4

BSc

Syllabuses and Regulations
(4-year curriculum)

2012-13

Faculty of Science
The University of Hong Kong

General Information

SCIENCE

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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SECTION I

BSc Degree Curriculum and Graduation Requirements

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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 6901 BSc programme under the 4-year curriculum are required to complete at least one Science major out of the 15 Science majors as the 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 '2012 curriculum' in 2012-13 or thereafter

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:

- 16 courses for the Science major including 2 Science Foundation courses, Disciplinary courses and capstone courses (96 credits)
- 2 English courses and 1 Chinese course for university language requirements (18 credits)
- 6 common core courses in 4 Areas of Inquiry (36 credits)
- A choice of 15 courses as elective courses, or to fulfill the requirements of a minor or a second major (90 credits)

Curriculum requirements (240 credits)

Option A **Students taking one Science major**	**Option B** **Students taking one Science major and one minor**	**Option C** **Students taking double majors (one Science major and a 2nd major)**
↓	↓	↓
Primary Science Major: 96 credits 2 Science Foundation courses (SCNC1111 & SCNC1112), 13 Disciplinary courses and 1 Capstone course		
+		
Common Core Courses: 36 credits # 6 courses in 4 Areas of Inquiry (at least 1 and not more than 2 courses from each AoI)		
+		
Language Courses: 18 credits English: 12 credits [6 credits in Core University English (CAES1000△) and 6 credits in English in the Discipline(CAES9820)] Chinese: 6 credits (CSCI9001)		
+	+	+
Electives: 90 credits To make up the 240 total credits	**Minor**^: 36 – 48 credits + **Electives**: 42 – 54 credits To make up the 240 total credits	**2nd Major** ^*: 72 – 96 credits

Notes:

\# Student must select not more than one course from the same Area of Inquiry within one academic year and at least one and not more than two courses from each Area of Inquiry during the whole period of study. Common Core courses should be completed normally within the first three years of study.

△ Students who have achieved the following qualifications shall be exempted from taking CAES1000 Core University English and should take a 6-credit elective course in lieu:

- Students with 5** on the English examination for the HKDSE
- Students whose first language is English
- Students who have completed the International Baccalaureate in English
- Students with an IELTS score of no less than a 7 on all of the four tests (The IELTS Reading, Writing, Listening and Speaking Tests)
- Students with a TOEFL Internet Based Test (IBT) score of 95 or above
- Students with a degree already awarded from an English Medium University

^ 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, selecting not more than one course from the same Area of Inquiry within one academic year and at least one and not more than two courses from each Area of Inquiry during the whole period of study. Common Core courses should be completed normally within the first three years of the BSc study.

(c) Capstone Requirement

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 capstone courses in each Science major may be different but a range of courses (e.g. research project, field work, internship) is offered to suit individual student's needs and interests. More details about the capstone courses will be available in due course.

2. BSc Graduation Requirements and Honours Classification *(for students admitted under the 4-year '2012 curriculum' in 2012-13 or thereafter)*

(a) Award of a BSc degree

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

(i) Satisfied the requirements in UG5 of the Regulations for First Degree Curricula[#];

(ii) Passed not fewer than 240 credits, comprising 96 credits of the required courses as prescribed in the major programme of the BSc degree curriculum.

[#] UG5 specifies that students have to successfully complete:
- (a) 12 credits in English language enhancement, including 6 credits in Core University English[1] (i.e. CAES1000) and 6 credits in an English in the Discipline course[2] (i.e. CAES9820 Academic English for Science Students);
- (b) 6 credits in Chinese language enhancement[3] (i.e. CSCI9001 Practical Chinese for Science Students);
- (c) 36 credits of courses in the Common Core Curriculum, selecting not more than one course from the same Area of Inquiry within one academic year and at least one and not more than two courses from each Area of Inquiry during the whole period of study; and
- (d) a capstone experience as specified in the syllabuses of the degree curriculum.

(b) Honours Classification

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

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

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[1] Candidates with the following qualifications shall be exempted from this requirement and should take a 6-credit elective course in lieu, see *Regulation UG6*:

Students with 5** on the English examination for the HKDSE
Students whose first language is English
Students who have completed the International Baccalaureate in English
Students with an IELTS score of no less than a 7 on all of the four tests (The IELTS Reading, Writing, Listening and Speaking Tests)
Students with a TOEFL IBT score of 95 or above
Students with a degree already awarded from an English Medium University

[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*.

