaining the course le Show very little or no ability to app	earning outcomes. La		
		knowledge to solve prob Demonstrate little or no of analytical and critica problems. Organization a -based course	lems. Apply limited or barely effective orga evidence of command of knowledge and s il abilities, logical and coherent thinking.	nizational and presentational skills. kills required for attaining the course le Show very little or no ability to app	earning outcomes. La		
Course Teaching	Lecture	knowledge to solve prob Demonstrate little or no of analytical and critica problems. Organization : -based course ies	llems. Apply limited or barely effective orga evidence of command of knowledge and s il abilities, logical and coherent thinking, and presentational skills are minimally effe	nizational and presentational skills. kills required for attaining the course le Show very little or no ability to app	earning outcomes. La ly knowledge to solv		
Course Teaching	Lecture-	knowledge to solve prob Demonstrate little or no of analytical and critica problems. Organization : -based course ies	llems. Apply limited or barely effective orga evidence of command of knowledge and s il abilities, logical and coherent thinking, and presentational skills are minimally effe	nizational and presentational skills. kills required for attaining the course le Show very little or no ability to app	earning outcomes. La by knowledge to solv		
Course Type Course Teaching & Learning Activities	Lecture- Activiti Lecture Tutorial	knowledge to solve prob Demonstrate little or no of analytical and critica problems. Organization : -based course ies	llems. Apply limited or barely effective orga evidence of command of knowledge and s il abilities, logical and coherent thinking, and presentational skills are minimally effe	nizational and presentational skills. kills required for attaining the course le Show very little or no ability to app	earning outcomes. La by knowledge to solv No. of Hours 36		

	Assignments	Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3
	Examination	One 3-hour written examination	75	CLO 1,2,3
Required/recommended	Kellison, S. G.: The Theory of Inter	est (Irwin: Illinois, 2008, 3rd edition))	
reading and	Broverman, S. A.: Mathematics of	Investment and Credit (ACTEX P	ublications - Mad River B	ooks: Connecticut,
online materials	2004, 3rd edition)			
Course Website	http://moodle.hku.hk			

STAT3616	Advanc	Advanced SAS programming (6 credits) Academic Y						
Offering Department	Statistics	& Actuarial Science		Quota	50			
Course Co-ordinator	TBC, Statistics & Actuarial Science ()							
Teachers Involved	, v							
Course Objectives	programn	ning for automation of p	dents, who have taken STAT2603 rocedures and data processing in sol	ving complex problems n	nore efficiently.			
Course Contents & Topics			arts. Macro programming. Advance up techniques, modifying transaction					
Course Learning	On succe	ssful completion of this	course, students should be able to:					
Dutcomes			of SAS and basic programming					
			or parallel processing to aid automati					
			without printing to OUTPUT windows		tion			
			evelop customized and automated ap					
		•	gramming statements and technique	s to solve complex proble	ms			
Pre-requisites		TAT2601 or STAT2901						
and Co-requisites and Impermissible combinations)	(Students	(Students are strongly recommended to take STAT2603 or STAT2604 prior to taking this course.)						
Offer in 2019 - 2020	N Off	er in 2020 - 2021 : 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.							
	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.							
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	Weighting in final course grade (%)	Assessment Methods to CLO Mappin			
	Assignments		Coursework (assignments,	50	CLO 1,2,3,4,5			
	_		tutorials, and a class test)					
	Assignme		One 2-hour written examination	50	CLO 1,2,3,4,5			
Required/recommended reading and online materials	Examina SAS Cert Carpente	tion ification Prep Guide: Ad		rd Edition.				

STAT3617	Sample survey methods (6 credits)	Academic Year	2019				
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 data thus obtained. Survey design includes overall survey design, design of sampling schemes and questionnaires, etc. Sampling methods include sample size determination, sampling and non-sampling errors and biases, methods of estimation of parameters from survey data, imputation for missing data etc.						
Course Contents & Topics	of parameters from survey data, imputation for missing data etc. Topics may include: survey design and planning; survey quality and ethics; implementation matters like management of survey staff, respondent relationship and logistical issues; and sampling methods like simple random sampling, systematic sampling, stratified sampling, cluster sampling, multi-stage sampling, sample size determination, post-stratification, ratio and regression estimation methods, non-sampling errors and biases, non-responses and missing data. Case studies of major applications of sample survey methods in the public and private sectors, with some examples on the analysis and application of the statistical data thus produced, will be discussed.						
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 demonstrate knowledge and understanding of the various steps to be taken in the planning and implementation of sample surveys						
	CLO 2 design different sample schemes and select the most efficient and suitable one for adoption for a particular survey - make statistical inference on parameters based on a sample						

	CLO 3 judge whether the statistics presented by other survey takers are trustworthy						
Pre-requisites (and Co-requisites and Impermissible combinations)	University		.2102, or (ECON1280 and any Univ AT1602 and any University level 2 o .T2901.				
Offer in 2019 - 2020	Y 2nd	sem Offer in 2020 - 2	2021 : Y	Examination	May		
Grade Descriptors (A+ to F)	A	learning outcomes. Show s	stery at an advanced level of extensive knows analytical and critical abilities and logic wide range of complex, familiar and unfamiliar	cal thinking, with evidence of ori	ginal thought, and ability		
	В	learning outcomes. Show e	ommand of a broad range of knowledge and evidence of analytical and critical abilities and ons. Apply effective organizational and prese	logical thinking, and ability to ap			
	С	outcomes. Show evidence familiar situations. Apply m	incomplete command of knowledge and sk of some analytical and critical abilities and oderately effective organizational and present	logical thinking, and ability to a tational skills.	pply knowledge to most		
	D						
	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.						
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		
	Examination		One 2-hour written examination 75		CLO 1,2,3		
Required/recommended reading and online materials	R. L. Sche W. G. Coo R. M. Gro Wiley & S L. Kish: Si	Examination One 2-hour written examination 75 CLO 1,2,3 L. Lohr: Sampling: Design and Analysis, 2nd edition (Duxbury Press, 2010) L. Scheaffer, W. Mendenhall, & R. L. Ott: Elementary Survey Sampling (Duxbury Press, 2011, 7th edition) J. G. Cochran: Sampling Techniques (John Wiley & Sons Ltd., 1997) J. M. Groves, F. J. Fowler, M. P. Couper, J. M. Lepkowski, E. Singer, R. Tourangeau: Survey Methodology (John Viley & Sons Ltd., 2009, 2nd edition) J. Kish: Survey Sampling (John Wiley & Sons, Inc., 1995) J. Salant & D. A. Dillman: How to Conduct Your Own Survey (John Wiley & Sons, Inc., 1994)					
	P. Salant	& D. A. Dillman: How to	Ochduct Your Own Survey (John W	/iley & Sons, Inc., 1994)			

STAT3618	Derivati	Derivatives and risk management (6 credits) Academic Year 201						
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	derivative be decom aims at d	s all risk managers must be well versed in the use s are forwards (having a linear payoff) and options posed to these underlying payoffs or alternatively emonstrating the practical use of financial derivativ trategies, and the no-arbitrage principle.	(having a non-line they are variations	ar payoff). All othe on these basic ic	er derivatives car leas. This course			
Course Contents & Topics	forwards European the Black hedging a	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 succe	ssful 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)	Not for sto Not for sto Not for sto	TAT3615; and udents who have passed in STAT3910, or have alrestents who have passed in STAT3905, or have alrested who have passed in FINA2322, or have alrested (Actuarial Science) students.	eady enrolled in this	course; and				
Offer in 2019 - 2020		sem Offer in 2020 - 2021 : Y		Examination	Dec			
Grade Descriptors (A+ to F)	A	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, v nd unfamiliar situations	skills required for attaining the skills	aining all the course 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.							
	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 Show evidence of some coherent and logical thinking, but wit knowledge to solve problems. Apply limited or barely effective	th limited analytical and	critical abilities. Show				
	Fail	Demonstrate little or no evidence of command of knowledge of analytical and critical abilities, logical and coherent thin problems. Organization and presentational skills are minimall	king. Show very little					
Course Type	Lecture-b	ased course						

Course Teaching	Activities	Details	Details						
& 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 1,3					
	Examination	One 2-hour written examination	75	CLO 1,2,3,4					
Required/recommended reading and online materials	18, 24. McDonald, R. L.: Derivatives M	ull, J. C.: Options, Futures, and Other Derivatives (Prentice Hall, 2009, 7th edition), Chapters 3, 5-7, 9-11, 13, 17-							
Course Website	http://moodle.hku.hk	, J		,					

STAT3620	Modern	nonparametric stati	stics (6 credits)	Academic Yea	2019			
Offering Department	Statistics	& Actuarial Science		Quota				
Course Co-ordinator	Dr P L H	Yu, Statistics & Actuarial	Science (plhyu@hku.hk)					
Teachers Involved		Dr P L H Yu, Statistics & Actuarial Science)						
Course Objectives		se aims to acquaint stud netric statistical methods	lents with the fundamentals, basic for data analysis.	properties and use of clas	ssical and moderr			
Course Contents & Topics	samples;	ics may include: order-statistics; goodness-of-fit tests; rank tests for single-sample and two-independen ples; tests for designed experiments; permutation tests; tests for trends and association; jackknife and astrapping methods; nonparametric regression.						
Course Learning	On succe	ssful completion of this c	ourse, students should be able to:					
Outcomes			rametric methods for analyzing data rametric statistical analyses	a				
	CLO 3 ga		in the use of statistical software	for data management and	performing basic			
	CLO 4 ef	fectively communicate fir	ndings and conclusions					
Pre-requisites (and Co-requisites and Impermissible combinations)		TAT2602 or STAT3902						
Offer in 2019 - 2020		sem Offer in 2020 - 20		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.							
	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the courlearning 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 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.						
	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. 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.							
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			
	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			
Required/recommended reading and	Gibbons,	Examination One 2-hour written examination 75 Alvo, M. and Yu, P.L.H.: Statistical Methods for Ranking Data (Springer, 2014) Bibbons, J.D. and Chakraborti, S.: Nonparametric Statistical Inference, 5th edition (CRC presediggins, James: Introduction to Modern Nonparametric Statistics (Duxbury Press, 2004) By Prent, P. and Smeeton, N.C.: Applied Nonparametric Statistical Methods, 4th edition (CRC preseding Press, 2004)						
online materials	Sprent, P	and Smeeton, N.C.: App			s, 2007)			

STAT3621	Statistical data analysis (6 credits)	Academic Year	2019
Offering Department	Statistics & Actuarial Science	Quota	50
Course Co-ordinator	Dr D Y Zhang, Statistics & Actuarial Science (doraz@hku.hk)		
Teachers Involved	(Dr D Y Zhang, Statistics & Actuarial Science)		
Course Objectives	Building on prior coursework in statistical methods and modeling, students will entire process of data analysis. The course aims to develop skills of model set so that questions of interest can be properly formulated and answered. An in review and improvement, when one's first attempt does not adequately fit the explore the data, to build reliable models, and to communicate the results audiences.	ection and hypoth portant element of data. Students of data analysis	neses formulation deals with model will learn how to to a variety of
Course Contents	Descriptive statistics, presentation and visualization of data; Simple statistical ar	alyses for the one	e-sample and two-

	sample case using parametric and nonparametric methods; Regression analyses: model fitting; variable selection and model diagnostic checking; Analysis of Variance (ANOVA): 1-way, two-way and higher-way ANOVA; Covariance analysis; Categorical and count data: binary logistic regression, Poisson regression.							
	Real data sets will be presented for modelling and analysis using statistical software for gaining hands-on							
		regrience. n successful completion of this course, students should be able to:						
			oblem and identify what to measure	for the guestion of intere	st			
			the quantitative and qualitative data					
		easures	·		' '			
	CLO 3 ide	entify the association am	ong several continuous or discrete va	ariables				
	sel	ection, perform model	l comprehensive statistical analyses l diagnostics, formulate testable h ations on the findings and report writi	nypotheses, make app	•			
Pre-requisites F		AT3600 or STAT3907	<u> </u>	0				
(and Co-requisites and Impermissible combinations)	(Students a	are strongly recommend	led to take STAT2603 or STAT2604	prior to taking this course	e.)			
Offer in 2019 - 2020	Y 2nd	sem Offer in 2020 - 20	021 : 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.							
	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 evid- of analytical and critical ab	ence of command of knowledge and skills rec ilities, logical and coherent thinking. Show presentational skills are minimally effective or	quired for attaining the course very little or no ability to ap				
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		Coursework (assignments and a mid-term take-home project)	50	CLO 1,2,3,4			
	Examination		One 3-hour written examination	50	CLO 1,2,3,4			
reading and	Ramsey, F. and Schafer, D. (2012). The Statistical Sleuth: A Course in Methods of Data Analysis, 3rd edition, Cengage Learning. Cody, R. (2011). SAS Statistics by Example. SAS Institute. Cody, R.P. & Smith, J.K. (2005). Applied Statistics and the SAS Programming Language, 5th edition, Pearson. Elliott, R.J. (2009). Learning SAS in the Computer Lab, 3rd edition, Cengage Learning. Kleinbaum, D.G., Kupper, L.L., Nizam, A. and Muller, K.E. (2007). Applied Regression Analysis and Other							
(E	Elliott, R.J. Kleinbaum	(2009). Learning SÁS i	n the Computer Lab, 3rd edition, Čer Nizam, A. and Muller, K.E. (2007)	ngage Learning.				

STAT3622	Data vis	Data visualization (6 credits)					Academic Year	2019	
Offering Department	Statistics	s & Actua	rial Science					Quota	50
Course Co-ordinator	Dr A J Zh	Zhang, Sta	atistics & Actuari	al Science	(ajzhang@	hku.hk)			
Teachers Involved	(Dr A J ZI	Zhang,Sta	atistics & Actuari	al Science)				
Course Objectives								lay statistical data phics and criticall	
Course Contents & Topics	Grammar visualizin	0 1	phics, visualizin	g patterns	over time	visualizing re	elationship	, visualizing spat	ial relationships,
Course Learning	On succe	cessful co	mpletion of this	course, stu	dents shou	d be able to:			
Outcomes	CLO 1	cho	ose the best cha	rt that fits t	the data				
	CLO 2	CLO 2 create a compelling visualization using computer software							
	CLO 3	3 communicate effectively using statistical graphics							
	CLO 4	0.4 critically evaluate graphics and suggest improvements							
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in S	S1A1260	2 or STAT3902						
Offer in 2019 - 2020	Y 2nd	nd sem	Offer in 2020 - 2	2021 : Y				Examination	No Exam
Grade Descriptors (A+ to F)	Α	learning to apply	g outcomes. Šhow s	trong analytic	cal and critical	abilities and logical	al thinking, w	skills required for atta rith evidence of origina Apply highly effective	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	outcom		of some ana	llytical and crit	ical abilities and l	ogical thinkin	for attaining most of ng, and ability to apply	
	D							ng some of the course critical abilities. Show I	

	knowledge to so	lve problems. Apply limited or barely effective organiza	tional and presentational skills.					
	Fail Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge problems. Organization and presentational skills are minimally effective or ineffective.							
Course Type	Lecture-based course							
Course Teaching & Learning Activities	Activities	Details		No. of Hours				
	Lectures			36				
	Tutorials			12				
	Reading / Self study			100				
Assessment Methods and Weighting	Methods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping				
	Presentation	oral presentation and in-class discussion	40	CLO 1,2,3,4				
	Project reports	written report	60	CLO 1,2,3,4				
Required/recommended reading and online materials	Tufle, Edwards R. (2001 Chang, Winston (2013). Murray, Dan (2013). Tab	au, Nathan (2011). Visualize This: The FlowingData Guide to Design, Visualization, and Statistics. Wiley. fulle, Edwards R. (2001). The Visual Display of Quantitative Information. 2nd edition, Graphics Press. flang, Winston (2013). R Graphics Cookbook. O Reilly Media. flurray, Dan (2013). Tableau Your Data!: Fast and Easy Visual Analysis with Tableau Software. Wiley. fling, Ritchie, S. (2014). Visual Storytelling with D3: An Introduction to Data Visualization in JavaScript. Addison-						
Course Website	http://moodle.hku.hk							

STAT3799	Directed studies in statistics (6 credits) Academic Yea				ar 2019			
Offering Department	Statistics	50						
Course Co-ordinator	Prof S M	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	To enhance students' knowledge of a particular topic and students' self-directed learning and critical thinking skills							
Course Contents & Topics	topic is p or a syn	The student undertakes a self-managed study on a topic in statistics 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 students understanding of the subject. The project may not require an element of originality.						
ourse Learning	On succe	essful completion of th	is course, students should be able to	:				
Outcomes	CLO 2 d s CLO 3 w	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 typica statistical research and data analyses CLO 3 write succinct reports on the findings of a research study CLO 4 make concise oral presentation of the findings of a research study						
re-requisites	Pass in	at least 24 credits of	f advanced level disciplinary core/el	ective courses in the Dec	ision Analytics/Ri			
and Co-requisites and Impermissible combinations)	Manager This caps to the cor	ment/Statistics Majors; stone course is only f nsent of course coordi	and Not for students who have alrea or students majoring in Decision Ana inator. This course is mutually exclusi lowed to take this capstone course is	dy enrolled in STAT4799 ir alytics/Risk Management/Si ve with STAT4710.	ı this academic ye			
Offer in 2019 - 2020	Y 1s	t sem 2nd sem Of	fer in 2020 - 2021 : Y	Examination	No Exam			
Grade Descriptors (A+ to F)	Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking, with evidence original thought. Insightful use and critical analysis / evaluation of information drawn from a full range of high quality sources are 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 widereas relevant to the topic.] Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Critical use relevant information from sources, showing ability to make meaningful comparisons between different secondary interpretation and to quote/reference aptly. Correct use of data of results to draw appropriate conclusions. Apply effective organizational are presentational skills.							
	C 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 Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack analytical and critical abilities, logical and coherent thinking. Limited use of secondary sources and no critical comparison them. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills at minimally effective or ineffective.							
ourse Type	-	ased course						
ourse Teaching	Activitie	S	Details		No. of Hours			
Learning Activities	Reading	/ Self study	discussion & meetings to be ar the supervisor	ranged by the student &	120			
Assessment Methods nd Weighting	Methods	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mappin			
	Oral pres	sentation	oral presentation & in-class discussion	40	CLO 1,2,4			
	Research report written report 60							
	Researc	h report	written report	60	CLO 1,2,3			