SECTION II

Credit Unit Statement of BSc Degree Curriculum

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SECTION II 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)

Students have to undertake at least 160 hours of internship work

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

3. The types of courses in the 15 Science Majors and 16 Science Minors are as follows:

Majors/Minors	Type of Courses					
	Lecture-based	Lecture with laboratory component	Laboratory & Workshop	Project-based	Field camps	Internship
Actuarial Studies (Minor)	✓	✓	✓	✓		✓
Astronomy (Major & Minor)	✓	✓	✓	✓		✓
Biochemistry (Major & Minor)	✓	✓	✓	✓		✓
Biological Sciences (Major)	✓	✓	✓	✓		✓
Chemistry (Major & Minor)	✓	✓	✓	✓		✓
Computational & Financial Mathematics (Minor)	✓	✓	✓	✓		✓
Earth Sciences (Minor)	✓	✓	✓	✓	✓	✓
Earth System Science (Major)	✓	✓	✓	✓	✓	✓
Ecology & Biodiversity (Major & Minor)	✓	✓	✓	✓	✓	✓
Environmental Science (Major & Minor)	✓	✓	✓	✓	✓	✓
Food & Nutritional Science (Major & Minor)	✓	✓	✓	✓		✓
Geology (Major)	✓	✓	✓	✓	✓	✓
Marine Biology (Minor)	✓	✓	✓	✓	✓	✓
Mathematics (Major & Minor)	✓	✓	✓	✓		✓
Mathematics / Physics (Major)	✓	✓	✓	✓		✓
Molecular Biology & Biotechnology (Major & Minor)	✓	✓	✓	✓		✓
Physics (Major & Minor)	✓	✓	✓	✓		✓
Plant Science (Minor)	✓	✓	✓	✓		✓
Risk Management (Major & Minor)	✓	✓	✓	✓		✓
Statistics (Major & Minor)	✓	✓	✓	✓		✓

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

SECTION III

List of Level 1 and 2 BSc Courses and

English and Chinese language courses on offer in 2012-13 and 2013-14

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Course Code	Title	Credit	Pre-requisite	Available in		Semester offered in 2012-2013	Exam held in 2012-2013	Quota	Course Coordinator	Major / Minor (The Major/Minor that this course appears as a required course)	
				2012-2013	2013-2014	0=year long 1=1st sem * 2=2nd sem S=summer TBC=To be confirmed	TBC= To be confirmed			Compulsory Course (Must Take)	Core Course (With Choices)
Department of Biochemistry											
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	No exam	---	Dr J Tanner, Biochemistry	2012 Major in Biochemistry 2012 Minor in Biochemistry	
BIOC2600	Basic biochemistry	6	Pass in BIOC1600 Perspectives in biochemistry or BIOL1110 From molecules to cells	N	Y	---	---	300	Prof D K Y Shum, Biochemistry	2012 Major in Biochemistry 2012 Minor in Biochemistry	2012 Major in Molecular Biology & Biotechnology 2012 Minor in Molecular Biology & Biotechnology
School of Biological Sciences											
BIOL1110	From molecules to cells	6	NIL	Y	Y	2	May	280	Prof B K C Chow, Biological Sciences	2012 Major in Biochemistry 2012 Major in Biological Sciences 2012 Major in Ecology & Biodiversity 2012 Major in Food & Nutritional Science 2012 Major in Molecular Biology & Biotechnology 2012 Minor in Biochemistry	2012 Minor in Food & Nutritional Science 2012 Minor in Molecular Biology & Biotechnology 2012 Minor in Plant Science
BIOL1111	Introductory microbiology	6	NIL	Y	Y	1	Dec	80	Dr V Dvornyk, Biological Sciences	2012 Major in Biological Sciences	
BIOL1201	Introduction to food and nutrition	6	NIL	Y	Y	1	Dec	110	Dr E T S Li, Biological Sciences	2012 Major in Food & Nutritional Science	2012 Minor in Food & Nutritional Science
BIOL1309	Evolutionary diversity	6	NIL	Y	Y	2	May	85	Prof R M K Saunders, Biological Sciences	2012 Major in Biological Sciences 2012 Major in Ecology & Biodiversity 2012 Minor in Ecology & Biodiversity	2012 Minor in Marine Biology 2012 Minor in Plant Science
BIOL1501	Bioethics	6	NIL	N	Y	---	---	40	Prof F C Leung, 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	Y	---	---	50	Prof F C Leung, Biological Sciences		
BIOL2102	Biostatistics	6	Pass in BIOC1600 Perspectives in biochemistry or BIOL1110 From molecules to cells or BIOL2306 Ecology and evolution or ENVS1301 Environmental life science	Y	Y	2	May	60	Dr K M Y Leung, Biological Sciences	2012 Major in Biological Sciences 2012 Major in Ecology & Biodiversity 2012 Major in Food & Nutritional Science 2012 Major in Molecular Biology & Biotechnology	2012 Major in Environmental Science 2012 Minor in Environmental Science2012 2012 Minor in Molecular Biology & Biotechnology
BIOL2103	Biological sciences laboratory course	6	Pass in BIOL1110 From molecules to cells	N	Y	---	---	---	Dr W Y Lui, Biological Sciences	2012 Major in Biological Sciences 2012 Major in Ecology & Biodiversity 2012 Major in Food & Nutritional Science 2012 Major in Molecular Biology & Biotechnology	2012 Minor in Marine Biology 2012 Minor in Plant Science
BIOL2220	Introduction to biochemistry	6	Pass in BIOL1110 From molecules to cells	N	Y	---	---	100	Dr C S C Lo, Biological Sciences	2012 Major in Food & Nutritional Science	2012 Major in Molecular Biology & Biotechnology 2012 Minor in Food & Nutritional Science 2012 Minor in Molecular Biology & Biotechnology
BIOL2306	Ecology and evolution	6	Pass in BIOL1309 Ecology diversity or BIOL1110 From molecules to cells	N	Y	---	---	70	Prof D Dudgeon, Biological Sciences	2012 Major in Biological Sciences 2012 Major in Earth System Science 2012 Major in Ecology & Biodiversity 2012 Major in Food & Nutritional Science 2012 Major in Molecular Biology & Biotechnology 2012 Minor in Ecology & Biodiversity	2012 Minor in Marine Biology 2012 Minor in Molecular Biology & Biotechnology
BIOL2511	General physiology	6	Pass in BIOL1110 From molecules to cells	N	Y	---	---	50	Prof A O L Wong, Biological Sciences		
ENVS1301	Environmental life science	6	NIL	Y	Y	1	Dec	40	Dr T Vengatesen, Biological Sciences		2012 Major in Environmental Science 2012 Minor in Environmental Science 2012 Minor in Molecular Biology & Biotechnology

^ Availability of courses in 2013-2014 is subject to change.