STAT3901	Life contingencies I (6 credits)	Academic Year	2019				
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-				

	financial i	mpact of the random ev	basic building block by which modern ent of untimely death, are develope	d. This course introduces				
			ematical skills for modelling life insu					
Course Contents		Key topics include: survival distributions; life table functions; select and ultimate tables; life insurance models; life annuity models; loss-at-issue random variable; benefit premiums.						
& Topics Course Learning								
Outcomes			course, students should be able to: lues, variances, probabilities, and pe	arcentiles for survival-time	random variables			
		•	rvival-time random variable that ar					
			mptions for fractional ages	ises from the disorder se	arvivar arric raridorri			
		· ·	enefit random variables defined on s	survival-time random varia	bles			
	CLO 4 de	efine and calculate the e	expected values, variances and pro	babilities for present-valu	e-of-benefit random			
			f-loss-at-issue random variables, ar	nd present-value-of-loss ra	andom variables			
	CLO 5 ca	alculate benefit premium	s for life insurances and annuities					
Pre-requisites (and Co-requisites and Impermissible combinations)	(Pass in S	STAT2602 and STAT36 ² STAT2902 and (Pass in STAT2602 and STAT290	SŤAT3902 or already enrolled in thi	s course)) or				
Offer in 2019 - 2020	Y 1st	sem Offer in 2020 - 2	021 : Y	Examination	Dec			
Grade Descriptors (A+ to F)	A	learning outcomes. Show s	stery at an advanced level of extensive known trong analytical and critical abilities and logical range of complex, familiar and unfamil	cal thinking, with evidence of ori	ginal thought, and ability			
	В	· ·						
	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.							
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	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			
	Examina	tion	One 3-hour written examination	75	CLO 1,2,3,4,5			
Required/recommended		Sowers. N.L., Gerber, H.U., Hickman, J.C., Jones, D.A. & Nesbitt, C.J.: Actuarial Mathematics (1997, 2nd edition) asca, Illinois: The Society of Actuaries Dickson, C.M.D., Hardy, M.R., and Waters, H.R.: Actuarial Mathematics for Life Contingent Risks (Cambridge:						
reading and online materials	Dickson,	,	nd Waters, H.R.: Actuarial Mathen	natics for Life Contingent	Risks (Cambridge:			

STAT3902	Statistic	cal models	s (6 credits)				Academic Year	2019
Offering Department	Statistics 8	& Actuarial	Science				Quota	
Course Co-ordinator	Dr J F Xu,	u, Statistics &	Actuarial Scie	ence (xujf@	Dhku.hk)			
Teachers Involved	(Dr J F Xu	u,Statistics	& Actuarial Scie	ence)				
Course Objectives	study the testing, the both quan	e concepts a he two majo intitative skil	and methods of areas of statis s and qualitati	of statistics stical infere ive percep	s. The cours nce. Throug tions essen	se will lay emph gh the study of th tial for making ri	dation of Actuarial Scie nasis on the estimation is course, students will gorous statistical analy ciety of Actuaries.	n and hypothesis be equipped with
Course Contents & Topics	estimator confidence two norma	r (MLE), mo ce interval e nal variances	ment estimato stimations for r	or, Bayesia normal mea	n estimato an, the diffe	r, properties of rence of two nor	entral limit theorem, ma estimators, limiting promal means, normal var on, Neyman-Pearson I	operties of MLE; iance, the ratio of
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 understand the importance of sufficient statistic(s) in data reduction and statistical inferences such as point estimation, confidence interval estimation, and testing hypothesis							
	CLO 2 derive maximum likelihood estimators of parameters to calculate maximum likelihood estimates							
	CLO 3 locate pivotal quantity to construct confidence intervals of parameters							
	CLO 4 find testing statistic to test hypotheses associated with one-sample and/or two-sample normal distributions with small sample sizes and non-normal distributions with large sample sizes							
Pre-requisites (and Co-requisites and Impermissible combinations)	Not for stu				2, or alread	y enrolled in this	course; and	
Offer in 2019 - 2020	Y 1st	t sem Offe	r in 2020 - 202	21 : Y			Examination	Dec
Grade Descriptors (A+ to F)	A	learning out	comes. Show stro owledge to a wide	ng analytical	and critical abi	lities and logical thin	e and skills required for att king, with evidence of origin lations. Apply highly effectiv	al 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. 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 critical	ridence of command of knowledge and skills abilities, logical and coherent thinking. Sho d presentational skills are minimally effective	w very little or no ability to ap				
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	Weighting in final course grade (%)	Assessment Methods to CLO Mapping			
	Assignments		Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3,4			
	Examina	tion	One 3-hour written examination	75	CLO 1,2,3,4			
Required/recommended reading and online materials	2004, 7th Hogg R. V edition) Arnold S.	iller I. & Miller M.: John E. Freund's Mathematical Statistics with Applications (Pearson Education International, 2004, 7th edition) ogg R. V., McKean J. W. & Craig A. T.: Introduction to Mathematical Statistics (Pearson Prentice Hall, 2005, 6th dition) rnold S. F.: Mathematical Statistics (Prentice-Hall, 1990) arsen R. J. and Marx M. L.: An Introduction to Mathematical Statistics and Its Applications (Pearson International						
Course Website		odle.hku.hk						

STAT3903	Stochastic models (6 credits) Statistics & Actuarial Science Quota								
Offering Department	Statistics								
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								
Course Contents & Topics	classificat 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		n successful completion of this course, students should be able to:							
Outcomes			ing method to calculate the mean and pr						
2410011100			sentials of Markov chains, the Poisson p	•	n .				
			ochastic models can be applied to the st						
Pre-requisites		TAT2901; and	conded models out be applied to the st	aa, or roar me prioriomena					
(and Co-requisites		,	assed in MATH3603, or have already er	arolled in this course: and					
and Impermissible			assed in MATT13003, or have already en						
combinations)		Actuarial Science) s		rolled in this course, and					
Offer in 2019 - 2020	-	sem Offer in 20	•	Examination	May				
Grade Descriptors	A 2110		gh mastery at an advanced level of extensive k		,				
(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.								
	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.								
Course Type	Lecture-b	ased course							
Course Teaching	Activitie	S	Details		No. of Hours				
Learning Activities	Lectures				36				
J	Tutorials								
		/ Self study							
Assessment Methods 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				
	Examina	tion	One 3-hour written examination	75	CLO 1,2,3				
Required/recommended reading and	S. M. Ross: Introduction to Probability Models (9th edition)								
online materials									

STAT3904	Corporate finance for actuarial science (6 credits)	Academic Year	2019

Offering Department	Statistics	Statistics & Actuarial Science Quota						
Course Co-ordinator	Dr D Lee	Dr D Lee, Statistics & Actuarial Science (leedav@hku.hk)						
Teachers Involved	(Dr D Lee	e,Statistics & Actuarial S	cience)					
Course Objectives	Finance principles	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	covered imeasures important pricing m	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 asset 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 succe	essful completion of this	course, students should be able to:					
Outcomes			nancial manager and the financial de		ation			
		•	and future values in calculating the v					
		•	ance using various investment criteria		•			
			ce portfolio theory, capital asset prici	0 .				
			considered by a company when d ct of financial leverage and long/shor					
	CLO 6 d	escribe the various form	s of market efficiency	-				
	CLO 7 c	alculate the value of opti	ions using the binomial option pricing	j model				
Pre-requisites			902) or (Pass in STAT3610 and STA					
(and Co-requisites	Not for st	udents who have passe	d in FINA1310, or have already enro	lled in this course.				
and Impermissible								
combinations)								
Offer in 2019 - 2020		d sem Offer in 2020 - 2		Examination	May			
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 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. Lacl 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.							
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			
	Assignm	ents	Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3,4,5,6,7			
	Examina	tion	One 3-hour written examination	75	CLO 1,2,3,4,5,6,7			
•			Corporate Finance (McGraw-Hill, 20	17, 12th edition)				
reading and online materials		•	(Pearson, 2017, 4th edition) sets (Pearson, 2013, 3rd edition)					
Course Website		odle.hku.hk	. , ., ., .,					

STAT3905	Introduc	tion to financia	l derivatives (6 cr	edits)	Academic Year	2019			
Offering Department	Statistics	Statistics & Actuarial Science Quota							
Course Co-ordinator	Dr K C Ch	eung, Statistics & A	Actuarial Science (kc	cg@hku.hk)					
Teachers Involved	(Dr K C C	neung,Statistics & A	Actuarial Science)						
Course Objectives				of the fundamental concepts ne no-arbitrage principle.	of financial deriva	itives. Emphases			
Course Contents & Topics				options; put options; equity y swaps; interest rate swaps;		ads and collars;			
Course Learning	On succes	ssful 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 (and Co-requisites and Impermissible combinations)	Not for stu Not for stu		ssed in FINA2322, o	or have already enrolled in this r have already enrolled in this					
Offer in 2019 - 2020	Y 1st	sem Offer in 2020	0 - 2021 : Y		Examination	Dec			
Grade Descriptors (A+ to F)	A	learning outcomes. Si	now strong analytical and	d level of extensive knowledge and critical abilities and logical thinking, vex, familiar and unfamiliar situations.	vith evidence of origina	al thought, and ability			
	В			ange of knowledge and skills require and critical abilities and logical thinkir					

		and some unfamiliar situati	ons. Apply effective organizational and pres	sentational 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	Show evidence of some co	nited command of knowledge and skills requirement and logical thinking, but with limited ins. Apply limited or barely effective organizations.	analytical and critical abilities. Sh			
	Fail Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply know problems. Organization and presentational skills are minimally effective or ineffective.						
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	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments		Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3		
	Examina	Examination One 3-hour written examination 75 CLO 1,2,3					
Required/recommended reading and online materials	McDonald	d, R. L.: Derivatives Mar	kets (Addison Wesley, 2012, 3rd e	dition), Chapters 1-5, 7-9st			
Course Website	http://mod	odle.hku.hk					

STAT3906	Risk theory I (6 credits) Statistics & Actuarial Science Quota				'ear 2019				
Offering Department	Statistics 8								
Course Co-ordinator	Dr K C Ch	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	stochastic processes to insurance problems such as the premium calculation.							
Course Contents & Topics	Severity m	Severity models; frequency models; collective risk models; coverage modifications; risk measures.							
Course Learning	On succes	n successful completion of this course, students should be able to:							
Outcomes		derstand the indi pectation of the tot	vidual risk model and the collecti al claim amounts	ve risk model, evaluate	the distribution and				
		timate the premiur nounts made in pre	m of a policyholder and the total cla	aim amounts using the info	rmation of the claim				
			nonly used risk measures and explair	their use and limitation					
Pre-requisites			ly enrolled in this course; or	. aren des and miniaten					
(and Co-requisites and Impermissible		ATH3603 or STAT							
combinations) Offer in 2019 - 2020	Y 1st	sem Offer in 202	0 2021 · V	Examinatio	n 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.								
	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.								
Course Type	Lecture-ba	ased course	'						
Course Teaching	Activities	,	Details		No. of Hours				
& Learning Activities	Lectures				36				
•	Tutorials								
	Reading /	Self study			12 100				
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				
	Examinati	ion	One 3-hour written examinatio	n 75	CLO 1,2,3				
reading and		CLO 1,2,3 Clugman S. A., Panjer H. H., & Willmot G. E.: Loss Models: From Data to Decisions (John Wiley & Sons, 2012, 4th edition)							
online materials									

STAT3907	Linear models and forecasting (6 credits) Academic Year 2019					
Offering Department	Statistics & Actuarial Science	Quota				
Course Co-ordinator	Dr J T Y Wong, Statistics & Actuarial Science (jefftywong@hku.hk)					
Teachers Involved	(Dr J T Y Wong, Statistics & Actuarial Science)					
Course Objectives	This course deals with applied statistical methods of linear models and investigates various forecasting procedures					

Course Contents		through using linear models and time series analysis. Regression and multiple linear regression; predicting; time series models including autoregressive, movin						
& Topics		•	average and integrated models; forecast	· ·	J · · · · · · · · · · · · · · · ·			
Course Learning	On succe	ssful completion of this	course, students should be able to:					
Dutcomes	CLO 1	fit a simple or multiple	e linear regression model to real data					
	CLO 2	CLO 2 do ANOVA analysis						
	CLO 3 identify and fit a suitable AR, MA or ARMA model to real data							
	CLO 4	CLO 4 perform residual analysis						
	CLO 5	do forecasting with the	nese fitted models					
Pre-requisites (and Co-requisites and Impermissible combinations)	Not for stu Not for stu Not for stu	ass in STAT2602 or STAT3902, or already enrolled in this course; and ot for students who have passed in STAT3600, or have already enrolled in this course; and ot for students who have passed in STAT4601, or have already enrolled in this course; and ot for students who have passed in ECON2280, or have already enrolled in this course; and or BSc(Actuarial Science) students only.						
Offer in 2019 - 2020		sem Offer in 2020 - 2	Examination	May				
Grade Descriptors (A+ to F)					nal thought, and ability			
	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.							
	D	Demonstrate partial but lim	ited accommend of Ironiviladae and alcilla required	I for attaining some of the sour				
		Show evidence of some col	ited command of knowledge and skills required herent and logical thinking, but with limited analy ns. Apply limited or barely effective organizations	ytical and critical abilities. Show				
	Fail	Show evidence of some col knowledge to solve problem Demonstrate little or no evidence of analytical and critical al	herent and logical thinking, but with limited analy	ytical and critical abilities. Show al and presentational skills. uired for attaining the course lea very little or no ability to apply	/ limited ability to appl arning outcomes. Lac			
Course Type	Fail	Show evidence of some col knowledge to solve problem Demonstrate little or no evidence of analytical and critical al	herent and logical thinking, but with limited analy s. Apply limitled or barely effective organizations dence of command of knowledge and skills requ bilities, logical and coherent thinking. Show v	ytical and critical abilities. Show al and presentational skills. uired for attaining the course lea very little or no ability to apply	/ limited ability to appl arning outcomes. Lac			
	Fail	Show evidence of some col knowledge to solve problem Demonstrate little or no evi of analytical and critical ai problems. Organization and ased course	herent and logical thinking, but with limited analy s. Apply limitled or barely effective organizations dence of command of knowledge and skills requ bilities, logical and coherent thinking. Show v	ytical and critical abilities. Show al and presentational skills. uired for attaining the course lea very little or no ability to apply	/ limited ability to appl arning outcomes. Lac			
Course Teaching	Fail Lecture-b	Show evidence of some col knowledge to solve problem Demonstrate little or no evi of analytical and critical ai problems. Organization and ased course	herent and logical thinking, but with limited analyse. Apply limited or barely effective organizations dence of command of knowledge and skills requibilities, logical and coherent thinking. Show vor presentational skills are minimally effective or in	ytical and critical abilities. Show al and presentational skills. uired for attaining the course lea very little or no ability to apply	vilmited ability to appl arning outcomes. Lac y knowledge to solve			
Course Teaching	Fail Lecture-b Activities	Show evidence of some col knowledge to solve problem Demonstrate little or no evi of analytical and critical ai problems. Organization and ased course	herent and logical thinking, but with limited analyse. Apply limited or barely effective organizations dence of command of knowledge and skills requibilities, logical and coherent thinking. Show vor presentational skills are minimally effective or in	ytical and critical abilities. Show al and presentational skills. uired for attaining the course lea very little or no ability to apply	v limited ability to appl arning outcomes. Lac y knowledge to solve No. of Hours			
Course Type Course Teaching & Learning Activities	Fail Lecture-b Activities Lectures Tutorials	Show evidence of some col knowledge to solve problem Demonstrate little or no evi of analytical and critical ai problems. Organization and ased course	herent and logical thinking, but with limited analyse. Apply limited or barely effective organizations dence of command of knowledge and skills requibilities, logical and coherent thinking. Show vor presentational skills are minimally effective or in	ytical and critical abilities. Show al and presentational skills. uired for attaining the course lea very little or no ability to apply	v limited ability to appl arning outcomes. Lac y knowledge to solve No. of Hours 36			
Course Teaching	Fail Lecture-b Activities Lectures Tutorials	Show evidence of some colknowledge to solve problem Demonstrate little or no evior of analytical and critical all problems. Organization and assed course S / Self study	herent and logical thinking, but with limited analyse. Apply limited or barely effective organizations dence of command of knowledge and skills requibilities, logical and coherent thinking. Show vor presentational skills are minimally effective or in	ytical and critical abilities. Show al and presentational skills. uired for attaining the course lea very little or no ability to apply	vilimited ability to apply arning outcomes. Lack y knowledge to solve to so			
Course Teaching & Learning Activities Assessment Methods	Fail Lecture-b Activities Lectures Tutorials Reading	Show evidence of some colknowledge to solve problem Demonstrate little or no evide of analytical and critical a problems. Organization and ased course S / Self study	herent and logical thinking, but with limited analys. Apply limited or barely effective organizations dence of command of knowledge and skills requibilities, logical and coherent thinking. Show of presentational skills are minimally effective or in the process of the process	ytical and critical abilities. Show al and presentational skills. uired for attaining the course leavery little or no ability to apply neffective. Weighting in final	No. of Hours 36 12 100 Assessment Methods to CLO			
Course Teaching & Learning Activities Assessment Methods	Fail Lecture-b Activities Lectures Tutorials Reading Methods	Show evidence of some colknowledge to solve problem Demonstrate little or no evide of analytical and critical all problems. Organization and assed course S / Self study	herent and logical thinking, but with limited analys. Apply limited or barely effective organizations dence of command of knowledge and skills requibilities, logical and coherent thinking. Show of presentational skills are minimally effective or in the command of the command	ytical and critical abilities. Show al and presentational skills. uired for attaining the course leavery little or no ability to apply neffective. Weighting in final course grade (%)	No. of Hours 36 12 100 Assessment Methods to CLO Mapping			
Course Teaching & Learning Activities Assessment Methods and Weighting	Fail Lecture-b Activities Lectures Tutorials Reading Methods Assignment	Show evidence of some colknowledge to solve problem Demonstrate little or no evide of analytical and critical all problems. Organization and assed course S // Self study	herent and logical thinking, but with limited analys. Apply limited or barely effective organizations dence of command of knowledge and skills requibilities, logical and coherent thinking. Show of presentational skills are minimally effective or in the command of the command	ytical and critical abilities. Show al and presentational skills. uired for attaining the course leavery little or no ability to apply neffective. Weighting in final course grade (%)	No. of Hours 36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5			
Course Teaching & Learning Activities Assessment Methods	Fail Lecture-b Activities Lectures Tutorials Reading Methods Assignme Examinat Pindyck, Irwin/McG Draper, N Cryer, J.I. Springer.	Show evidence of some colknowledge to solve problem Demonstrate little or no evid of analytical and critical al problems. Organization and ased course S / Self study ents tion R.S. and Rubinfeld, D.I. Graw-Hill. R. and Smith, H. (1998 D. and Chan, K.S. (200 W. (2010). Regression	herent and logical thinking, but with limited analys. Apply limited or barely effective organizations dence of command of knowledge and skills require bilities, logical and coherent thinking. Show of presentational skills are minimally effective or in the command of the comma	wical and critical abilities. Show al and presentational skills. Sirved for attaining the course leavery little or no ability to apply neffective. Weighting in final course grade (%) 25 75 Economic Forecasts, Fou Edition, New York: Wileyications in R, Second Editions	No. of Hours 36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5 rth Edition, New York			