Course Code	Title	Credit	Pre-requisite	Available in		Semester offered in 2012-2013	Exam held in 2012-2013	Quota	Course Coordinator	Major / Minor (The Major/Minor that this course appears as a required course)	
				2012-2013	2013-2014	0=year long 1=1st sem * 2=2nd sem S=summer TBC=To be confirmed	TBC= To be confirmed			Compulsory Course (Must Take)	Core Course (With Choices)
School of Biological Sciences (Cont'd)											
ENVS2015	Global change ecology	6	Pass in ENVS1301 Environmental life science	N	N	---	---	50	Dr C Dingle, Biological Sciences		2012 Major in Environmental Science 2012 Minor in Environmental Science
Centre for Applied English Studies											
CAES1000	Core University English	6	NIL	Y	Y	1, 2	Dec, May	---	Mr P D Desloge, English		
CAES9820	Academic English for science students	6	NIL	N	Y	---	---	---	Mr P D Desloge, English		
Department of Chemistry											
CHEM1041	Foundations of chemistry	6	Level 3 or above in HKDSE Combined Science with Chemistry component or Integrated Science, or equivalent. Not for students with Level 3 or above in HKDSE Chemistry.	Y	Y	1	Dec	150	Dr A P L Tong, Chemistry		
CHEM1042	General chemistry	6	Level 3 or above in HKDSE Chemistry or equivalent; students without Level 3 or above in HKDSE Chemistry but having a pass in CHEM1041 Foundations of Chemistry may be allowed to take this course.	Y	Y	1, 2	Dec, May	180	Dr A P L Tong, Chemistry	2012 Major in Biochemistry 2012 Major in Chemistry 2012 Minor in Chemistry	2012 Major in Environmental Science 2012 Minor in Environmental Science
CHEM2041	Principles of chemistry	6	Pass in CHEM1042 General Chemistry; and Not for students who have passed in CHEM2341 Inorganic Chemistry I or have already enrolled in this course; and Not for students who have passed in CHEM2441 Organic Chemistry I or have already enrolled in this course; and Not for students who have passed in CHEM2541 Physical Chemistry I, or have already enrolled in this course; and Not for Chemistry major students.	Y	Y	2	May	120	Dr I K Chu, Chemistry		2012 Major in Environmental Science 2012 Minor in Chemistry 2012 Minor in Environmental Science
CHEM2042	Principles of chemistry for pharmacy students	6	Pass in CHEM1042 General Chemistry; and Not for students who have passed in CHEM2041 Prinicples of Chemistry, or already enrolled in this course. (This course is for BPharm students only)	N	Y	---	---	---	Dr E L M Wong, Chemistry		
CHEM2241	Analytical chemistry I	6	Pass in CHEM1042 General Chemistry	Y	Y	2	May	80	Dr W T Chan, Chemistry	2012 Major in Chemistry	2012 Minor in Chemistry
CHEM2341	Inorganic chemistry I	6	Pass in CHEM1042 General Chemistry	Y	Y	2	May	130	Prof V W W Yam, Chemistry	2012 Major in Chemistry	2012 Minor in Chemistry
CHEM2441	Organic chemistry I	6	Pass in CHEM1042 General Chemistry	N	Y	---	---	---	Prof P Chiu, Chemistry	2012 Major in Biochemistry 2012 Major in Chemistry	2012 Minor in Chemistry
CHEM2442	Fundamentals of organic chemistry	6	Pass in CHEM1042 General chemistry; and Not for students who have passed CHEM2441 Organic chemistry I or have already enrolled in this course.	N	Y	---	---	---	Dr P H Toy, Chemistry		2012 Minor in Chemistry

Course Code	Title	Credit	Pre-requisite	Available in		Semester offered in 2012-2013	Exam held in 2012-2013	Quota	Course Coordinator	Major / Minor (The Major/Minor that this course appears as a required course)	
				2012-2013	2013-2014	0=year long 1=1st sem * 2=2nd sem S=summer TBC=To be confirmed	TBC= To be confirmed			Compulsory Course (Must Take)	Core Course (With Choices)
Department of Chemistry (Cont'd)											
CHEM2443	Fundamentals of organic chemistry for pharmacy students	6	Pass in CHEM1042 General chemistry; and Not for students who have passed in CHEM2442 Fundamentals of organic chemistry, or already enrolled in this course. (This course is for BPharm students only)	N	Y	---	---	---	Dr P H Toy, Chemistry		
CHEM2541	Physical chemistry I	6	Pass in CHEM1042 General chemistry	N	Y	---	---	---	Prof D L Phillips, Chemistry	2012 Major in Biochemistry 2012 Major in Chemistry	2012 Minor in Chemistry
School of Chinese											
CSCI9001	Practical Chinese for science students	6	NIL	N	N	---	---	---	Mr K W Wong, Chinese		
Department of Earth Sciences											
EASC1401	Blue planet	6	NIL	Y	Y	1, 2	Dec, May	---	Dr P Bach, Earth Sciences	2012 Major in Earth System Science	2012 Major in Environmental Science 2012 Minor in Earth Sciences 2012 Minor in Environmental Science
EASC1402	Principles of geology	6	NIL	Y	Y	1	Dec	---	Prof L S Chan, Earth Sciences	2012 Major in Earth System Science 2012 Major in Geology	2012 Minor in Earth Sciences
EASC1403	Geological heritage of Hong Kong	6	NIL	N	Y	---	---	---	Prof M F Zhou, Earth Sciences		
EASC1404	Early life on earth	6	NIL	Y	Y	2	May	50	Dr K H Lemke, Earth Sciences		
EASC2401	Fluid/Solid interactions in earth processes	6	Pass in EASC1401 Blue Planet or EASC1402 Principles of Geology	N	Y	---	---	---	Dr K Lemke, Earth Sciences	2012 Major in Earth System Science 2012 Major in Geology	2012 Minor in Earth Sciences
EASC2402	Field methods	6	Pass in EASC1402 Principles of Geology	Y	Y	2	No exam	---	Dr P Bach, Earth Sciences	2012 Major in Earth System Science 2012 Major in Geology	
EASC2404	Introduction to atmosphere and hydrosphere	6	Pass in EASC1401 Blue Planet or EASC1402 Principles of Geology	N	Y	---	---	---	TBC, Earth Sciences		2012 Major in Environmental Science 2012 Minor in Environmental Science
EASC2406	Geochemistry	6	Pass in EASC1402 Principles of Geology	N	Y	---	---	---	Dr S H Li, Earth Sciences	2012 Major in Earth System Science 2012 Major in Geology	
EASC2407	Mineralogy	6	Pass in EASC1402 Principles of Geology	N	Y	---	---	---	Prof M Sun, Earth Sciences	2012 Major in Geology	
EASC2408	Planetary geology	6	Pass in EASC1401 Blue planet or EASC1402 Principles of geology or PHYS1650 Nature of the universe	Y	Y	2	May	---	Dr M H Lee, Earth Sciences	2012 Major in Astronomy	
ENVS1401	Introduction to environmental science	6	NIL	Y	Y	1	Dec	---	Dr Y Zong, Earth Sciences	2012 Major in Environmental Science 2012 Minor in Environmental Science	
Department of Mathematics											
MATH1011	University mathematics I	6	Level 2 or above in HKDSE Mathematics or equivalent. 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 K H Law, Mathematics		
MATH1013	University mathematics II	6	Level 2 or above in Module 1, or Module 2 of HKDSE Mathematics or equivalent. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I. Not for students who have passed MATH1821, or have already enrolled in this course.	Y	Y	1, 2	Dec, May	---	Dr Y M Chan, Mathematics	2012 Major in Mathematics 2012 Major in Mathematics/Physics 2012 Major in Risk Management 2012 Major in Statistics 2012 Minor in Computational & Financial Mathematics 2012 Minor in Mathematics	2012 Minor in Actuarial Studies
MATH1641	Mathematical laboratory and modeling	6	NIL	Y	Y	2	May	20	Dr K H Chan, Mathematics		

Course Code	Title	Credit	Pre-requisite	Available in		Semester offered in 2012-2013	Exam held in 2012-2013	Quota	Course Coordinator	Major / Minor (The Major/Minor that this course appears as a required course)	
				2012-2013	2013-2014	0=year long 1=1st sem * 2=2nd sem S=summer TBC=To be confirmed	TBC= To be confirmed			Compulsory Course (Must Take)	Core Course (With Choices)
Department of Mathematics (Cont'd)											
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. Not for students who have passed MATH1013, or have already enrolled in this course.	Y	Y	1	Dec	---	Dr J T Chan, Mathematics	2012 BSc in Actuarial Science	
MATH1851	Calculus and ordinary differential equations	6	NIL (This course is exclusive for Engineering students.)	Y	Y	1, 2	Dec, May	460	Prof K M Tsang, Mathematics		
MATH1853	Linear algebra, probability and statistics	6	NIL This course is exclusively for Engineering students.	Y	Y	1, 2	Dec, May	460	Dr W K Ching, Mathematics		
MATH2012	Fundamental concepts of mathematics	6	Pass in MATH1013 University mathematics II	Y	Y	1, 2	Dec, May	---	Dr Y M Chan, Mathematics	2012 Major in Mathematics	
MATH2101	Linear algebra I	6	Pass in MATH1013 University mathematics II	N	Y	---	---	---	TBC, Mathematics	2012 Major in Mathematics 2012 Major in Mathematics/Physics 2012 Minor in Computational & Financial Mathematics 2012 Minor in Mathematics	
MATH2102	Linear algebra II	6	Pass in MATH2101 Linear algebra I	N	Y	---	---	---	TBC, Mathematics	2012 Major in Mathematics	
MATH2211	Multivariable calculus	6	Pass in MATH1013 University mathematics II	Y	Y	1, 2	Dec, May	---	Dr G Han, Mathematics	2012 Major in Mathematics 2012 Major in Mathematics/Physics 2012 Minor in Computational & Financial Mathematics 2012 Minor in Mathematics	
MATH2241	Introduction to mathematical analysis	6	Pass in MATH1013 University mathematics II	Y	Y	1, 2	Dec, May	---	Dr J T Chan, Mathematics	2012 Major in Mathematics	
MATH2822	Mathematical methods for actuarial science II	6	Pass in MATH1821 Mathematical methods for actuarial science I	Y	Y	2	May	---	Dr J T Chan, Mathematics	2012 BSc in Actuarial Science	
Department of Physics											
PHYS1050	Physics for engineering students	6	Level 3 or above in HKDSE Physics or Combined Science with Physics components or equivalent (This course is exclusive for Engineering students.)	Y	Y	1	Dec	---	Prof M H Xie, Physics		
PHYS1055	How things work	6	NIL	Y	Y	2	May	---	Dr M K Yip, Physics		
PHYS1056	Weather and climate	6	NIL	Y	Y	1	Dec	---	Dr K M Lee, Physics		
PHYS1057	Kitchen science	6	NIL	N	N	---	---	---	Dr A B Djurišić, Physics		
PHYS1058	Introduction to relativity	6	Level 3 or above in HKDSE Physics or equivalent; or Pass in PHYS1240 Physics by Inquiry	N	Y	---	---	---	TBC, Physics		
PHYS1150	Problem solving in physics	6	Level 3 or above in HKDSE Physics or equivalent; Students without Level 3 or above in HKDSE Physics but having a pass in PHYS1240 Physics by inquiry may be allowed to take this course	Y	Y	2	May	---	Dr K M Lee, Physics	2012 Major in Physics	