STAT3908	Credibil	ity theory and loss distributions (6 credits)	Academic Year	2019				
Offering Department	Statistics	& Actuarial Science	Quota					
Course Co-ordinator	Dr A G Be	enchimol, Statistics & Actuarial Science (benchi@hku.hk)						
Teachers Involved	(Dr A G B	Senchimol, Statistics & Actuarial Science)						
Course Objectives	calculation particular	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	constructi determina	Limited fluctuation approach; Buhlman's approach; Bayesian approach; empirical Bayes parameter estimations; construction and selection of parametric models; properties and estimation of failure time and loss distributions, determination of the acceptability of a fitted model; comparison of fitted models; simulation of both discrete and continuous random variables.						
Course Learning	On successful completion of this course, students should be able to:							
Outcomes	CLO 1 apply limited fluctuation (classical) credibility including criteria for both full and partial credibility							
	CLO 2 perform Bayesian analysis using both discrete and continuous models							
	CLO 3 apply Buhlmann and Buhlmann-Straub models and understand the relationship of these to the Bayesian model							
	CLO 4 apply conjugate priors in Bayesian analysis and in particular the Poisson-gamma model							
	CLO 5 apply empirical Bayesian methods in the nonparametric and semiparametric cases							
	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 2019 - 2020	Y 2nd	d sem Offer in 2020 - 2021 : Y	Examination	May				
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive knowledglearning outcomes. Show strong analytical and critical abilities and logical thir to apply knowledge to a wide range of complex, familiar and unfamiliar situ presentational skills.	nking, with evidence of origination	al 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. 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 lifamiliar situations. Apply moderately effective organizational and presentational skills.					
	D		erent and logical thinking,	but with limited ana	d for attaining some of the co lytical and critical abilities. She al and presentational skills.		
	Fail		ilities, logical and coherer	nt thinking. Show	uired for attaining the course very little or no ability to ap ineffective.		
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		Coursework (ass tutorials, and a class	ignments, test)	25	CLO 1,2,3,4,5,6,7	
	Examination		One 3-hour written e	xamination	75	CLO 1,2,3,4,5,6,7	
Required/recommended reading and online materials	Klugman S edition).	S. A., Panjer H. H., & Wi	llmot G. E.: Loss Mod	lels: From Data	to Decisions (John Wile	ey & Sons, 2010, 4th	
Course Website	http://mood	dle.hku.hk					

Offering Department Course Co-ordinator Teachers Involved Course Objectives Thi app Course Contents & Topics Course Learning Outcomes CL CL CL CL Pre-requisites State Course Learning CL CL CL CL Pre-requisites State (Dr Cr	plications of more advanced its course is a continuation as random variable; policy variable. LO 1 calculate policy values incorporate expenses insurances and annuiti LO 3 calculate probabilities analyze multiple decredecrements LO 5 analyze multiple life multiple of explain the concept of ass in STAT3901, or already or BSc(Actuarial Science) studies.	al Science (leedav@hku.hk) al Science) cing some topics in non-traditional life id theories of life contingencies. of the materials covered in STAT3901. Whalues; expenses and asset shares; multiple his course, students should be able to: is for life insurances and annuities in gross premium and calculate policy values and actuarial present values under the multiple ment models and calculate the life insurances and profit testing if enrolled in this course; and udents only.	e shall discuss the follor e state models and their lues based on the gross tiple state model framev icces and annuities in mo	will be placed on wing topics: future applications; profil s premium for life work odels with multiple h multiple lives	
Course Co-ordinator Teachers Involved Course Objectives Course Contents & Topics Course Learning Outcomes Col CL	D Lee, Statistics & Actuaria r D Lee, Statistics & Actuaria r D Lee, Statistics & Actuaria is course aims at introduc plications of more advanced is course is a continuation is random variable; policy va- sting. In successful completion of the LO 1 calculate policy values LO 2 incorporate expenses insurances and annuiti LO 3 calculate probabilities analyze multiple decre decrements LO 5 analyze multiple life multiple of explain the concept of ass in STAT3901, or already or BSc(Actuarial Science) stu-	al Science) cing some topics in non-traditional life id theories of life contingencies. of the materials covered in STAT3901. Whalues; expenses and asset shares; multiple his course, students should be able to: is for life insurances and annuities in gross premium and calculate policy values and actuarial present values under the multiplement models and calculate the life insurances and profit testing remodels in this course; and udents only.	insurance. Emphasis we shall discuss the follow state models and their lues based on the grostitiple state model frameworces and annuities in models with	wing topics: future applications; profi s premium for life work odels with multiple h multiple lives	
Teachers Involved (Dr Course Objectives Thi approximate approximat	r D Lee, Statistics & Actuaria is course aims at introduce is course is a continuation of the course in successful completion of the course in successful completion of the course in calculate policy values in calculate policy values in calculate probabilities in calculate probabilities analyze multiple decredecrements LO 5 analyze multiple life multiple of explain the concept of its in STAT3901, or already or BSc(Actuarial Science) students	al Science) cing some topics in non-traditional life id theories of life contingencies. of the materials covered in STAT3901. Whalues; expenses and asset shares; multiple his course, students should be able to: is for life insurances and annuities in gross premium and calculate policy values and actuarial present values under the multiplement models and calculate the life insurances and profit testing remodels in this course; and udents only.	e shall discuss the follor e state models and their lues based on the gross tiple state model framewaces and annuities in models with	wing topics: future applications; profi s premium for life work odels with multiple h multiple lives	
Course Objectives Course Contents Thi App Course Contents Thi Source Course Learning On CL CL CL CL CL CL CL CCL CCL CCL CCL C	sis course aims at introduce plications of more advanced in scourse is a continuation of string. In successful completion of the LO 1 calculate policy values LO 2 incorporate expenses insurances and annuiting LO 3 calculate probabilities analyze multiple decrements LO 4 analyze multiple decrements LO 5 analyze multiple life multiple of explain the concept of ass in STAT3901, or already or BSc(Actuarial Science) students	cing some topics in non-traditional life of theories of life contingencies. of the materials covered in STAT3901. We alues; expenses and asset shares; multiple his course, students should be able to: of or life insurances and annuities in gross premium and calculate policy varies and actuarial present values under the multiplement models and calculate the life insurances and profit testing renrolled in this course; and udents only.	e shall discuss the follor e state models and their lues based on the gross tiple state model framewaces and annuities in models with	wing topics: future applications; profi s premium for life work odels with multiple h multiple lives	
Course Contents & Topics Course Learning Outcomes CL CL CL CL CL CL CL Cu CL	nis course is a continuation of seriandom variable; policy vasting. n successful completion of the LO 1 calculate policy values LO 2 incorporate expenses insurances and annuiti LO 3 calculate probabilities analyze multiple decrements LO 4 analyze multiple life manual LO 6 explain the concept of lass in STAT3901, or already or BSc(Actuarial Science) students.	of the materials covered in STAT3901. Walues; expenses and asset shares; multiple his course, students should be able to: for life insurances and annuities in gross premium and calculate policy values and actuarial present values under the multiment models and calculate the life insurances and profit testing renrolled in this course; and udents only.	lues based on the grost tiple state model framewonces and annuities in models with	applications; profi s premium for life work odels with multiple h multiple lives	
& Topics loss tes Course Learning On CL CL CL CL CL CL CL CL CL CCL CL CCL C	ss random variable; policy vasting. n successful completion of the LO 1 calculate policy values LO 2 incorporate expenses insurances and annuiting LO 3 calculate probabilities analyze multiple decredecrements LO 5 analyze multiple life materials in STAT3901, or already or BSc(Actuarial Science) students	alues; expenses and asset shares; multiple his course, students should be able to: so for life insurances and annuities in gross premium and calculate policy varies and actuarial present values under the multiment models and calculate the life insurances and profit testing enrolled in this course; and udents only.	lues based on the grost tiple state model framewonces and annuities in models with	applications; profi s premium for life work odels with multiple h multiple lives	
Outcomes CL	LO 1 calculate policy values LO 2 incorporate expenses insurances and annuiti LO 3 calculate probabilities analyze multiple decre decrements LO 5 analyze multiple life m LO 6 explain the concept of ass in STAT3901, or already or BSc(Actuarial Science) stu	s for life insurances and annuities in gross premium and calculate policy values and actuarial present values under the multiment models and calculate the life insuranced and profit testing venrolled in this course; and udents only.	tiple state model framev nces and annuities in mo annuities in models with	vork odels with multiple h multiple lives	
CL CL CL CL CL CL Cu CL CL Cu CL CL Cu CL Cu	LO 2 incorporate expenses insurances and annuiti LO 3 calculate probabilities analyze multiple decredecrements LO 5 analyze multiple life multiple explain the concept of ass in STAT3901, or already or BSc(Actuarial Science) students	in gross premium and calculate policy values and actuarial present values under the mulement models and calculate the life insuranced and profit testing a carrolled in this course; and udents only.	tiple state model framev nces and annuities in mo annuities in models with	vork odels with multiple h multiple lives	
CL C	LO 4 analyze multiple decred decrements LO 5 analyze multiple life multiple of explain the concept of ass in STAT3901, or already or BSc(Actuarial Science) students	ement models and calculate the life insurar nodels and calculate the life insurances and profit testing renrolled in this course; and udents only.	nces and annuities in mo	odels with multiple	
CL CL CL CL Pre-requisites and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	decrements LO 5 analyze multiple life manalyze manalyze manalyze manalyze multiple multiple manalyze multiple manalyze multiple manalyze multiple multiple manalyze multiple	odels and calculate the life insurances and profit testing enrolled in this course; and udents only.	annuities in models with	h multiple lives	
Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	LO 5 analyze multiple life m LO 6 explain the concept of ass in STAT3901, or already or BSc(Actuarial Science) stu	profit testing renrolled in this course; and udents only. 0 - 2021 : Y			
Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	ass in STAT3901, or already or BSc(Actuarial Science) stu 2nd sem Offer in 2020	renrolled in this course; and udents only.	Examination		
Offer in 2019 - 2020 Y Grade Descriptors (A+ to F)			Examination		
Grade Descriptors (A+ to F)				May	
В	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.				
	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 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.				
Fa	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. Organizational and presentational skills are minimally effective or ineffective.				
	cture-based course				
	ctivities	Details		No. of Hours	
-	ectures			36	
	utorials			12	
	eading / Self study			100	
Assessment Methods and Weighting	ethods	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
	ssignments	Coursework (assignments, tutorials, a computer-based assessment and a class test)	25	CLO 1,2,3,4,5,6	
	xamination	One 3-hour written examination	75	CLO 1,2,3,4,5,6	
reading and Dic		Mathematics (Society of Actuaries, 1997, 2 rial Mathematics for Life Contingent Risks	,	Press, 2013, 2nd	

STAT3910	Financial	l economics I (6 cre	dits)	Academic Year	2019		
Offering Department	Statistics &	Actuarial Science		Quota			
Course Co-ordinator	Prof H L Ya	ang, Statistics & Actuaria	al Science (hlyang@hku.hk)				
Teachers Involved	(Prof H L Y	'ang,Statistics & Actuari	al Science)				
Course Objectives	estimation, ideas and r	and Black-Scholes form methods.	on the derivative market. The course a mula and its variations. The course a	llso includes some basic	risk management		
Course Contents & Topics	time option	-pricing theory; binomia	nerican options; conditional expectat Il model and its Greeks; true probabili a; implied volatility; option Greeks; ma	ties vs. risk-neutral proba	bilities; estimating		
Course Learning	On success	sful completion of this co	ourse, students should be able to:				
Outcomes		culate option price using	•				
	CLO 2 understand the risk neutral probability						
	cor	nditional expectation and	ity theory, include probability space, discrete time martingale	,			
	imp	olied volatility	noles formula and its assumptions,				
		derstand the hedging str derstand exotic options	ategies and portfolio, market-maker r	isk, self-financing portfolio)		
Pre-requisites		AT2602 or STAT3902;					
(and Co-requisites and Impermissible combinations)		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.					
Offer in 2019 - 2020	Y 1st s	sem Offer in 2020 - 20	21 : 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.						
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		
	Assignmer	nts	Coursework (assignments, tutorials, a computer-based assessment and a class test)	25	CLO 1,2,3,4,5,6		
	Examination	on	One 3-hour written examination	75	CLO 1,2,3,4,5,6		
Required/recommended reading and online materials	Lecture not	tes on conditional expec	Markets (2nd edition), Chapters 10-14 etations and martingale her Derivatives (2008, 7th edition)				
Course Website	http://mood		noi Derivatives (2000, 7th edition)				
Course Mensile	111tp.//111000	alc.iru.ir					

STAT3911	Financial economics II (6 credits)	Academic Year	2019				
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 is an advanced course on the option pricing theory. The course covers Black-Scholes equation and stochastic calculus, and interest models.						
Course Contents & Topics	Brownian motion; introduction to stochastic calculus; arithmetic and geometric Brownian motion; Ito formula; Sharpe ratio and risk premium; Black-Scholes equation; risk-neutral stock-price process and option pricing; option's elasticity and volatility; Vasicek, Cox-Ingersoll-Ross, and Black-Derman-Toy models; delta-hedging for bonds and the Sharpe-ratio equality constraint; Black's model; options on zero-coupon bonds; interest-rate caps and caplets.						
Course Learning Outcomes	On successful completion of this course, students should be able to: CLO 1 understand Brownian motion and its properties CLO 2 understand the Ito calculus and Ito formula CLO 3 understand the Black-Scholes model and option pricing theory CLO 4 understand the delta hedging and some basic risk management methods CLO 5 understand some basic interest rate models						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in MATH3603 or STAT3603 or STAT3903 or STAT3910						
Offer in 2019 - 2020	Y 2nd sem Offer in 2020 - 2021 : 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	•					
	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	Show evidence of some coh	ted command of knowledge and skills requi terent and logical thinking, but with limited and s. Apply limited or barely effective organizati	nalytical and critical abilities. Sh			
	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.					
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 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 reading and online materials	John Hull Alison Eth	obert L. McDonald: Derivatives Markets (2nd edition), Chapters 20, 21 and 24. hn Hull: Options, Futures and Other Derivatives (2008, 7th edition) ison Etheridge: A Course in Financial Calculus (2002) even Shreve: Stochastic Calculus for Finance II Continuous-Time Models (2008)					
Course Website	http://mod	://moodle.hku.hk					

STAT3951	Further t	topics in contin	gencies (6 credits)	Academic Yea	r 2019	
Offering Department	Statistics 8	& Actuarial Science		Quota		
Course Co-ordinator	Dr D Lee,	Statistics & Actuari	al Science (leedav@hku.hk)			
Teachers Involved	(Dr D Lee,	Statistics & Actuari	al Science)			
Course Objectives	This cours insurance.		anced stochastic models and actuarial to	echniques used in the field	of life and non-life	
Course Contents & Topics	application	ns of actuarial téch	s of the multiple state model; unit-linked niques to a wide range of insurance prol se products; simple ruin models for non-l	olems; equity-linked life-co		
Course Learning Outcomes	CLO 1 ob de	tain transition pro			e expected state	
	CLO 2 ap	ply the Esscher tra	nsform on probability distributions and st	ochastic processes		
			d insurance products and value them usir			
	CLO 4 va	lue equity-linked de	eath benefits via the discounted density fu	unction		
		preciate the role of surance	of the expected discounted penalty fun	ection in simple risk proce	esses for non-life	
	CLO 6 ev	aluate ruin probabi	lities and related quantities for simple risk	processes		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in S1	Pass in STAT3909; and Pass in STAT3910, or already enrolled in this course; and For BSc(Actuarial Science) students only.				
Offer in 2019 - 2020	Y 1st	sem Offer in 2020	0 - 2021 : 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 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	of analytical and criti	to evidence of command of knowledge and skills re cal abilities, logical and coherent thinking. Show in and presentational skills are minimally effective o	very little or no ability to apply		
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	Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3,4,5,6	
	Examination		One 3-hour written examination	75	CLO 1,2,3,4,5,6	

online materials	CT5 Contingencies Core Technical Core Reading (Institute of Actuaries, 2010) Lecture notes on equity linked insurance products and simple dividend-ruin models.
Course Website	http://moodle.hku.hk

STAT3952	Investn	nent and asset mana	agement (6 credits)	Academic Year	2019		
Offering Department		& Actuarial Science		Quota			
Course Co-ordinator	TBC, Sta	tistics & Actuarial Science	ce ()	'			
Teachers Involved	(TBC,Sta	atistics & Actuarial Science	ce)				
Course Objectives			is to introduce students to some of the				
		· ·	nent portfolio. Emphasis will be place ment strategy formulation and interest		problems faced by		
Course Contents		•	ew on the problems faced by actuari		amental actuarial		
& Topics		•	This course will cover the following Income Portfolios and Performance M	•	agement Process,		
Course Learning	On succe	essful completion of this	course, students should be able to:				
Outcomes			nt policy and an investment strategy ca				
		, ,	a fiduciary in managing investment po				
		lescribe how to select a nvestment strategies for i	an investment strategy for an individ institutional investors	lual and the particular is	ssues influencing		
	CLO 4 e	explain principles of risk-b	pased capital management				
	CLO 5 d	lescribe asset allocation	strategies that can be used to construc	ct an asset portfolio			
	CLO 6 id	dentify and describe finar	ncial and non-financial risks faced by a	n entity			
	it	nvestment policy and stra		. ,			
			nark for a given portfolio or portfolio nt methodologies for investment portfo		cribe and assess		
Pre-requisites		Pass in STAT3901; and					
(and Co-requisites		lot for students who have passed in FINA2320, or have already enrolled in this course; and					
and Impermissible	For BSc(Actuarial Science) stude	nts only.				
combinations)	N O	for in 2020 2024 . N		Eveninetian			
Offer in 2019 - 2020 Grade Descriptors		N Offer in 2020 - 2021 : N Examination					
(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.						
	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						
	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						
		•	d presentational skills are minimally effective or in	neffective.			
Course Type		pased course	In the H		N		
Course Teaching	Activitie		Details	No. of Hours			
& Learning Activities	Lectures			36			
	Tutorials				12		
Accoccment Mathada		/ Self study	Details Weighting in final		100		
Assessment Methods and Weighting	Methods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
			Assignments tutorials/evennle		01.0		
	Assignm	nents	Assignments, tutorials/example classes, group discussions, project and presentation	50			
	Assignm		classes, group discussions, project	50	1,2,3,4,5,6,7,8 CLO		
reading and	Examina D. Babbe Z. Bodie, Crouhy, F. J. Fab	ation el & F. J. Fabozzi: Investr , A. Kane, & A. Marcus: I Galai, & Mark: Risk Mana ozzi: Handbook of Fixed	classes, group discussions, project and presentation One 2-hour written examination ment Management for Insurers (Frank nvestments (McGraw-Hill, 2005, 7th eagement (2001) Income Securities (McGraw-Hill, 2005	50 J. Fabozzi & Assoc., 199 dition) 5, 7th edition)	1,2,3,4,5,6,7,8 CLO 1,2,3,4,5,6,7,8		
reading and online materials	Examina D. Babbe Z. Bodie, Crouhy, F. J. Fab Litterman	ation el & F. J. Fabozzi: Investr , A. Kane, & A. Marcus: I Galai, & Mark: Risk Mana ozzi: Handbook of Fixed n: Modern Investment Ma	classes, group discussions, project and presentation One 2-hour written examination ment Management for Insurers (Frank nvestments (McGraw-Hill, 2005, 7th edagement (2001)	50 J. Fabozzi & Assoc., 199 dition) 5, 7th edition)	1,2,3,4,5,6,7,8 CLO 1,2,3,4,5,6,7,8		
Required/recommended reading and online materials Course Website Additional Course	Examina D. Babbe Z. Bodie, Crouhy, F. J. Fab Littermar	ation el & F. J. Fabozzi: Investr , A. Kane, & A. Marcus: I Galai, & Mark: Risk Mana ozzi: Handbook of Fixed n: Modern Investment Ma odle.hku.hk	classes, group discussions, project and presentation One 2-hour written examination ment Management for Insurers (Frank nvestments (McGraw-Hill, 2005, 7th eagement (2001) Income Securities (McGraw-Hill, 2005	50 J. Fabozzi & Assoc., 1999 dition) 5, 7th edition) 2003)	1,2,3,4,5,6,7,8 CLO 1,2,3,4,5,6,7,8 9)		

STAT3953	Fundamentals of actuarial practice (6 credits) Academic Year 2019						
Offering Department	Statistics & Actuarial Science Quota						
Course Co-ordinator	Dr A G Benchimol, Statistics & Actuarial Science (benchi@hku.hk)						
Teachers Involved	(Dr A G Benchimol, Statistics & Actuarial Science)						
Course Objectives	This course teaches students about the business environment and exposes them to practical real-world situations using the actuarial control cycle as a framework.						
Course Contents & Topics	This course provides an overview on selected materials relating to the following topics: Role of the Professional Actuary, External Forces, Risk in Actuarial Problems, Design and Pricing of Actuarial Solutions. Emphasis will be placed on applications to various financial security programmes including individual life insurance, group insurance, social security plans, retirement plans, investment funds and property and casualty insurance.						

	On succe	sstul completion of	this course, students should be ab	ole to:		
Outcomes	CLO 1 provide introductory description of financial security systems, common actuarial techniques and practical experiences					
	CLO 2 de	escribe actuarial pra	actices, principles, approaches, me	ethods, commonalities, problem	s and solutions	
	CLO 3 e	xplain actuarial prac	ctices across the traditional areas o	of practice		
		xplain actuarial pra	actices as applied directly on beh	nalf of financial security system	n providers or as a	
			in nontraditional and emerging are	as of practice		
			ne specific mathematical and techn		c actuarial courses	
			ssional role as an Associate of the			
Pre-requisites		TAT3909: and		,		
(and Co-requisites and Impermissible combinations)	For BSc(A	Actuarial Ścience) s	tudents only.			
Offer in 2019 - 2020	Y 1st	t sem Offer in 202	0 - 2021 : Y	Examination	No Exam	
Grade Descriptors (A+ to F)	A	learning outcomes. S	th mastery at an advanced level of exten- show strong analytical and critical abilities a to a wide range of complex, familiar and	and logical thinking, with evidence of o	riginal thought, and ability	
	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 family 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. Organizational and presentational skills are minimally effective or ineffective.					
		ased course				
Course Type	Lecture-b					
	Activitie		Details		No. of Hours	
Course Teaching		s	Details		No. of Hours	
Course Teaching	Activitie	S	Details			
Course Teaching	Activities Lectures Project w	S	Details		36	
Course Teaching & Learning Activities Assessment Methods	Activities Lectures Project w	vork / Self study	Details Details	Weighting in final course grade (%)	36 12	
Course Teaching & Learning Activities Assessment Methods	Activities Lectures Project w Reading	vork / Self study			36 12 100 Assessment Methods	
Course Teaching & Learning Activities Assessment Methods	Activities Lectures Project w Reading Methods	vork / Self study s	Details	course grade (%)	36 12 100 Assessment Methods to CLO Mapping	
Course Teaching & Learning Activities Assessment Methods	Activities Lectures Project w Reading Methods	vork / Self study s	Details oral presentation	course grade (%)	36 12 100 Assessment Methods to CLO Mapping CLO 4,5,6 CLO 4,5,6,7	
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended reading and online materials	Activitie Lectures Project w Reading Methods Presenta Project re Test Klugman, Bellis, C., Cycle (Ins Brown, F Insurance	vork / Self study stion eports , S.: Understanding , Klugman, S., Shelstitute of Actuaries of R.L. and Gottlieb, le (ACTEX Publication	Details oral presentation written report	course grade (%) 25 50 25 arries, 2012) nding Actuarial Management:	36 12 100 Assessment Methods to CLO Mapping CLO 4,5,6 CLO 4,5,6,7 CLO 1,2,3,4,5,6,7 The Actuarial Control operty and Casualty	

STAT3954	Current topics in actuarial science (6 credits)	Academic Year	2019				
Offering Department	Statistics & Actuarial Science	Quota					
Course Co-ordinator	TBC, Statistics & Actuarial Science ()						
Teachers Involved							
Course Objectives	This course aims at providing practical elements for actuarial students included basic capability to understand, research in and handle the laws as and benefit students in their coming future career.						
Course Contents & Topics	This course covers a full range of topics related to both areas including Actuaries' Legal Thinking.	,	,				
	For Practical Actuarial Practice: It covers the major practical topics in Insurance, it covers the full picture of actuarial control cycle including Reporting and Experience Analysis. For General Insurance, it covers the band Valuation.	g Product Pricing, Val	uation, Financial				
	For Actuaries' Legal Thinking: This is the 7th year of the course and the full start of a new course structure echoing changes in the market for basic legal and general insurance skills for actuaries. Intellectually stimulating recent legal materials with heavy involvement of actuarial and other general insurance expertise would dominate the course, alongside with basic legal research skills and fundamental legal thinking. Sharing of experience from quests from the General Insurance Industry would also infiltrate the course.						
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 have a basic understanding regarding Actuarial Control Cycle from A to Z for Life Insurance and General Insurance						
	CLO 2 possess some experience regarding fundamental actuarial practice through practical project						
	CLO 3 possess basic understanding of the legal system in Hong Kong						
	CLO 4 possess fundamental knowledge in certain core legal aspects such as the law of contract and the law of tort						
	CLO 5 possess fundamental knowledge of the law of insurance						
	CLO 6 conduct elementary legal researches when facing with legal problems						
	CLO 7 understand the basic elements of a routine judgment, the matrix of	the facts and the law ir	volved				
Pre-requisites	Pass in STAT3901, or already enrolled in this course; or						
	Pass in STAT3909, or already enrolled in this course; and						

and Impermissible combinations)	For BSc(Actuarial Science) stude	ents only.			
Offer in 2019 - 2020	N Of	fer in 2020 - 2021 : N			Examination	
Grade Descriptors (A+ to F)	A	learning outcomes. Show	strong analytical and	critical abilities and logical	wledge and skills required for al thinking, with evidence of orig ar situations. Apply highly effec	ginal thought, and ability
	В		evidence of analytical	and critical abilities and le	skills required for attaining at logical thinking, and ability to aptational skills.	
	С		of some analytical	and critical abilities and l	Ils required for attaining most ogical thinking, and ability to a ational 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		abilities, logical and	coherent thinking. Show	equired for attaining the course very little or no ability to apprint rineffective.	
Course Type	Lecture-b	pased course				
Course Teaching	Activitie	Activities		Details		No. of Hours
& Learning Activities	Lectures					36
	Tutorials	,				12
	Reading / Self study					100
Assessment Methods and Weighting	Methods	S	Details		Weighting in final course grade (%)	Assessment Methods to CLO Mapping
	Assignm	nents	Coursework practical proje	(assignments, ct & class test(s))	100	CLO 1,2,3,4,5,6,7
Course Website	1	odle.hku.hk				

STAT3955	Surviva	l analysis (6 credi	ts)	Academic Ye	ar 2019		
Offering Department	Statistics	& Actuarial Science	•	Quota			
Course Co-ordinator	Dr J F Xu	Dr J F Xu, Statistics & Actuarial Science (xujf@hku.hk)					
Teachers Involved	(Dr J F Xu,Statistics & Actuarial Science)						
Course Objectives	This course is concerned with how models which predict the survival pattern of humans or other entities are						
	established. This exercise is sometimes referred to as survival-model construction.						
Course Contents & Topics	include: t commonl survival of from pos- kernel de means of	The nature and properties of parametric and nonparametric survival models will be studied. Topics to be covered include: the introduction of some important basic quantities like the hazard function and survival function; some commonly used parametric survival models; concepts of censoring and/or truncation; parametric estimation of the survival distribution by maximum likelihood estimation method; nonparametric estimation of the survival functions from possibly censored samples by means of the Kaplan-Meier estimator, the Nelson-Aalen estimator; and the kernel density estimator or the Ramlau-Hansen estimator and comparisons of k independent survival functions by means of the generalized log-rank test; parametric regression models; Cox's semiparametric proportional hazards regression model; and multivariate survival analysis.					
Course Learning	On succe	ssful completion of thi	s course, students should be able to:				
Outcomes	CLO 2 p m CLO 3 a	oncept of death and lif erform estimation for nechanisms nalyze survival data us	tanding of the nature of failure time do e r some commonly used survival mo sing the Cox's semiparametric proportion to a multivariate setup to accommodat	odels under different ty	rpes of censoring		
Pre-requisites			enrolled in this course; or	e mainvariate sarvivar de	itu		
(and Co-requisites and Impermissible combinations)	Pass in S	STAT3600 or STAT390	n1				
Offer in 2019 - 2020		d sem Offer in 2020		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 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 critical	evidence of command of knowledge and skills re I abilities, logical and coherent thinking. Show and presentational skills are minimally effective o	very little or no ability to ap			
	Lecture-b	ased course					
Course Type	Activitie	S	Details		No. of Hours		
	Lectures				36		
Course Teaching	Lectures						
Course Teaching	Lectures Tutorials				12		
Course Teaching	Tutorials				12 100		
Course Teaching & Learning Activities Assessment Methods	Tutorials	/ Self study	Details	Weighting in final course grade (%)	100 Assessment Methods		
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	Tutorials Reading	/ Self study	Details Coursework (assignments, tutorials, and a class test)		100 Assessment		

online materials	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	

STAT3956	Pension	n funds and pension	mathematics (6 credits)	Academic Yea	ar 2019		
Offering Department	Statistics	& Actuarial Science	· ·	Quota			
Course Co-ordinator	Prof G Ma	a, Statistics & Actuarial S	Science (gma328@hku.hk)				
Teachers Involved	(Prof G M	la,Statistics & Actuarial S	Science)				
Course Objectives	of pension	This course covers the basics of pension plan design and pension fund management, as well as the fundamentals of pension plan valuations using different actuarial cost methods. The students will be introduced to the application of actuarial valuation techniques to the funding and accounting of pension plans.					
Course Contents & Topics	obligation	he following topics will be covered: Fundamentals of private pension plans; pricing and valuation of pension bligations; actuarial cost methods and their effects on cost patterns; selection of actuarial assumptions; principles f asset and liability management.					
Course Learning	On succe	ssful completion of this c	course, students should be able to:				
Outcomes	CLO 1	calculate the pension be	enefits in accordance with the provisi	ons of a pension plan			
	CLO 2	calculate the normal cos	st and actuarial liabilities using differe	ent actuarial cost methods			
	CLO 3	perform gain and loss ar	nalyses for pension valuations				
	CLO 4	select appropriate assun	mptions and methods for funding or a	accounting purposes			
		•	sults presented in actuarial valuation				
	CLO 6	understand the principles	s of asset and liability modeling as r	elated to pension plans			
Pre-requisites (and Co-requisites and Impermissible combinations)		TAT3909; and Actuarial Science) studer	nts only.				
Offer in 2019 - 2020	Y 1st	sem Offer in 2020 - 20	021 : Y	Examination	Dec		
Grade Descriptors	Α			wledge and skills required for a	attaining all the course		
(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.					
	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.						
					oply knowledge to most		
	D	familiar situations. Apply mo Demonstrate partial but limi Show evidence of some coh knowledge to solve problem	derately effective organizational and present ited command of knowledge and skills requii nerent and logical thinking, but with limited ar is. Apply limited or barely effective organization	ational skills. red for attaining some of the counalytical and critical abilities. Sho conal and presentational skills.	urse learning outcomes. w limited ability to apply		
	D Fail	familiar situations. Apply mo Demonstrate partial but limi Show evidence of some coh knowledge to solve problem Demonstrate little or no evid of analytical and critical at	oderately effective organizational and present ited command of knowledge and skills requin nerent and logical thinking, but with limited ar	ational skills. red for attaining some of the counalytical and critical abilities. Shoonal and presentational skills. equired for attaining the course law yery little or no ability to app	urse learning outcomes. w limited ability to apply earning outcomes. Lack		
	Fail	familiar situations. Apply mo Demonstrate partial but limi Show evidence of some coh knowledge to solve problem Demonstrate little or no evid of analytical and critical at	oderately effective organizational and present itled command of knowledge and skills requin- berent and logical thinking, but with limited ar is. Apply limited or barely effective organization dence of command of knowledge and skills re bilities, logical and coherent thinking. Show	ational skills. red for attaining some of the counalytical and critical abilities. Shoonal and presentational skills. equired for attaining the course law yery little or no ability to app	urse learning outcomes. w limited ability to apply earning outcomes. Lack		
Course Teaching	Fail	familiar situations. Apply mo Demonstrate partial but limi Show evidence of some col- knowledge to solve problem Demonstrate little or no evid of analytical and critical at problems. Organization and lased course	oderately effective organizational and present itled command of knowledge and skills requin- berent and logical thinking, but with limited ar is. Apply limited or barely effective organization dence of command of knowledge and skills re bilities, logical and coherent thinking. Show	ational skills. red for attaining some of the counalytical and critical abilities. Shoonal and presentational skills. equired for attaining the course law yery little or no ability to app	urse learning outcomes. w limited ability to apply earning outcomes. Lack		
Course Teaching	Fail Lecture-b	familiar situations. Apply mo Demonstrate partial but limi Show evidence of some col- knowledge to solve problem Demonstrate little or no evid of analytical and critical at problems. Organization and assed course S	derately effective organizational and present ited command of knowledge and skills requirerent and logical thinking, but with limited ar is. Apply limited or barely effective organization dence of command of knowledge and skills rebilities, logical and coherent thinking. Show presentational skills are minimally effective or the contraction of the contra	ational skills. red for attaining some of the counalytical and critical abilities. Shoonal and presentational skills. equired for attaining the course law yery little or no ability to app	urse learning outcomes. w limited ability to apply earning outcomes. Lack bly knowledge to solve		
Course Teaching	Fail Lecture-b Activities	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 ab problems. Organization and tassed course	derately effective organizational and present ited command of knowledge and skills requirerent and logical thinking, but with limited ar is. Apply limited or barely effective organization dence of command of knowledge and skills rebilities, logical and coherent thinking. Show presentational skills are minimally effective or the contraction of the contra	ational skills. red for attaining some of the counalytical and critical abilities. Shoonal and presentational skills. equired for attaining the course law yery little or no ability to app	urse learning outcomes. w limited ability to apply earning outcomes. Lack sly knowledge to solve No. of Hours 36 12		
Course Teaching	Fail Lecture-b Activities Lectures Tutorials	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 ab problems. Organization and tassed course	derately effective organizational and present ited command of knowledge and skills requirerent and logical thinking, but with limited ar is. Apply limited or barely effective organization dence of command of knowledge and skills rebilities, logical and coherent thinking. Show presentational skills are minimally effective or the contraction of the contra	ational skills. red for attaining some of the counalytical and critical abilities. Shoonal and presentational skills. equired for attaining the course law yery little or no ability to app	urse learning outcomes. w limited ability to apply earning outcomes. Lack bly knowledge to solve No. of Hours 36		
Course Teaching & Learning Activities Assessment Methods	Fail Lecture-b Activities Lectures Tutorials	familiar situations. Apply mo Demonstrate partial but limi Show evidence of some col- knowledge to solve problem Demonstrate little or no evid of analytical and critical ab- problems. Organization and cased course S / Self study	derately effective organizational and present ited command of knowledge and skills requirerent and logical thinking, but with limited ar is. Apply limited or barely effective organization dence of command of knowledge and skills rebilities, logical and coherent thinking. Show presentational skills are minimally effective or the contraction of the contra	ational skills. red for attaining some of the counalytical and critical abilities. Shoonal and presentational skills. equired for attaining the course law yery little or no ability to app	urse learning outcomes. w limited ability to apply earning outcomes. Lack sly knowledge to solve No. of Hours 36 12		
Course Teaching & Learning Activities Assessment Methods	Fail Lecture-b Activities Lectures Tutorials Reading	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 problems. Organization and tassed course S / Self study	derately effective organizational and present ited command of knowledge and skills requinerent and logical thinking, but with limited ar is. Apply limited or barely effective organization of command of knowledge and skills rebilities, logical and coherent thinking. Show presentational skills are minimally effective of Details Details Details Coursework (assignments, tutorials, and a class test)	ational skills. red for attaining some of the counalytical and critical abilities. Sho onal and presentational skills. equired for attaining the course law very little or no ability to apport ineffective. Weighting in final course grade (%)	In the control of the		
Course Type Course Teaching & Learning Activities Assessment Methods and Weighting	Fail Lecture-b Activitie: Lectures Tutorials Reading Methods Assignme	familiar situations. Apply mo Demonstrate partial but limi Show evidence of some col- knowledge to solve problem Demonstrate little or no evid of analytical and critical at problems. Organization and assed course S / Self study defents sents	derately effective organizational and present ited command of knowledge and skills requinerent and logical thinking, but with limited ar is. Apply limited or barely effective organization of command of knowledge and skills rebitities, logical and coherent thinking. Show presentational skills are minimally effective of Details Details Details Coursework (assignments, tutorials, and a class test) One 3-hour written examination	ational skills. red for attaining some of the counalytical and critical abilities. Sho and and presentational skills. equired for attaining the course law very little or no ability to apport ineffective. Weighting in final course grade (%) 25 75	w limited ability to apply earning outcomes. Lack limited ability to apply earning outcomes. Lack limited in the service of th		
Course Teaching & Learning Activities Assessment Methods and Weighting	Fail Lecture-b Activitie Lectures Tutorials Reading Methods Assignme Examina Arthur W. McGill, D. William H. Morneau Actuarial Actuarial Measurine Actuarial David Fail Cost Mett 2001 Sup	familiar situations. Apply mo Demonstrate partial but limi Show evidence of some col- knowledge to solve problem Demonstrate little or no evid of analytical and critical at problems. Organization and lassed course s / Self study and the self s	derately effective organizational and present ited command of knowledge and skills requinerent and logical thinking, but with limited ar is. Apply limited or barely effective organization of command of knowledge and skills rebilities, logical and coherent thinking. Show presentational skills are minimally effective of Details Details Details Coursework (assignments, tutorials, and a class test)	ational skills. red for attaining some of the counalytical and critical abilities. Sho anal and presentational skills. equired for attaining the course leave the counal and presentational skills. equired for attaining the course leave the course grade (were) little or no ability to appoint ineffective. Weighting in final course grade (%) 25 75 dition). of Private Pensions (2010 Valuation, (2nd edition). 1016, 16th Edition) tions for Measuring Pensional Course of Measuring Pensional Course (MSPA). George Matra Course (MSPA).	No. of Hours No. of Hours 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5,6 CLO 1,2,3,4,6 , 9th Edition) On Obligations c Assumptions for No Valuations ay, FSPA: Actuarial		

STAT4601	Time-series analysis (6 credits)	Academic Year	2019
Offering Department	Statistics & Actuarial Science	Quota	
Course Co-ordinator	Dr G Li, Statistics & Actuarial Science (gdli@hku.hk)		
Teachers Involved	(Dr G Li,Statistics & Actuarial Science)		
Course Objectives	A time series consists of a set of observations on a random variable taken over climatology, economics, environment studies, finance and many other discip series are usually correlated; the course establishes a framework to discuss different type of time series, investigates various representations for the process of different forecasting procedures. Students will analyse real time-series data of	lines. The observers this. This courses and studies t	rations in a time se distinguishes
Course Contents & Topics	Stationarity and the autocorrelation functions; linear stationary models; line identification; estimation and diagnostic checking; seasonal models and forecas		
Course Learning	On successful completion of this course, students should be able to:		