Course Code	Title	Credit	Pre-requisite	Available in		Semester offered in 2012-2013	Exam held in 2012-2013	Quota	Course Coordinator	Major / Minor (The Major/Minor that this course appears as a required course)	
				2012-2013	2013-2014	0=year long 1=1st sem * 2=2nd sem S=summer TBC=To be confirmed	TBC= To be confirmed			Compulsory Course (Must Take)	Core Course (With Choices)
Department of Physics (Cont'd)											
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 Physics for Engineering students or already enrolled in this course; and Not for students who have passed in PHYS1250 Fundamental Physics or already enrolled in this course.	Y	Y	1	Dec	---	Dr F K Chow, Physics		
PHYS1250	Fundamental physics	6	Level 3 or above in HKDSE Physics or equivalent; Students without Level 3 or above in HKDSE Physics but having a pass in PHYS1240 Physics by inquiry may be allowed to take this course; Not for students who have passed in PHYS1050 Physics for Engineering Students or already enrolled in this course.	Y	Y	1, 2	Dec, May	---	Dr M K Yip, Physics	2012 Major in Astronomy 2012 Major in Mathematics/Physics 2012 Major in Physics 2012 Minor in Astronomy 2012 Minor in Physics	
PHYS1650	Nature of the universe	6	NIL	Y	Y	1, 2	Dec, May	---	Dr K M Lee, Physics	2012 Major in Astronomy 2012 Minor in Astronomy	
PHYS2150	Methods in physics I	6	Pass in PHYS1150 Problem Solving in Physics or MATH1011 University Mathematics I or MATH1013 University Mathematics II or MATH1851 Calculus and Ordinary Differential Equations	N	Y	---	---	---	Dr F K Chow, Physics		
PHYS2155	Methods in physics II	6	Pass in PHYS1150 Problem Solving in Physics or MATH1011 University Mathematics I or MATH1013 University Mathematics II or MATH1851 Calculus and Ordinary Differential Equations	N	Y	---	---	---	Dr W Yao, Physics		
PHYS2250	Introductory mechanics	6	Pass in PHYS1250 Fundamental Physics	N	Y	---	---	---	Dr M K Yip, Physics	2012 Major in Astronomy 2012 Major in Mathematics/Physics 2012 Major in Physics 2012 Minor in Physics	
PHYS2255	Introductory electricity and magnetism	6	Pass in PHYS1250 Fundamental Physics	N	Y	---	---	---	Dr J C S Pun, Physics	2012 Major in Astronomy 2012 Major in Physics	
PHYS2260	Heat and waves	6	Pass in PHYS1250 Fundamental Physics	N	Y	---	---	---	TBC, Physics	2012 Major in Physics	
PHYS2265	Modern physics	6	Pass in PHYS1250 Fundamental Physics	N	Y	---	---	---	Dr F C C Ling, Physics	2012 Major in Astronomy 2012 Major in Mathematics/Physics 2012 Major in Physics 2012 Minor in Astronomy 2012 Minor in Physics	
PHYS2850	Atomic and nuclear physics	6	Pass in PHYS2265 Modern physics	N	Y	---	---	---	Dr S Zhang, Physics		