Outcomes	CLO 1 re	ecognize a stationary vs i	non-stationary time series				
		•	operties of commonly used time se	eries models such as AR (a	autoregressive), MA		
	(moving average) and ARMA models						
			ime series into stationary ones				
		•	es models based on autocorrelation				
			RMA model to real data using SAS	(after transforming to stati	onarity if necessary)		
		erform goodness of fit tes o forecasting with these f					
Pre-requisites		TAT3600: and	illed little series models				
(and Co-requisites	Not for st	udents who have passed	l in STAT3614, or have already en l in STAT3907, or have already en				
Offer in 2019 - 2020	Y 2nd	d sem Offer in 2020 - 2	021 : Y	Examination	May		
Grade Descriptors (A+ to F)	A	learning outcomes. Show st	tery at an advanced level of extensive k trong analytical and critical abilities and log ide range of complex, familiar and unfan	gical thinking, with evidence of ori	ginal thought, and ability		
	В	•					
	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 knowled 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 appl knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.					
	Fail	Demonstrate little or no evic of analytical and critical at	dence of command of knowledge and skills bilities, logical and coherent thinking. Sho presentational skills are minimally effective	required for attaining the course ow very little or no ability to ap			
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	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignme	ents	Coursework (assignments, tutorials, and a class test)	40	CLO 1,2,3,4,5,6,7		
	Examination		One 2-hour written examination	60	CLO 1,2,3,4,6,7		
		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 editio N. W .S. Wei: Time Series Analysis: Univariate and Multivariate Methods (Addison-Wesley, 2006, 2nd edition) N. K. Li: Diagnostic Checks in Time Series (Chapman & Hall/CRC, 2004)					
reading and online materials	J. D. Crye Bovas Ab W. W .S. W. K. Li: I	raham & Johannes Ledo Wei: Time Series Analys Diagnostic Checks in Tin	olter: Statistical Methods for Foreca sis: Univariate and Multivariate Met	asting (John Wiley & Sons, thods (Addison-Wesley, 20 2004)	on) 2005, 2nd edition) 06, 2nd edition)		

STAT4602	Multivari	Multivariate data analysis (6 credits) Academic Year 2019					
Offering Department	Statistics 8	Statistics & Actuarial Science Quota 50					
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	each obse correlated statistical	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-on experience with the statistical software SAS.					
Course Contents & Topics	covariance componen	with multivariate data. Multivariate normality and transfo matrix. Correlations: Simple, partial, multiple and ts analysis. Factor analysis. Problems for means o Discriminant analysis. Classification. Multivariate linear r	canonical. Multivariate regre f several samples. Multivari	ession. Principa			
Course Learning		sful completion of this course, students should be able to					
Outcomes	CLO 1 analyze multivariate data with main SAS procedures, such as PROC IML, PROC REG, PROC CORR, PROC CANCORR, PROC PRINCOMP, PROC FACTOR, PROC DISCRIM, PROC CANDISC and etc						
	CLO 2 compare the mean structure of multiple measurements for one or more than one population(s) by multivariate MANOVA and profile analysis						
	CLO 3 investigate the linear associations among one/two group(s) of variables by multiple, partial and canonical correlation and multivariate regression						
	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						
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in S1	Pass in STAT3600 or STAT3907					
Offer in 2019 - 2020	Y 2nd	sem Offer in 2020 - 2021 : Y	Examination	May			
Grade Descriptors (A+ to F)	A	Demonstrate thorough mastery at an advanced level of extensive k learning outcomes. Show strong analytical and critical abilities and to to apply knowledge to a wide range of complex, familiar and unfan presentational skills.	gical thinking, with evidence of origin	al thought, and abilit			
	В	Demonstrate substantial command of a broad range of knowledge at learning outcomes. Show evidence of analytical and critical abilities an and some unfamiliar situations. Apply effective organizational and pres	id logical thinking, and ability to apply				
	С	Demonstrate general but incomplete command of knowledge and outcomes. Show evidence of some analytical and critical abilities an					

		familiar situations. Apply mo	derately effective organizational and prese	ntational 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 cours of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to a problems. Organization and presentational skills are minimally effective or ineffective.						
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 and tutorials)	25	CLO 1,2,3,4,5		
	Examination		One 3-hour written examination	75	CLO 1,2,3,4,5		
Required/recommended reading and online materials	Mardia K. Seber G. A Morrison D Hair J. F.,	Johnson, R. A. & Wichern, D. W.: Applied Multivariate Statistical Analysis (Prentice-Hall, 2007, 6th edition) Mardia K. V., Kent J. T., and Bibby J. M.: Multivariate Analysis (Academic Press, 1979) Seber G. A. F.: Multivariate Observations (John Wiley & Sons, 1984) Morrison D. F.: Multivariate Statistical Methods (McGraw-Hill, 1990, 3rd ed.) Hair J. F., Anderson R. E., Tatham R. L., & Black W. C.: Multivariate Data Analysis (Prentice-Hall, 2006, 6th edition) Srivastava M. S.: Methods of Multivariate Statistics (John Wiley and Sons, 2002)					
Course Website	http://moo	dle.hku.hk					

STAT4603	Current	topics in risk mana	gement (6 credits)	Academic Year	2019		
Offering Department	Statistics & Actuarial Science Quota						
Course Co-ordinator		Quota					
Teachers Involved	Ms O T K Choi, Statistics & Actuarial Science (ochoi@hku.hk) (Ms O T K Choi, Statistics & Actuarial Science)						
Course Objectives				ent by considering curre	ent tonics in risl		
odise 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 & Topics		_iquidity risk; Operational risk; Modeĺ risk; Enterprise risk management; Cutting edge risk analytics and innovatio n risk management.					
Course Learning	On succe	ssful completion of this o	course, students should be able to:				
Outcomes	CLO 1	gain insights into curren	t advances in risk management				
	CLO 2	understand current risk	management pitfalls and development	t			
	CLO 3	make effective use of m	odels and techniques for managing va	rious kinds of risk			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in (S	STAT3618 or FINA2322)					
Offer in 2019 - 2020	Y 1st	sem Offer in 2020 - 20	021 : Y	Examination	Dec		
Grade Descriptors (A+ to F)	Α	learning outcomes. Show sto apply knowledge to a w presentational skills.	tery at an advanced level of extensive knowl- rong analytical and critical abilities and logical ide range of complex, familiar and unfamiliar	thinking, with evidence of origin situations. Apply highly effective	al thought, and abilit ve 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.						
	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.						
Course Type	Lecture-b	ased course					
	Activities	2	D-4-!I-				
Course Teaching			Details		No. of Hours		
	Lectures	•	Details		No. of Hours		
		•	Details				
Course Teaching & Learning Activities	Lectures Tutorials	/ Self study	Details		36		
	Lectures Tutorials	/ Self study	Details	Weighting in final course grade (%)	36 12 100 Assessment Methods		
& Learning Activities Assessment Methods	Lectures Tutorials Reading	/ Self study			36 12 100 Assessment		
& Learning Activities Assessment Methods	Lectures Tutorials Reading / Methods	/ Self study	Details Coursework (assignments, tutorials, class test(s) and project	course grade (%)	36 12 100 Assessment Methods to CLO Mappin		
& Learning Activities Assessment Methods and Weighting Required/recommended reading and	Lectures Tutorials Reading Methods Assignme Examinat Dowd, K: Fiedler, R Franzetti, Basel Co standards Basel Coi	ents ion Measuring Market Risk. : Liquidity Modelling. (R C: Operational Risk Mommittee on Banking S and monitoring (BIS, 20 mmittee on Banking Su	Details Coursework (assignments, tutorials, class test(s) and project (s)) One 2-hour written examination 2nd Edition (Wiley, 2005). (Chapters as Books, 2011) deling and Management. (Chapman 8 upervision:Basel III: International Fr	50 50 14, 16) t Hall/CRC Finance Series amework for liquidity ris	36 12 100 Assessment Methods to CLO Mappir CLO 1,2,3 CLO 1,2,3		
& Learning Activities Assessment Methods and Weighting	Lectures Tutorials Reading Methods Assignme Examinat Dowd, K: Fiedler, R Franzetti, Basel Co standards Basel Col banking s	ents ion Measuring Market Risk. : Liquidity Modelling. (R C: Operational Risk Mommittee on Banking S and monitoring (BIS, 20	Details Coursework (assignments, tutorials, class test(s) and project (s)) One 2-hour written examination 2nd Edition (Wiley, 2005). (Chapters ask Books, 2011) deling and Management. (Chapman & upervision:Basel III: International Fruit)	50 50 14, 16) t Hall/CRC Finance Series amework for liquidity ris	36 12 100 Assessment Methods to CLO Mappir CLO 1,2,3 CLO 1,2,3		

STAT4606	Risk management and Basel Accords in banking and finance (6 credits) Acade				2019		
Offering Department	Statistics 8	& Actuarial Science		Quota			
Course Co-ordinator	Mr P K Y I	Pang, Statistics & Actua	arial Science (the_pang@yahoo.com)			
Teachers Involved		Pang, Statistics & Actua					
Course Objectives	To provide	comprehensive know	ledge and in-depth understanding of	risk management in the	banking and finance		
·	course. A	ccordingly, minimal bac	on management with basic measure ckground in quantitative methods wi ps, options) knowledge will be requir	ll be required and involv			
Course Contents	The cours	e introduces and explai	ins:				
& Topics	- risk natural - design are the imporal - the companies - measure - Basel ac - key deve	the importance of risk management, risk nature and types, design and 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, Basel accords and the capital treatments for credit, market and operational risks, key developments (eg: Know-Your-Customers, Anti-Money laundering, Sarbanes-Oxley) and critical issues, the importance of business continuity,					
	- design a	nd implementation of a	business continuity plan.				
Course Learning			course, students should be able to:				
Outcomes	an	d cycle	ce, nature and classification of vario	us risks, and the risk m	anagement principle		
			and understanding of the measureme	nts of credit, market and	operational risks		
			el accords and its capital treatments		•		
			e of, design and implement a busines				
Pre-requisites (and Co-requisites and Impermissible combinations) Offer in 2019 - 2020		sem Offer in 2020 -	or STAT3905 or (FINA2322 and any				
Grade Descriptors				Examination	,		
(A+ to F)	A Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attai learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective presentational skills. B Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply k 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 to outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply 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 Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show lire						
	Fail Nowledge 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.						
Course Type		ased course					
Course Teaching	Activities	1	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		Coursework (assignments, tutorials, and a class test)	40	CLO 1,2,3,4		
	Examinat	ion	One 2-hour written examination	60	CLO 1,2,3,4,5		
Required/recommended reading and online materials	Jorion, P.: Hull, J. C.: Gallati, R.	Financial Risk Manage Risk Management and Risk Management and	R.: The Essentials of Risk Manageme er Handbook + Test Bank: FRM part I d Financial Institutions (Pearson High d Capital Adequacy (McGrawHill, 200	/Part II (Wiley, 2010, 6th er Education, 2010, 2nd			
Course Website	http://moo						
Additional Course	This cours	e is previously called S	STAT2320 as the prerequisite change	d to STAT3303			

STAT4607	Credit risk analysis (6 credits)	Academic Year	2019
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	For a commercial bank, credit risk has always been the most significant. It is the risk of default on debt, swap, 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 credit migration; credit scoring and internal rating models; Credit portfolio models such as CreditMetrics, CreditPortfolioView, KMV and actuarial approach; Credit derivatives.		
Course Learning Outcomes	On successful completion of this course, students should be able to:		
	CLO 1 understand the Basel requirements for credit risk		
	CLO 2 estimate credit scores using the logit model		

		0.3 understand and estimate default probabilities using various approaches such as Moody's KMV and the					
		ortality method	of credit value-at-risk and the C	reditMetrics ann	roach		
		stimate default correlat		reditivietrics app	ioacii		
		ssess rating systems	10113				
Pre-requisites			5 or STAT3010 or (FINIA2322 a	nd any I Iniversit	Llevel 3 course	١	
(and Co-requisites and Impermissible combinations)	1 433 111 0	Pass in STAT3618 or STAT3905 or STAT3910 or (FINA2322 and any University level 3 course)					
Offer in 2019 - 2020	Y 2nd	d sem Offer in 2020 -	2021 : Y		Examination	May	
Grade Descriptors (A+ to F)	Α	learning outcomes. Show	astery at an advanced level of exten- strong analytical and critical abilities a wide range of complex, familiar and	ind logical thinking, v	vith evidence of original	ginal thought, and ability	
	В	learning outcomes. Show	command of a broad range of knowler evidence of analytical and critical abilit tions. Apply effective organizational an	ies and logical thinkir	ng, and ability to ap		
	С	Demonstrate general but outcomes. Show evidence	incomplete command of knowledge e of some analytical and critical abiliti noderately effective organizational and	and skills required es and logical thinki	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.						
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		nting in final se grade (%)	Assessment Methods to CLO Mapping	
	Assignme	ents	Coursework (assignmen tutorials, and class test(s))	ts,	40	CLO 1,2,3,4,5,6	
	Examina	tion	One 2-hour written examina	tion	60	CLO 1,2,3,4,5,6	
Required/recommended	Resti, A.	and Sironi, A. (2007).	Risk Management and Shareh	olders' Value in	Banking: From	Risk Measurement	
reading and		Capital Allocation Poli	,				
online materials)). Credit Risk Measurement In	and Out of the F	inancial Crisis:	New Approaches to	
	Value at Risk and Other Paradigms (3rd Edition). Wiley.						
	Loffler, G. and Posch, P. N. (2010). Credit Risk Modeling using Excel and VBA (2nd Edition). Wiley.						
	Jorion, P. (2011). Financial Risk Manager Handbook (6th Edition). Wiley. Crouhy, M., Galai, D., and Mark, R. (2001). Risk Management. McGraw-Hill.						
			nent and Financial Institutions (21/		
			res, and Other Derivatives (9th				
			(2009). Basic Econometrics (5th				
			09). Active Credit Portfolio Man				
			Portfolio Management. Wiley.		- , -		
Course Website		odle.hku.hk					

STAT4608	Market	sk analysis (6 credits)		Academic Year	2019		
Offering Department	Statistics	Actuarial Science		Quota			
Course Co-ordinator	Dr K Zhu,	Statistics & Actuarial Science (mazhuke@hku.hk)				
Teachers Involved	(Dr K Zhu	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 ma	itisk Measures; Value-at-Risk (VaR) models (parametric, Monte Carlo simulation and Historical simulation); Risk actor 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 succe	sful completion of this course,	students should be able to:				
Outcomes	CLO 1	understand VaR and expec	ted 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	CLO 5 understand backtesting and stress testing					
Pre-requisites (and Co-requisites and Impermissible combinations)		AT3907 and STAT3910; or AT4601 and (FINA2320 or ST	AT3609)				
Offer in 2019 - 2020	Y 2nd	sem Offer in 2020 - 2021 : 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	· · · · · · · · · · · · · · · · · · ·					
	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 organizati	ional and presentational skills.				
	of analytic	al and critical abilities, logical and coherent thinking. Show	o evidence of command of knowledge and skills required for attaining the course learning outcomes. cal abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to s n and presentational skills are minimally effective or ineffective.				
Course Type	Lecture-based cours	е					
Course Teaching & Learning Activities	Activities	Details		No. of Hours			
	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	Alexander, C.: Mark Alexander, C.: Mark Alexander, C.: Mark	orion, P.: Value-at-Risk: The New Benchmark for Managing Financial Risk (McGraw-Hill, 2007, 3rd edition) lexander, C.: Market Models: A Guide to Financial Data Analysis (Wiley, 2001) lexander, C.: Market Risk Analysis: Practical Financial Econometrics (Wiley, 2008) lexander, C.: Market Risk Analysis: Value-at-Risk Models (Wiley, 2009) say, R. S.: Analysis of Financial Time Series (Wiley, 2005, 2nd edition)					
Course Website	http://moodle.hku.hk	, , ,	,				

STAT4609	Big data	analytics (6 c	redits)	Academic Ye	ear 2019	
Offering Department		& Actuarial Scien	,	Quota	50	
Course Co-ordinator			ctuarial Science (plhyu@hku.hk)	1		
Teachers Involved			ctuarial Science)			
Course Objectives	In the past social web valuable in	In 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 aluable 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	Recomme	nder systems,	-	analysis, Text analytics, Sentime		
Course Learning			of this course, students should be	e able to:		
Outcomes	CLO 1 un	derstand and apengths and weak	pply a wide range of data ana knesses	alytic techniques, and recognize t	heir characteristics,	
			perience of computer software for	,		
		•		lues for data extraction, taking int	o account both the	
			a and the goals of the user of the			
		•	,	ing into account the requirements	ot the data analytic	
		<u> </u>	ed and the goals of the user			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in STAT3612 or STAT4904					
Offer in 2019 - 2020	Y 2nd	sem Offer in 2	020 - 2021 : 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.					
	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. 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.					
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		30	CLO 1,2,3,4	
	Project reports			30	CLO 1,2,3,4	
	Test 40 CLO 3,4					
Required/recommended reading and online materials	Technique Aggarwal,	ieron, A. (2019). Hands-On Machine Learning with Scikit-Learn, Keras & TensorFlow: Concepts, Tools, and echniques to Build Intelligent Systems. 2nd edition, O'Reilly Media. ggarwal, C.C. (2016). Recommender Systems: The Textbook. Springer, New York. arkar, D. (2016). Text Analytics with Python. Apress.				
	Chollet F	(2018) Deen Le	earning with Python. MANNING.			

STAT4610	Bayesian learning (6 credits)	Academic Year	2019
Offering Department	Statistics & Actuarial Science	Quota	

Course Co-ordinator	, Statistics	, Statistics & Actuarial Science (ug_enquiry@saas.hku.hk)						
Teachers Involved								
Course Objectives		This course aims to introduce Bayesian methodologies and computational techniques of Markov Chain Monte Carlo, and application in the deep learning.						
Course Contents & Topics								
Course Learning Outcomes	On succes	On successful completion of this course, students should be able to:						
Pre-requisites (and Co-requisites and Impermissible combinations)								
Offer in 2019 - 2020	N Offe	Offer in 2020 - 2021 : Y						
Grade Descriptors (A+ to F)	A	learning outcomes. Show s	stery at an advanced level of e strong analytical and critical abilit vide range of complex, familiar	ties and logical thinking, v	vith evidence of orig	inal 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.						
	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.							
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		nting in final e grade (%)	Assessment Methods to CLO Mapping		
	Assignme	nts	Coursework (assignr tutorials, and class test(25			
	Examinati	on			75			

STAT4710	Capstone experience for statistics undergraduates (6 credits) Academic Year 2019					
Offering Department	Statistics & Actuarial Science Quota 50					
Course Co-ordinator	Prof G Yin, Statistics & Actuarial Science (ug_enquiry@saas.hku.hk)					
Teachers Involved	(Prof G Yin, Statistics & Actuarial Science)					
Course Objectives	This project-based course aims to provide students with capstone experience to formulate and investigate real lift 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 junio university years.					
Course Contents & Topics	No formal teaching. Students are expected to devote 120-140 hours working on this project. Students will work groups of four or five under the supervision of a teacher. Students are required to give a presentation on their wo two to three weeks before the end of the semester, and submit their final report at the end of the semester. It aims to help the students to establish a good and solid foundation of life-long learning skills, and to enable students to equip with hands-on experience in solving real life problems starting from identification of the k variable(s) of interest, literature search, model formulation, data analysis or simulation, technical report writing a presentation of the results. Students will need to find an interesting topic of their own, conduct literature sear regarding the most recent research related to the problem, make suggestions to improve the current situations even solve the problem identified in their project.					
Course Learning Outcomes	On successful completion of this course, students should be able to: 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 current 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 writing, communication and consultation skills					
Pre-requisites (and Co-requisites and Impermissible combinations)	CLO 6 advocate to others the appreciation of statistics/risk management as to its relevance to our daily life 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. 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.					
Offer in 2019 - 2020	Y 1st sem 2nd sem Offer in 2020 - 2021 : 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 familia 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.				
	Show evidence of so	out limited command of knowledge and skills require me coherent and logical thinking, but with limited and roblems. Apply limited or barely effective organization	alytical and critical abilities. Sho			
	of analytical and crit	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.				
Course Type	Project-based course					
Course Teaching	Activities	Details		No. of Hours		
& Learning Activities	Reading / Self study	Tutorials, group work/project, readir	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 1,2,3,4,5,6		
Required/recommended reading and online materials		to 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.).				
Course Website	http://moodle.hku.hk					

STAT4711	Capstone experience for credits)	or actuarial science undergraduates (Academic Year	2019			
Offering Department	Statistics & Actuarial Science	9	Quota	50			
Course Co-ordinator		arial Science (ug_enquiry@saas.hku.hk)	14	1			
Teachers Involved	(Prof G Yin, Statistics & Actua	, e= , ,					
Course Objectives	This project-based course all problems in actuarial science years. It aims to help the students to equip with han designing the solution, and property of the second secon	This project-based course aims to provide students with capstone experience to formulate and investigate practice problems in actuarial science by integrating and applying actuarial theories and techniques learnt in their university rears. It aims to help the students to establish a good and solid foundation of self-learning skills, and to enable students to equip with hands-on experience in solving practical problems including definition of the problem designing the solution, and presentation of the results.					
Course Contents & Topics	project. Students will work supervisor. Students are rec semester, and submit their fi Topics acceptable for project	piven for this course. Students are expected to in groups of four or five under the supervaluired to give a presentation on their work two nal report at the end of the semester. Its in this course can be related to any of the transpage investment enterprise risk management.	ision of a teacher ar o to three weeks befo aditional actuarial area	nd/or an industry re the end of the s of practice such			
	as life insurance, pension, finance, investment, enterprise risk management and general insurance. Students are also encouraged to suggest topics in non-traditional actuarial areas provided they can find a suitable teacher and/or industry supervisor. All topics for this course will be subject to final approval by the Department to ensure relevance to actuarial science. Students will need to decide on the topic for a practical project, conduct market research regarding industry activities related to the topic, and make suggestion on a solution of the problem identified in their project.						
Course Learning	On successful completion of this course, students should be able to:						
Outcomes	CLO 1 define a practical problem, discuss the issues faced by different stakeholders, and design workable solutions for the problems						
	CLO 2 integrate theoretical results and practical approaches, and to specify limitations of current developments						
	CLO 3 work in a team and to collaborate with members with different background						
	CLO 4 deliver actuarial results effectively in a written report and in oral presentations						
	CLO 5 develop further logical, critical thinking, creativity, technical report writing, communication and consultation skills CLO 6 explain to a non-actuarial audience the approaches of actuarial science as applied to problems in a						
Due no maio ita	financial security sys	tem		•			
Pre-requisites		s of advanced level disciplinary core/electi		ciuanai Science)			
(and Co-requisites		in STAT3901, or already enrolled in this course	e; or				
and Impermissible combinations)	This capstone course is onl STAT4798.	dy enrolled in this course); and y for BSc(Actuarial Science) students, and is allowed to take this capstone course is their y	•	h STAT4767 and			
Offer in 2019 - 2020		Offer in 2020 - 2021 : 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.						
	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.						
Course Type	Project-based course						
Course Teaching	Activities	Details		No. of Hours			
& Learning Activities	Reading / Self study	Tutorials, group work/project, reading/se	elf-study	120			
Assessment Methods and Weighting	Methods Details Weighting in final course grade (%) 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			

STAT4766	Statistic	s internship (6 c	credits)	Academic Ye	ar 2019	
Offering Department	Statistics 8	& Actuarial Science		Quota		
Course Co-ordinator	Dr C W Kv	van, Statistics & Ac	tuarial Science (cwkwan@hku.hk)			
Teachers Involved			essors of oral presentations and written			
Course Objectives	take on a	minimum of 160 ho	ents majoring in Decision Analytics/Risl ours of internship work related to his/h oplications of academic knowledge in a	ner major disciplines. It pro	vides students with	
Course Contents & Topics	his/her in encounter	Jpon 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) hat the student has been involved in during his/her internship.				
Course Learning	On succes	sful completion of t	his course, students should be able to:			
Outcomes	CLO 1 ga	in first-hand work e	xperience in an industry related to deci	sion analytics, risk manage	ment or statistics	
		ply knowledge in c ork place	lecision analytics, risk management o	r statistics to solve praction	al problems in the	
	or CLO 4 co	statistics courses mmunicate speciali	or specific quantitative skills developed st knowledge in decision analytics, risk			
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in a Management This caps mutually e	work environment 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.				
Offer in 2019 - 2020			ummer Offer in 2020 - 2021 : Y	Examination	No Exam	
Grade Descriptors (Pass /Pass with distinction /Fail)	Pass Able to apply knowledge to solve problems in the workplace. Successfully handles and carries out the work required in the job assigned by supervisor(s). Establishes effective collaboration and communication with supervisor(s), colleagues, and clients the job. Successfully fulfills the requirements set out in the Course Description regarding working hours, written and oral representation 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 assign by supervisor(s). Fails to establish effective collaboration or communication with supervisor(s), other colleagues, or clients in job. Fails to satisfy the requirements set out in the Course Description regarding working hours, written and oral report,				olleagues, and clients in , written and oral report, ald be awarded a grade and in the job or assigned leagues, or clients in the	
Course Type	Internship	evaluation by supervise	or (3), etc.			
Course Teaching	Activities	i	Details		No. of Hours	
& Learning Activities	Internship		it is expected that students are to (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 prese	entation	oral presentation and in-class discussion	40	CLO 1,2,3,4	
	Written re	port	written report	60	CLO 1,2,3,4	
Course Website	http://moo	dle.hku.hk				
Additional Course Information	presentation during the student batter Satisfactor be recorded interested	on on their interns internship period (in used on the feedback ry completion of this ed on the student's to enrol in this cour	ernship, each student is required to hip experience. Supervisors will assen the case of internships outside the uncle by the external supervisor). It is course can be counted towards the Castranscript. This course will be asset se should contact the Department to old	ss the students based or niversity, the internal super capstone requirement. Det ssed on "Pass/Fail" basis. otain the approval.	their performance visor will assess the ails of internship wil Students who are	
	Enrolment	of this course is no	ot conducted via the online course sele office after approval has been obtained	ection system and should b		

STAT4767	Actuarial science internship (6 credits)	Academic Year	2019			
Offering Department	Statistics & Actuarial Science	Quota				
Course Co-ordinator	Dr A G Benchimol, Statistics & Actuarial Science (benchi@hku.hk)					
Teachers Involved	(Various teachers as the assessors of oral presentations and written reports, St	atistics & Actuarial	Science)			
Course Objectives		This course is offered to actuarial science students who take on a 6-month full time or similar internships. The objective is for a student to complete this course as a project based on his/her internship.				
Course Contents & Topics		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) that the student has been involved in during his/her internship.				
Course Learning	On successful completion of this course, students should be able to:					
Outcomes	CLO 1 gain practical experiences during internship					
	CLO 2 describe basic actuarial practices learned during the internship					
	CLO 3 explain how actuarial theories learned in University can be applied in practice					
	CLO 4 provide context for specific technical skills developed in basic actuarial courses					
Pre-requisites (and Co-requisites and Impermissible	Pass in at least 24 credits of advanced level disciplinary core/elective of programme including STAT3901; and This capstone course is only for BSc(Actuarial Science) students; and is mutual	`	,			

combinations)	The earlies	st that a student is	s allowed to take this capstone course is	their year 3 study.		
Offer in 2019 - 2020	Y 1st	sem 2nd sem	Offer in 2020 - 2021 : Y	Examination	No Exam	
Grade Descriptors (Pass /Pass with distinction /Fail)	Pass	assigned by supervi	edge to solve problems in the workplace. Successfi sor(s). Establishes effective collaboration and con \(f \text{uffil} \) the requirements set out in the Course De upervisor(s), etc. Students demonstrating excelle	nmunication with supervisor(s), obscription regarding working hour	colleagues, and clients in s, written and oral report,	
	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.				
Course Type	Internship					
Course Teaching	Activities		Details	Details		
& Learning Activities	Internship work it is expected that students are to work at least 6 m 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 prese	entation	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://mood	dle.hku.hk				
Additional Course Information	employer/o Satisfactor be recorde interested Enrolment	direct supervisor in y completion of the ed on the studer to enrol in this co of this course is	his assessment component, the comple s required for passing the course. his course can be counted towards the C it's transcript. This course will be asse urse should contact the Department to ol not conducted via the online course sele office after approval has been obtained	Capstone requirement. Dessed on "Pass/Fail" basis btain the approval. ection system and should lessed.	tails of internship will Students who are be made through the	

STAT4798	Statistic	cs and actuarial	science project (6 credits)	Academic Y	ear 2019	
Offering Department	Statistics	& Actuarial Science		Quota	50	
Course Co-ordinator	Prof S M	S Lee, Statistics & A	Actuarial Science (smslee@hku.hk)			
Teachers Involved	(Various	teachers as the asse	essors of oral presentations and written	reports, Statistics & Actua	rial Science)	
Course Objectives	Each year	ır a few projects sui	table for Actuarial Science students w	ill be offered to provide st	udents with praction	
	experience	ce in approaching a	real problem, in report writing and in or	al presentation.		
Course Contents	These pr	ojects, under the s	upervision of individual staff members	s, involve the applications	s of statistics and/	
k Topics	probabilit	y in a wide range of	problems of practical and/or academic	interests.		
Course Learning	On succe	ssful completion of	this course, students should be able to:			
Outcomes			ıl research problems			
	CLO 2	earn and apply adva	anced techniques in probability and/or s	statistics to solve real life p	roblems	
	CLO 3	summarize and pres	ent research findings in a professional	manner		
Pre-requisites and Co-requisites and Impermissible combinations)	programn Pass or a This caps This cour	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.				
Offer in 2019 - 2020			Offer in 2020 - 2021 : 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 evi original thought. Insightful use and critical analysis / evaluation of information drawn from a full range of high quality sot to quote/reference aptly. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly organizational and presentational skills. [Work of A+ should show considerable additional work beyond that is required 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	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 them. Misuse of data minimally effective or	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	no critical comparison	
Course Type	Project-b	ased course				
Course Teaching	Activitie	S	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	sentation	oral presentation & in-class discussion	40	CLO 1,2,3	
	Research	n report	written report	60	CLO 1,2,3	
Course Website	http://mod	odle.hku.hk				
Additional Course nformation	Approval	is subject to past ac	ademic performance.			

STAT4799 Statistics project (12 credits) Academic Year 2019

Offering Department	Statistics	& Actuarial Science		Quota	50
Course Co-ordinator	Prof S M S	S Lee, Statistics & Actuar	rial Science (smslee@hku.hk)		
Teachers Involved	(Various t	eachers as the assessor	s of oral presentations and written	reports, Statistics & Actua	rial Science)
Course Objectives		provide students with p	for students majoring in Decision practical experience in approaching		
Course Contents & Topics		, ,	vision of individual staff members lems of practical and/or academic		of statistics and/or
Course Learning	On succes	ssful completion of this co	ourse, students should be able to:		
Outcomes		•	in solving a research or applied p		
	st	atistical research and dat	•	of computer software or	orograms, for typical
			ne findings of a research study		
		·	ation 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	nent/Statistics Majors inclaiready enrolled in at least udents who have already stone course is only for s asent of course coordinate	st one of the following courses: S enrolled in STAT3799 in this acac students majoring in Decision Ana or.	TAT3612, STAT3911, ST demic year.	AT4601, STAT4602
		se is mutually exclusive v			
Off ! 0040 0000			ed to take this capstone course is		No Essess
Offer in 2019 - 2020 Grade Descriptors	Y Yea	ar long Offer in 2020 - 2	2021:Y p of the subject. Show strong analytical a	Examination	
	B C D	organizational and presental areas relevant to the topic.] Demonstrate substantial grarelevant information from soi and to quote/reference aptly presentational skills. Demonstrate general but inc Use of relevant information quote/reference aptly. Most moderately effective organizations are partial but limit logical thinking, but with limit through summary rather that Apply limited or barely effect.	titical use of data and results to draw apptional skills. [Work of A+ should show con asp of the subject. Evidence of analytica urces, showing ability to make meaningfu. Correct use of data of results to draw a complete grasp of the subject. Evidence of from sources, showing ability to make the correct but some erroneous use of dational and presentational skills. ed grasp, with retention of some relevant it ited analytical and critical abilities. Demon analysis and comparison. Limited ability ive organizational and presentational skills tell or no grasp of the knowledge and uses, logical and coherent thinking. Limited.	I and critical abilities and logical comparisons between different propriate conclusions. Apply efficient of some analytical and critical abecomparisons between different at and results to draw appropriate use and reference of set to use data and results to draw. Inderstanding of the subject. Even the subject of the subject. Even the subject is and results to draw to use data and to use data and to use data and to use data and to use data an	I thinking. Critical use of secondary interpretations rective organizational and lities and logical thinking int interpretations and to priate conclusions. Apply the of some coherent and veral sources, but mainly appropriate conclusions dence of little or lack of
	D :	them. Misuse of data and r minimally effective or ineffect	results and/or unable to draw appropriate		
Course Type		ased course	D-4-il-		No efiles
Course Teaching & Learning Activities	Activities	8	Details	.a.t 0 diaa!!!-	No. of Hours
	0	/ Self study	the student is expected to m supervisor regularly in the course	e of the project	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
			oral presentation & in-class	40	01.0.4.0.4
	Oral pres	sentation	discussion	40	CLO 1,2,4
Course Website	·	sentation odle.hku.hk		40	CLO 1,2,4
Course Website Additional Course	http://moo		discussion	40	CLO 1,2,4

STAT4901	Risk theo	ry II (6 credits) Academic Ye	ar 2019				
Offering Department	Statistics &	Actuarial Science Quota					
Course Co-ordinator	TBC, Statist	tics & Actuarial Science ()					
Teachers Involved		·					
Course Objectives		e is an advanced course in risk theory which extends various topics discusse tility theory, ruin theory, aggregate claims process, and related topics.	d in STAT3906. It				
Course Contents & Topics	coefficient; I Poisson pro	ry; discrete ruin model; compound Poisson risk model; ruin probability; reins Lundbergs inequality; Tijms approximation; non-homogeneous birth process; con ocess; inflation model; IBNR (Incurred But Not Reported) claims; mixed Erlang di quilibrium distributions.	agion model; mixed				
Course Learning	On success	ful completion of this course, students should be able to:					
Outcomes	CLO 1 understand utility theory including some commonly used utility functions, Jensens inequal and utility maximization						
	CLO 2 defir	ne discrete and continuous ruin models					
	CLO 3 calculate the adjustment coefficient, Lundbergs inequality and Tijms approximation in ruin theory						
	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 claim frequencies						
	CLO 6 understand mixed Poisson process and its applications including the inflation model and the IBNR model						
	CLO 7 deriv	ve the relationship between stop-loss moments and equilibrium distributions					
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in STA	AT3906					
Offer in 2019 - 2020	N Offer	in 2020 - 2021 : N Examination					

Grade Descriptors (A+ to F)	A	learning outcomes. Show str	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	learning outcomes. Show ev	nmand of a broad range of knowledge and idence of analytical and critical abilities and I ns. Apply effective organizational and presen	ogical 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 critical ab	ence of command of knowledge and skills re illities, logical and coherent thinking. Show presentational skills are minimally effective o	very little or no ability to ap			
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 1,2,3,4,5,6		
	Examination		One 3-hour written examination	75	CLO 1,2,3,4,5,6		
Required/recommended reading and online materials	edition). Kaas R., C Bowers N edition). Willmot G	Goovaerts M., Dhaene J. L., Gerber H.U., Hickm	mot G.E.: Loss Models: From Data , & Denuit M.: Modern Actuarial Ris an J.C. & Jones D.A.: Actuarial M erg Approximations for Compound	k Theory (Springer, 2004 athematics (Society of A	, 1st edition). Actuaries, 1997, 2nd		
Course Website	http://moo	dle.hku.hk					

s cours dents v blication e conter herent i dering o monoto ics as o succes .O 1	& Actuarial Science stics & Actuarial Science stics & Actuarial Science will find useful. In a science will find useful. In a science will be chosen risk measures; Pof risks; Renewal micity; Measures determined by the soful completion of understand the mapply the tools to TAT3906 Ter in 2020 - 2021 Demonstrate thorous learning outcomes.	Science () d course in actuarial science which discit focuses on tools that are in the from from the following topics: remium calculation principles; Copulas; equations with insurance applications; Rof dependency; Phase-type distributions instructor. If this course, students should be able to nathematical tools useful for further resease solve potentially unseen problems	Extreme value theory; Storage Reliability properties; Generals; Applications to enterprise arch and applications Examination (nowledge and skills required for	with examples on ochastic dominance alized linear models erisk analysis; Othe	
s cours dents v blication e conter herent i dering c monoto ics as d succes O 1 O 2 ss in ST	se is an advanced will find useful. Ins. Ins. Ins. Ins. Ins. Ins. Ins. Ins	d course in actuarial science which discill focuses on tools that are in the from the following topics: remium calculation principles; Copulas; equations with insurance applications; R of dependency; Phase-type distributions instructor. If this course, students should be able to nathematical tools useful for further researched to potentially unseen problems : N	Extreme value theory; Storage Reliability properties; Generals; Applications to enterprise arch and applications Examination (nowledge and skills required for	with examples or ochastic dominance alized linear models a risk analysis; Other	
dents vollication of content of the	will find useful. Ins. Ints will be chosen risk measures; P of risks; Renewal oricity; Measures determined by the saful completion o understand the m apply the tools to FAT3906 Per in 2020 - 2021	It focuses on tools that are in the from the following topics: It remium calculation principles; Copulas; equations with insurance applications; R of dependency; Phase-type distributions instructor. If this course, students should be able to nathematical tools useful for further researched by the potentially unseen problems In the following topics: Copulas; Promiting the following the follo	Extreme value theory; Storage Reliability properties; Generals; Applications to enterprise arch and applications Examination (nowledge and skills required for	with examples on ochastic dominance alized linear models erisk analysis; Othe	
dents vollication of content of the	will find useful. Ins. Ints will be chosen risk measures; P of risks; Renewal oricity; Measures determined by the saful completion o understand the m apply the tools to FAT3906 Per in 2020 - 2021	It focuses on tools that are in the from the following topics: It remium calculation principles; Copulas; equations with insurance applications; R of dependency; Phase-type distributions instructor. If this course, students should be able to nathematical tools useful for further researched by the potentially unseen problems In the following topics: Copulas; Promiting the following the follo	Extreme value theory; Storage Reliability properties; Generals; Applications to enterprise arch and applications Examination (nowledge and skills required for	with examples on ochastic dominance alized linear models erisk analysis; Othe	
herent in dering of monoto ics as described succession 1	risk measures; P of risks; Renewal onicity; Measures determined by the ssful completion o understand the m apply the tools to FAT3906 er in 2020 - 2021 Demonstrate thorou learning outcomes.	remium calculation principles; Copulas; equations with insurance applications; R of dependency; Phase-type distributions instructor. If this course, students should be able to nathematical tools useful for further reseasolve potentially unseen problems N N	Reliability properties; Generals; Applications to enterprises: arch and applications Examination Character and skills required for	alized linear models risk analysis; Othe	
succes .O 1 .O 2 ss in ST	esful completion o understand the m apply the tools to FAT3906 er in 2020 - 2021	If this course, students should be able to nathematical tools useful for further researched solve potentially unseen problems : N Igh mastery at an advanced level of extensive keys	Examination		
.O 2 ss in ST	apply the tools to FAT3906 er in 2020 - 2021 Demonstrate thorou learning outcomes.	solve potentially unseen problems : N igh mastery at an advanced level of extensive k	Examination (nowledge and skills required for		
ss in ST	FAT3906 er in 2020 - 2021 Demonstrate thorou learning outcomes.	:N igh mastery at an advanced level of extensive k	knowledge and skills required for		
	er in 2020 - 2021 Demonstrate thorou learning outcomes.	igh mastery at an advanced level of extensive k	knowledge and skills required for		
Offe	Demonstrate thorous	igh mastery at an advanced level of extensive k	knowledge and skills required for		
	learning outcomes.				
	presentational skills.	to a wide range of complex, familiar and unfan	niliar situations. Apply highly effe	ective organizational and	
	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.					
il	of analytical and cr	ritical abilities, logical and coherent thinking. Sh	low very little or no ability to ap		
cture-ba	ased course				
tivities	3	Details		No. of Hours	
ctures					
torials					
ading /	Self study				
ethods		Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping	
signme	ents	Coursework (assignments, tutorials and class test(s))	40	CLO 1,2	
aminati	ion		60	CLO 1,2	
t t	eture-ba tivities ctures torials ading / thods signme aminatias R.,	and some unfamilia Demonstrate gener outcomes. Show evidence partial Show evidence of s knowledge to solve of analytical and o problems. Organiza cture-based course tivities ctures torials adding / Self study signments amination ass R., Goovaerts M., Di	and some unfamiliar situations. Apply effective organizational and pres Demonstrate general but incomplete command of knowledge and outcomes. Show evidence of some analytical and critical abilities an familiar situations. Apply moderately effective organizational and prese Demonstrate partial but limited command of knowledge and skills rec Show evidence of some coherent and logical thinking, but with limited knowledge to solve problems. Apply limited or barely effective organiz Demonstrate little or no evidence of command of knowledge and skills of analytical and critical abilities, logical and coherent thinking. Sh problems. Organization and presentational skills are minimally effective ture-based course tivities Details Cursework (assignments, tutorials and class test(s)) amination as R., Goovaerts M., Dhaene J., & Denuit M.: Modern Actuarial	and some unfamiliar situations. Apply effective organizational and presentational skills. 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 a familiar situations. Apply moderately effective organizational and presentational skills. Demonstrate partial but limited command of knowledge and skills required for attaining some of the construction 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 ledge 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 of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to approblems. Organization and presentational skills are minimally effective or ineffective. Sture-based course tivities Details Details Weighting in final course grade (%) Sthods Coursework (assignments, tutorials and class test(s))	

online materials	- Willmot G.E. & Lin X.S.: Lundberg Approximations for Compound Distributions with Insurance Applications
	(Springer, 2000, 1st edition).
	- McNeil A.J., Frey R. & Embrechts, P.: Quantitative Risk Management: Concepts, Techniques, and Tools
	(Princeton University Press, 2005, 1st edition).
Course Website	http://moodle.hku.hk

STAT4903	Actuaria	al techniques for	general insurance (6 credits)	Academic Yea	r 2019
Offering Department		& Actuarial Science	J. 11	Quota	
ourse Co-ordinator			Actuarial Science (benchi@hku.hk)	Quotu	
eachers Involved		enchimol, Statistics &	·		
ourse Objectives			to develop knowledge of the basic tec	bnigues for ratemaking a	nd actimating clai
ourse Objectives	liabilities f be empha China. St	for general insurance sized. The course a	is develop knowledge of the basic teck. Application of the actuarial technique lso provides general knowledge on the he fundamental concept on general in	es to resolve general insul general insurance markets	ance problems w in Hong Kong ar
ourse Contents Topics	- Introduc	al Insurance Markets ction of general insura ions on general insur			
	- How to a Ratema - Ratema - Ratema - Calculat - Pure pre - Loss rat - Rating c - Consider 3. Estima - Data rec - Build an - Reservii - Consider - Appraiser - Appraiser - Applica	te the underwriting exemium methods tio methods differential and relative erations when selecting claim liabilities quirement and analyze claim deveng techniques erations when estimate recoveries and unper and validation of the emission of the erations using predictivical tions using tions using the tions using tions using the tions using the tions using tions using tions using the tions using tions using tions using tions using the tions using tions using tions using t	I rate pages Jures		
	- e.g. pre	dictive modeling, Ent	erprise Risk Management, etc.		
ourse Learning	On succes	ssful completion of th	is course, students should be able to:		
Outcomes	CLO 1		ure and underlying risk of general insur	ance products	
	CLO 2	calculate the premiu	um rate for basic general insurance pro	ducts	
	CLO 3		liabilities for general insurance product		
Pre-requisites and Co-requisites nd Impermissible ombinations)	Pass in S	TAT3906			
Offer in 2019 - 2020	Y 1st	sem Offer in 2020	- 2021 : Y	Examination	Dec
rade Descriptors	Α	Demonstrate thorough	mastery at an advanced level of extensive kno	wledge and skills required for	attaining all the cours
(A+ to F)	В	to apply knowledge to presentational skills. Demonstrate substantia learning outcomes. Sho	w strong analytical and critical abilities and logic a wide range of complex, familiar and unfamilial command of a broad range of knowledge and w evidence of analytical and critical abilities and logical control and critical abilities.	ar situations. Apply highly effective skills required for attaining at leading or application of the street of the	tive organizational ar
	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	of analytical and critical problems. Organization	evidence of command of knowledge and skills re al abilities, logical and coherent thinking. Show and presentational skills are minimally effective of	very little or no ability to app	
ourse Type		ased course			
ourse Teaching	Activities	S	Details		No. of Hours
Learning Activities	Lectures				36
	Tutorials				12
	Reading /	/ Self study			100
ssessment Methods	Methods		Details	Weighting in final	Assessment
nd Weighting			Course quark (cociss manustr	course grade (%)	Methods to CLO Mappir
	Assignme	ents	Coursework (assignments, tutorials, and a class test)	25	CLO 1,2,3
	Examinat	tion	One 3-hour written examination	75	CLO 2,3
equired/recommended			oaid Claims Using Basic Techniques, C		
nline materials		and Modlin C Rad	sic Ratemaking, Casualty Actuarial Soc	iety Fourth Edition Octob	er 2010
ourse Website		odle.hku.hk	Sio Nateriaking, Casualty Actualial Suc	ioty, i ourai Luidoii, Octob	01 2010
dditional Course	Reference				
nformation			e American Academy of Actuaries, Ac	tuarial Standard of Practic	e No. 12 Trandi
			ty Insurance Ratemaking	dana olandara or i raciic	5 140. 10, Holluli

American Academy of Actuaries Committee on Risk Classification, Risk Classification Statement of Principles,

Casualty Actuarial Society Committee on Ratemaking Principles, Statement of Principles Regarding Property and Casualty Insurance Ratemaking, Casualty Actuarial Society, May 1988
Feldblum, S., Personal Automobile Premiums: An Asset Share Pricing Approach for Property-Casualty Insurance, PCAS LXXXIII, 1996, pp. 190-256 (excluding Secions 7-9)
Insurance Services Office, Inc., Personal Automobile Manual (Effective 6-98), General Rules 1-6 only.

STAT4904	Statistic	al learning for risk	modelling (6 credits)	Academic Year	2019		
Offering Department		& Actuarial Science	<u> </u>	Quota			
Course Co-ordinator	Dr C Wang	g, Statistics & Actuarial	Science (stacw@hku.hk)				
Teachers Involved	(Dr C War	g,Statistics & Actuarial	Science)				
Course Objectives	have a firm	n understanding of the dictive analytics techni	complex data sets that have emerge basic statistical modelling and predic ques, such as principal component a . The R programming language will b	tion techniques. This cours analysis, naive Bayes clas	e introduces some sification, decision		
Course Contents & Topics	methods, oboosting,	dimensional reduction i	s-validation, linear model selection a methods), generalised linear model, ipal component analysis, naive Bay)	tree-based methods (decis	ion trees, bagging		
Course Learning	On succes	sful completion of this	course, students should be able to:				
Outcomes	CLO 1 u	nderstand and apply a	wide range of predictive analytics ted	chniques for risk modelling			
	CLO 2 a	pply the techniques by	using the R programming language	and interpret the outputs			
	CLO 3 re	ecognize and compare	the characteristics, strengths and we	aknesses of different meth	ods		
Pre-requisites (and Co-requisites and Impermissible combinations)	Not for stu	ass in STAT3907 or STAT3600; and ot for students who have passed in STAT3612, or already enrolled in this course; and or BSc(Actuarial Science) students only.					
Offer in 2019 - 2020	Y 2nd	2 2nd sem Offer in 2020 - 2021 : Y					
Grade Descriptors (A+ to F)	A	learning outcomes. Show sto apply knowledge to a variety presentational skills.	stery at an advanced level of extensive kno strong analytical and critical abilities and logic wide range of complex, familiar and unfamili	al thinking, with evidence of original ar situations. Apply highly effections	nal thought, and ability ve 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.						
	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 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.						
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 and computer-based project(s))	50	CLO 1,2,3		
	Examinati	on	One 2-hour written examination	50	CLO 1,2,3		
Required/recommended reading and online materials	An Introdu Springer	ction to Statistical Lea	rning, with Applications in R, James	, Witten, Hastie, Tibshirani	, 2013, New York		
	1	dle.hku.hk					

STAT7609	Research methods in statistics (6 credits)	Academic Year	2019
Offering Department	Statistics & Actuarial Science	Quota	
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 course introduces some statistical concepts and methods which pote preparing for work on a research degree in statistics. Focus is on a techniques and their underlying theory.		
Course Contents & Topics	Contents may be selected from: (1) Basic asymptotic methods: modes of convergence; stochastic order theorems; delta method; Edgeworth expansions; saddlepoint approximatio (2) Parametric and nonparametric likelihood methods: high-order approxim signed likelihood ratio statistics; empirical likelihood. (3) Nonparametric statistical inference: sample quantiles; sign and nonparametric regression; density estimation; kernel methods. (4) Computationally-intensive methods: cross-validation; bootstrap; permut (5) Robust methods: measures of robustness; M-estimator; L-estimator; R-(6) U-statistics, projection methods. (7) Other topics as determined by the instructor.	ns. nations; profile likelihood rank tests; Kolmogord ation methods.	d and its variants
Course Learning	On successful completion of this course, students should be able to:		
Outcomes	CLO 1 comprehend the language and technicalities found in statistical re	accorch literature	

	CLO 2	understand the use of	f standard mathematical tools for cond	ucting statistical research	1
			earch tools to solve standard statistical	•	
			ome developments in contemporary s		
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in ST	TAT3600 or STAT390	77		
Offer in 2019 - 2020	Y 1st	sem Offer in 2020 -	2021 : Y	Examination	Dec
Grade Descriptors (A+ to F)	Α	learning outcomes. Show	nastery at an advanced level of extensive kn v strong analytical and critical abilities and logi a wide range of complex, familiar and unfamil	cal thinking, with evidence of or	iginal thought, and ability
	В	learning outcomes. Show	command of a broad range of knowledge and v evidence of analytical and critical abilities and ations. Apply effective organizational and prese	logical thinking, and ability to ap	
	С	outcomes. Show evidence	It incomplete command of knowledge and sk ce of some analytical and critical abilities and moderately effective organizational and presen	logical thinking, and ability to a	
	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 r I abilities, logical and coherent thinking. Show and presentational skills are minimally effective	required for attaining the course w very little or no ability to ap	
Course Type	Lecture-ba	ased course			
Course Teaching	Activities		Details		
& Learning Activities	Lectures		Details		No. of Hours
a Learning Activities	Lectures		Details		No. of Hours
a Learning Activities	Lectures Tutorials		Dotailo		
a Learning Activities	Tutorials	/ Self study	Stand		36
Assessment Methods	Tutorials	•	Details	Weighting in final course grade (%)	36 12
Assessment Methods	Tutorials Reading /	,			36 12 100 Assessment Methods
Assessment Methods	Tutorials Reading / Methods	ents	Details Coursework (assignments,	course grade (%)	36 12 100 Assessment Methods to CLO Mapping
Assessment Methods and Weighting Required/recommended reading and online materials	Tutorials Reading / Methods Assignme Examinati Efron, B. a Owen, A.E Shao, J. (1	ents ion and Tibshirani, R.J. (1 3. (2001). Empirical Li 1999). Mathematical S	Details Coursework (assignments, tutorials, and a class test)	course grade (%) 25 75 Chapman & Hall: New Yon.	36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4 CLO 1,2,3,4

STAT7610	Advanced probability (6 credits) Academic Year 2019						
Offering Department	Statistics	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 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	CLO 1 u	inderstand the fundamen	ntal measure theory and probability	theory			
		earn the general conceptand dominated converger	t of integration, understand the monce theorem	onotone convergence theorer	n, Fatou's lemma		
	CLO 3 u	inderstand the concept o	f conditional expectation				
	CLO 4 h	nave some elementary kr	nowledge of martingale				
Pre-requisites (and Co-requisites and Impermissible combinations)	Pass in STAT3603 or STAT3903						
Offer in 2019 - 2020	Y 1s	t sem Offer in 2020 - 2	021 : 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 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.						
	quired for attaining some of the cours analytical and critical abilities. Show						
	Fail Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. La of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solv problems. Organization and presentational skills are minimally effective or ineffective.						
Course Type	Lecture-b	pased 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 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	Jean Jacod and Philip Protter: Probability Essentials (Universitext, Springer-Verlag, New York, 2004, 2nd edition) Chung K. L.: A Course in Probability Theory (Academic Press, 2001, 3rd edition)				
Course Website	http://moodle.hku.hk				

	Computa	ational statistics (6	credits)	Academic Ye	ar 2019		
Offering Department	Statistics 8	& Actuarial Science		Quota			
Course Co-ordinator	Prof G Yin	, Statistics & Actuarial S	Science (gyin@hku.hk)				
Teachers Involved	(Prof G Yii	n,Statistics & Actuarial S	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	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			course, students should be able to:				
Outcomes		derstand the importance and integration and boot	e of the technique for generating rates trapping methods	ndom variables in Bayesi	an statistics, Monte		
			and disadvantages of the Newton-l to fit generalized linear models	Raphson algorithm and	the Fisher scoring		
	the	eir range of application,	and basic principle of the EM-type and apply them to solve practical pro-	oblems			
	ge	nerate posterior sample					
			to obtain estimated standard error netric and non-parametric cases	rs of estimators and conf	fidence intervals of		
Pre-requisites and Co-requisites and Impermissible combinations)	Pass in STAT3600 or STAT3907						
Offer in 2019 - 2020	Y 1st	sem Offer in 2020 - 20	021 : 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.					
			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 ski of some analytical and critical abilities and l	lls required for attaining most ogical thinking, and ability to a	of the course learning		
	C D	Demonstrate general but in outcomes. Show evidence of familiar situations. Apply mo Demonstrate partial but limi Show evidence of some coh	ncomplete command of knowledge and ski of some analytical and critical abilities and l	Ils required for attaining most ogical thinking, and ability to a attional skills. red for attaining some of the co- lalytical and critical abilities. Sho	of the course learning pply knowledge to most urse learning outcomes.		
		Demonstrate general but in outcomes. Show evidence of familiar situations. Apply mo Demonstrate partial but limi Show evidence of some coh knowledge to solve problem Demonstrate little or no evid of analytical and critical at	ncomplete command of knowledge and ski of some analytical and critical abilities and lo derately effective organizational and present- tited command of knowledge and skills requir nerent and logical thinking, but with limited ar	Ils required for attaining most ogical thinking, and ability to a attional skills. red for attaining some of the co- laytical and critical abilities. Shoul and presentational skills. required for attaining the course of the	of the course learning pply knowledge to most urse learning outcomes. we limited ability to apply learning outcomes. Lack		
Course Type	D Fail	Demonstrate general but in outcomes. Show evidence of familiar situations. Apply mo Demonstrate partial but limi Show evidence of some coh knowledge to solve problem Demonstrate little or no evid of analytical and critical at	ncomplete command of knowledge and ski of some analytical and critical abilities and l detrately effective organizational and present tited command of knowledge and skills requir nerent and logical thinking, but with limited an is. Apply limited or barely effective organization dence of command of knowledge and skills re bilities, logical and coherent thinking. Show	Ils required for attaining most ogical thinking, and ability to a attional skills. red for attaining some of the co- laytical and critical abilities. Shoul and presentational skills. required for attaining the course of the	of the course learning pply knowledge to most urse learning outcomes. we limited ability to apply learning outcomes. Lack		
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Course Type Course Teaching & Learning Activities Assessment Methods and Weighting Required/recommended reading and online materials	D Fail Lecture-ba Activities Lectures Tutorials Reading / Methods Assignme Examinati Tan, M., 7 Computati	Demonstrate general but in outcomes. Show evidence of familiar situations. Apply mo Demonstrate partial but limi Show evidence of some cohence	ncomplete command of knowledge and ski of some analytical and critical abilities and I detentile of fective organizational and present ided command of knowledge and skills requirement and logical thinking, but with limited ar is. 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 Details Details Details Coursework (assignments, practical work, and a term test) One 2-hour written examination Bayesian Missing Data Problems	Ills required for attaining most ogical thinking, and ability to a attain attain attain at skills. The defect of attaining some of the collabitical and critical abilities. Should and presentational skills. Equired for attaining the course is very little or no ability to apprint in a course in the course of th	of the course learning puly knowledge to most urse learning outcomes. Dow limited ability to apply learning outcomes. Lackply knowledge to solve No. of Hours 36 12 100 Assessment Methods to CLO Mapping CLO 1,2,3,4,5 CLO 1,2,3,4,5		

STAT7614	Advanced statistical modelling (6 credits)	2019				
Offering Department	Statistics & Actuarial Science Quota					
Course Co-ordinator	Dr Y K Chung, Statistics & Actuarial Science (yukchung@hku.hk)					
Teachers Involved	(Dr Y K Chung, Statistics & Actuarial Science)					
Course Objectives	This course introduces modern methods for constructing and evaluating statistical models and their implementation using popular computing software, such as R or Python. It will cover both the underlying principles of each modelling approach and the model estimation procedures.					
Course Contents & Topics	Topics from: (i) Generalized linear models; (ii) Mixed models; (iii) Kernel and local polynomial regression; selection of smoothing parameters; (iv) Generalized additive models; (v) Hidden Markov model and Bayesian network.					
Course Learning	On successful completion of this course, students should be able to:					

Outcomes	CLO 1 u	CLO 1 understand the basic characteristic and rationale behind the formulation of each statistical model					
	CLO 2 id	dentify for a given set of c	del and tools to use				
	CLO 3 develop computational skills of building scoring models for various management and prediction, prol involving binary and count responses; employing the powerful tool of kernel smoothing using R or P						
			ems; and analysing data with R pa	ckages gimz, ime4, gan	i, depriix54, brilearii		
Pre-requisites	or equivalent Python libraries Pass in STAT3600 or STAT3907						
(and Co-requisites	F 455 III C	31A13000 01 31A13907					
and Impermissible							
combinations)							
Offer in 2019 - 2020	Y 1s	t sem 2nd sem Offer	in 2020 - 2021 : Y	Examination	n Dec May		
Grade Descriptors (A+ to F)	Α	learning outcomes. Show st	stery at an advanced level of extensive kn trong analytical and critical abilities and logi ide range of complex, familiar and unfami	cal thinking, with evidence of c	riginal 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 prese	logical thinking, and ability to a			
	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 less of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply problems. Organization and presentational skills are minimally effective or ineffective.						
Course Type	Lecture-k	pased course					
Course Teaching	Activitie	es	Details		No. of Hours		
& Learning Activities	Lectures				24		
	Tutorials	S		12			
	Reading	/ Self study			100		
Assessment Methods and Weighting	Method	S	Details	Weighting in final course grade (%)	Assessment Methods to CLO Mapping		
	Assignments		Coursework (assignments and class test(s))	50	CLO 1,2,3		
	Examina	ation	One 2-hour written examination	50	CLO 1,2,3		
Required/recommended reading and online materials	W. Hardl W. Zucch	R.H. Myers et al., 2010: Generalized Linear Models (2nd ed.), Wiley 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 Pre					
Course Website			sian Networks: with Examples in R,	CRC Piess			
Course Website	πιιρ.//πο	http://moodle.hku.hk					

STAT7615	Advan credits	ced quantitative risk m	Academic Year	2019			
Offering Department	Statistic	s & Actuarial Science	Quota				
Course Co-ordinator	Dr Z Zh	Dr Z Zhang, Statistics & Actuarial Science (zhangz08@hku.hk)					
Teachers Involved	(Dr Z Zh	nang,Statistics & Actuarial S	cience)				
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 of univariate volatility models; multivariate volatility models; Value-at-risk and expected shortfall; estimation, back testing and stress testing; Extreme value theory for risk management.						
Course Learning Outcomes			urse, students should be able to: s to determine the value of options an	nd other derivative securi	ties		
		+ ' ' '	securities using appropriate models	J GOITGUTO GOOGIT			
		estimate the value-at-risk					
and Impermissible	Y 2nd sem Offer in 2020 - 2021 : Y Examination May						
combinations) Offer in 2019 - 2020 Grade Descriptors (A+ to F)	Y 2	Demonstrate thorough master learning outcomes. Show stro	ry at an advanced level of extensive knowled ing analytical and critical abilities and logical th	dge and skills required for att	aining all the course al thought, and ability		
Offer in 2019 - 2020 Grade Descriptors		Demonstrate thorough maste learning outcomes. Show stro to apply knowledge to a wid	ry at an advanced level of extensive knowled	dge and skills required for att	aining all the course al thought, and ability		
Offer in 2019 - 2020 Grade Descriptors		Demonstrate thorough maste learning outcomes. Show stroto apply knowledge to a wid presentational skills. Demonstrate substantial com learning outcomes. Show evice	ry at an advanced level of extensive knowled ing analytical and critical abilities and logical th	dge and skills required for att inking, with evidence of original ituations. Apply highly effective is required for attaining at least al thinking, and ability to apply	aining all the course al thought, and ability e organizational and st most of the course		
Offer in 2019 - 2020 Grade Descriptors	A	Demonstrate thorough maste learning outcomes. Show strc to apply knowledge to a wid presentational skills. Demonstrate substantial com learning outcomes. Show evic and some unfamiliar situations. Demonstrate general but inc outcomes. Show evidence of	ry at an advanced level of extensive knowler ing analytical and critical abilities and logical the e range of complex, familiar and unfamiliar s mand of a broad range of knowledge and skil lence of analytical and critical abilities and logic	dge and skills required for att inking, with evidence of original ituations. Apply highly effectiv its required for attaining at leas all thinking, and ability to apply onal skills. equired for attaining most of all thinking, and ability to appl	aining all the course al thought, and ability e organizational and st most of the course knowledge to familiar the course learning		
Offer in 2019 - 2020 Grade Descriptors	В	Demonstrate thorough maste learning outcomes. Show strc to apply knowledge to a wid presentational skills. Demonstrate substantial com learning outcomes. Show evic and some unfamiliar situations. Demonstrate general but inc outcomes. Show evidence of familiar situations. Apply mode Demonstrate partial but limite Show evidence of some cohe	ry at an advanced level of extensive knowler ing analytical and critical abilities and logical the e range of complex, familiar and unfamiliar s mand of a broad range of knowledge and skill ence of analytical and critical abilities and logic s. Apply effective organizational and presentation omplete command of knowledge and skills r some analytical and critical abilities and logic	dge and skills required for att inking, with evidence of original ituations. Apply highly effective its required for attaining at least all thinking, and ability to apply onal skills. required for attaining most of ital thinking, and ability to apply all skills. for attaining some of the cours ical and critical abilities. Show	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.		
Offer in 2019 - 2020 Grade Descriptors	A B C	Demonstrate thorough maste learning outcomes. Show strc to apply knowledge to a wid presentational skills. Demonstrate substantial com learning outcomes. Show evice and some unfamiliar situations. Demonstrate general but incoutcomes. Show evidence of familiar situations. Apply mode Demonstrate partial but limite Show evidence of some cohe knowledge to solve problems. Demonstrate little or no evide of analytical and critical ability.	ry at an advanced level of extensive knowlering analytical and critical abilities and logical the range of complex, familiar and unfamiliar simmed of a broad range of knowledge and skill ence of analytical and critical abilities and logics. Apply effective organizational and presentation omplete command of knowledge and skills risome analytical and critical abilities and logicarately effective organizational and presentation discontinuous of knowledge and skills required from the folial properties of the command of knowledge and skills required frent and logical thinking, but with limited analytical and critical and properties of the command of knowledge and skills required from the folial properties of the command of knowledge and skills required from the folial properties of the command of knowledge and skills required from the comm	dge and skills required for att inking, with evidence of origin- ituations. Apply highly effectiv ls required for attaining at leas all thinking, and ability to apply onal skills. equired for attaining most of all thinking, and ability to appl and skills. for attaining some of the cours ical and critical abilities. Show and presentational skills. red for attaining the course lea ery 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 rming outcomes. Lack		
Offer in 2019 - 2020 Grade Descriptors (A+ to F)	B C D	Demonstrate thorough maste learning outcomes. Show strc to apply knowledge to a wid presentational skills. Demonstrate substantial com learning outcomes. Show evice and some unfamiliar situations. Demonstrate general but incoutcomes. Show evidence of familiar situations. Apply mode Demonstrate partial but limite Show evidence of some cohe knowledge to solve problems. Demonstrate little or no evide of analytical and critical ability.	ry at an advanced level of extensive knowler and analytical and critical abilities and logical the range of complex, familiar and unfamiliar smand of a broad range of knowledge and skil ence of analytical and critical abilities and logic s. Apply effective organizational and presentatic omplete command of knowledge and skills rome analytical and critical abilities and logic erately effective organizational and presentation d command of knowledge and skills required frent and logical thinking, but with limited analyt Apply limited or barely effective organizational nee of command of knowledge and skills required ince of command of knowledge and skills required in the standard command of knowledge and skills required in the standard command of knowledge and skills required in the standard command of knowledge and skills required the standard command comma	dge and skills required for att inking, with evidence of origin- ituations. Apply highly effectiv ls required for attaining at leas all thinking, and ability to apply onal skills. equired for attaining most of all thinking, and ability to appl and skills. for attaining some of the cours ical and critical abilities. Show and presentational skills. red for attaining the course lea ery 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 rming outcomes. Lack		
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Offer in 2019 - 2020 Grade Descriptors (A+ to F)	B C D Fail	Demonstrate thorough maste learning outcomes. Show stro to apply knowledge to a wid presentational skills. Demonstrate substantial com learning outcomes. Show evice and some unfamiliar situations. Demonstrate general but incoutcomes. Show evidence of familiar situations. Apply mode Demonstrate partial but limite Show evidence of some cohe knowledge to solve problems. Demonstrate little or no evide of analytical and critical abil problems. Organization and p-based course	ry at an advanced level of extensive knowler and analytical and critical abilities and logical the range of complex, familiar and unfamiliar summed of a broad range of knowledge and skill ence of analytical and critical abilities and logics. Apply effective organizational and presentation omplete command of knowledge and skills round and presentation of command of knowledge and skills required from the decision of knowledge and skills required from the knowledge and skills re	dge and skills required for att inking, with evidence of origin- ituations. Apply highly effectiv ls required for attaining at leas all thinking, and ability to apply onal skills. equired for attaining most of all thinking, and ability to appl and skills. for attaining some of the cours ical and critical abilities. Show and presentational skills. red for attaining the course lea ery 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 rning outcomes. Lack knowledge to solve		

	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	d McLeish, Don L.: Monte Carlo Simulation & Finance. (Wiley, 2005). Glasserman, Paul: Monte Carlo Methods in Financial Engineering. (Springer, 2003). Danielsson Jon: Financial Risk Forecasting (Willy 2011) McNeil, A. J., Frey, R. & Embrechts, P.: Quantitative Risk Management (Princeton, 2005) Tsay, R.S.: Analysis of Financial Time Series (Wiley, 2010, 3rd edition)				
Course Website	http://moodle.hku.hk				

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 '2012 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.

(See also General Regulations and Regulations for First Degree Curricula)

Definitions

Sc1¹ 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.

¹ 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 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 values²:

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 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 '2012 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

Sc1¹ 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.

¹ 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 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 values²:

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 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 '2012 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

Sc1¹ 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 '2012 curriculum' to the BSc degree curriculum to the first year in the academic years 2012-13 and 2013-14, and students admitted directly to the third year in the academic years 2014-15 and 2015-16.

(See also General Regulations and Regulations for First Degree Curricula)

Definitions

Sc1¹ 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.

¹ 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

Regulations for First Degree Curricula (for students admitted under the 4-year '2012 curriculum' to the first year in the academic year 2019-20 and thereafter)

(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

¹ 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:
 - 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 English² and 6 credits in an English in the Discipline course³;
- (b) successful completion of 6 credits in Chinese language enhancement⁴;
- (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 Inquiry⁵ 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

² 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.

⁴ 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.

⁵ 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;
 - (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 follows⁶:

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	rass	1.0
F		Fail	0

⁶ 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 divisions⁷: 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 values⁸:

Class of honours	<u>GGPA 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 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.

⁷ UG 9 is not applicable to the BChinMed, BDS and MBBS curricula.

⁸ 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 '2012 curriculum' to the first year in the academic year 2018-19, and students admitted directly to the second 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.

'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

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.

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 English² and 6 credits in an English in the Discipline course³;
- (b) successful completion of 6 credits in Chinese language enhancement⁴;
- (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 Inquiry⁵ 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 exempted must replace the number of exempted credits with courses of the same credit value.

² 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.

⁴ 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*.

⁵ 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.

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 follows⁶:

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
\mathbf{C}	}	Satisfactory	2.0
C-	J	•	1.7
D+	l	Pass	1.3
D	ſ	rass	1.0
F		Fail	0

(b) Special permission may be given by Senate for courses in individual curricula to be

⁶ 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 divisions⁷: 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 values⁸:

<u>Class of honours</u>	<u>GGPA 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 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.

⁷ UG 9 is not applicable to the BChinMed, BDS and MBBS curricula.

⁸ 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

Regulations for First Degree Curricula (for students admitted under the 4-year '2012 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.

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¹ 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:

$$GPA = \frac{\sum\limits_{i}^{\sum} Course \ Grade \ Point \times Course \ Credit \ Value}{\sum\limits_{i}^{\sum} Course \ Credit \ Value}$$

(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 English² and 6 credits in an English in the Discipline course³;
- (b) successful completion of 6 credits in Chinese language enhancement⁴;
- (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 Inquiry⁵ 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

² 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.

⁴ 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*.

⁵ 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 follows⁶:

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⁶ 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 divisions⁷: 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 values⁸:

<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.

⁷ UG 9 is not applicable to the BChinMed, BDS and MBBS curricula.

⁸ 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 CURRICULA¹

Regulations for First Degree Curricula (for students admitted under the 4-year '2012 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.

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¹ 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 English² and 6 credits in an English in the Discipline course³;
- (b) successful completion of 6 credits in Chinese language enhancement⁴;
- (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 Inquiry⁵ 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

² 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.

⁴ 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*.

⁵ 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 follows⁶:

	Standard	Grade Point
1		4.3
}	Excellent	4.0
J		3.7
)		3.3
}	Good	3.0
J		2.7
1		2.3
}	Satisfactory	2.0
J	•	1.7
l	Dogg	1.3
ſ	rass	1.0
	Fail	0
	<pre>} } }</pre>	<pre> Excellent } Good Satisfactory Pass</pre>

⁶ 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 divisions⁷: 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.

⁷ 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 '2012 curriculum' to the first year in the academic years 2012-13 and 2013-14, and students admitted directly to the third year in 2014-15 and 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.

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¹ 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 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:

curriculum within the maximum period of registration:

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

- (a) successful completion of 12 credits in English language enhancement, including 6 credits in Core University English² and 6 credits in an English in the Discipline course³;
- (b) successful completion of 6 credits in Chinese language enhancement⁴;
- (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 Inquiry⁵ 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.

² 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.

⁴ 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*.

⁵ 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.

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 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 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 follows⁶:

	Standard	Grade Point
1		4.3
}	Excellent	4.0
J		3.7
1		3.3
}	Good	3.0
J		2.7
1		2.3
}	Satisfactory	2.0
J	•	1.7
l	Dogg	1.3
ſ	rass	1.0
	Fail	0
	<pre>} } }</pre>	<pre> Excellent } Good Satisfactory Pass</pre>

⁶ 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 divisions⁷: 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.

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 $^{^{7}\,}$ UG 9 is not applicable to the BChinMed, BDS and MBBS curricula.

Teaching Weeks

SCIENCE

Teaching Weeks 2019-20 for Undergraduate and Taught Postgraduate Students

	SUN	MON	TUE	WED	THUR	FRI	SAT	FIRST SEMESTER: SEP 2 - DEC 23, 2019	Week
	1	2	3	4	5	6	7	First Day of Teaching: Sep 2, 2019	1
	8	』 ² 9	10	11	12	13	[14]	1 list Day of Teaching. Sep 2, 2019	2
SEP-19	15	16	17	18	19	20	21		3
	22	23	24	25	26	27	28		4
	29	30							5
			[1]	2	3	4	5		
OCT-19	6 13	[7]	8 15	9	10 17	11 18	12 19	Pooding/Field Trin Weeks Oct 14, 10, 2010	6 7(Baadina)
001-13	20	21	22	23	24	25	26	Reading/ Field Trip Week: Oct 14 - 19, 2019	7(Reading) 8
	27	28	29	30	31	20	20		9
						1	2		
	3	4	5	6	7	8	9		10
NOV-19	10	11 18	12 19	13 20	14 21	15 22	16 23		11 12
	17 24	25	26	27	28	29	30	Last Day of Teaching: Nov 30, 2019	13
	1	2	3	4	5	6	7	Revision Period: Dec 2 - 6, 2019	14(Revision)
	8	9	10	11	12	13	14	Assessment Period: Dec 7 - 23, 2019	1
DEC-19	15	16	17	18	19	20	21		2
	22	23	(24)	[25]	[26]	27	28		3
	29	30	<31>	F13	2	2	4	4	Break
	5	6	7	[1] 8	2 9	3 10	4 11		Break
JAN-20	12	13	14	15	16	17	18	SECOND SEMESTER: JAN 20 - MAY 30, 2020	Break
	19	20	21	22	23	<24>	[25]	First Day of Teaching: Jan 20, 2020	1
	26	[27]	[28]	29	30)	31		Class Suspension Period for the Lunar New Year:	
		_		_		_	1	Jan 25 - 31, 2020	_
FEB-20	2 9	3 10	4 11	5 12	6 13	7 14	8 15		2 3
FED-20	16	10 17	18	12	20	21	22		3 4
	23	24	25	26	27	28	29		5
	1	2	3	4	5	6	7		6
	8	9	10	11	12	13	14	Reading/ Field Trip Week: Mar 9 - 14, 2020	7(Reading)
MAR-20	15	(16)	17	18	19	20	21		8
	22 29	23 30	24 31	25	26	27	28		9 10
	29	30	31	1	2	3	[4]	-	10
	5	6	7	8	9	[10]	[11]		11
APR-20	12	[13]	14	15	16	17	18		12
	19	20	21	22	23	24	25		13
	26	27	28	29	[30]	[1]	2	Last Day of Teaching: May 2, 2020	14
	3	4	5	6	7	8	9	Revision Period: May 4 - 9, 2020	15(Revision)
MAY-20	10	11	12	13	14	15	16	Assessment Period:	1
WIA 1-20	17	18	19	20	21	22	23	May 11 - 30, 2020	2
	24	25	26	27	28	29	30		3
	31	1	2	3	4	5	6	-	Break
	7	8	9	10	11	12	13		Break
JUN-20	14	15	16	17	18	19	20		Break
	21	22	23	24	[25]	26	27	OPTIONAL SUMMER SEMESTER	Break
	28	29	30					JUN 29 - AUG 22, 2020	1
	_		7	[1]	2	3	4		2
JUL-20	5 12	6 13	7 14	8 15	9 16	10 17	11 18		2 3
3CL-20	19	20	21	22	23	24	25		4
	26	27	28	29	30	31			5
							1		
	2	3	4	5	6	7	8		6
AUG-20	9 16	10 17	11 18	12 19	13 20	14 21	15 22		7 8
	23	24	25	26	27	28	29		0
	30	31	23	20	27	20	27		
•					ı			_	
[] General Holiday Reading/ Field Trip Week									
() University	Holiday (F	full Day)			Revision P	eriod			
/> University	, Holidaa /	ofternos-	also)		Class S	ancies D	ried for the T	upar Naw Vaar	
<> University	, rioliday (arternoon oi	11y <i>)</i>	\bigcup	Ciass Susp	ension Pe	nou for the L	unar New Year	

Notes:

First Semester: 11 Mondays and Tuesdays, 12 Wednesdays, Thursdays and Fridays, 11 Saturdays Second Semester: 11 Mondays, 13 Tuesdays and Wednesdays, 12 Thursdays, 10.5 Fridays, 11 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

Website : https://www.scifac.hku.hk/

(Please visit https://www.scifac.hku.hk/ 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/