Course Code	Title	Credit	Pre-requisite	Available in		Semester offered in 2012-2013	Exam held in 2012-2013	Quota	Course Coordinator	Major / Minor (The Major/Minor that this course appears as a required course)	
				2012-2013	2013-2014	0=year long 1=1st sem * 2=2nd sem S=summer TBC=To be confirmed	TBC= To be confirmed			Compulsory Course (Must Take)	Core Course (With Choices)
Faculty of Science											
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 N K Tsing, Mathematics	2012 Major in Astronomy 2012 Major in Biochemistry 2012 Major in Biological Sciences 2012 Major in Chemistry 2012 Major in Earth System Science 2012 Major in Ecology & Biodiversity 2012 Major in Environmental Science 2012 Major in Food & Nutritional Science 2012 Major in Geology 2012 Major in Mathematics 2012 Major in Mathematics/Physics 2012 Major in Molecular Biology & Biotechnology 2012 Major in Physics 2012 Major in Risk Management 2012 Major in Statistics	
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	2012 Major in Astronomy 2012 Major in Biochemistry 2012 Major in Biological Sciences 2012 Major in Chemistry 2012 Major in Earth System Science 2012 Major in Ecology & Biodiversity 2012 Major in Environmental Science 2012 Major in Food & Nutritional Science 2012 Major in Geology 2012 Major in Mathematics 2012 Major in Mathematics/Physics 2012 Major in Molecular Biology & Biotechnology 2012 Major in Physics 2012 Major in Risk Management 2012 Major in Statistics	
Department of Statistics and Actuarial Science											
STAT1600	Statistics: ideas and concepts	6	Pass in MATH1013 University mathematics II, or have already enrolled in this course.	Y	Y	1, 2	Dec, May	---	Prof W K Li, Statistics and Actuarial Science	2012 Major in Risk Management 2012 Major in Statistics	
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 Extended Module 1 or 2 of Mathematics; and Not for students who have passed or already enrolled in any of the following courses: STAT2901 Probability and statistics: foundations of actuarial science, STAT1602 Business statistics, STAT2601 Probability and statistics I, STAT1603 Introductory statistics, ECON1280 Analysis of economic data	Y	Y	1, 2	Dec, May	---	Dr E A L Li, Statistics and Actuarial Science		2012 Major in Environmental Science 2012 Minor in Risk Management 2012 Minor in Statistics

Course Code	Title	Credit	Pre-requisite	Available in		Semester offered in 2012-2013	Exam held in 2012-2013	Quota	Course Coordinator	Major / Minor (The Major/Minor that this course appears as a required course)	
				2012-2013	2013-2014	0=year long 1=1st sem * 2=2nd sem S=summer TBC=To be confirmed	TBC= To be confirmed			Compulsory Course (Must Take)	Core Course (With Choices)
Department of Statistics & Actuarial Science (Cont'd)											
STAT1602	Business statistics	6	Not for students who have passed or already enrolled in any of the following courses: STAT1601 Elementary statistical methods, STAT2601 Probability and statistics I, STAT1603 Introductory statistics, STAT2901 Probability and statistics: foundations of actuarial science, ECON1280 Analysis of economic data (This course is exclusive for School of Business students.)	Y	Y	1, 2	Dec, May	---	Dr Y K Chung, Statistics and Actuarial Science		2012 Minor in Risk Management 2012 Minor in Statistics
STAT1603	Introductory statistics	6	(Level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent) or (Pass in MATH1011 University Mathematics I, or already enrolled in this course); and Not for students who have passed or already enrolled in any of these courses: STAT1601 Elementary statistical methods, STAT1602 Business statistics, STAT2601 Probability and statistics I, STAT2901 Probability and statistics: foundations of actuarial science	Y	Y	1	Dec	---	Dr G C S Lui, Statistics and Actuarial Science		2012 Major in Environmental Science 2012 Minor in Risk Management 2012 Minor in Statistics
STAT2601	Probability and statistics I	6	Pass in MATH1013 University mathematics II, or already enrolled in this course; or Pass in MATH1851 Calculus and ordinary differential equations and MATH1853 Linear algebra, probability and statistics; and Not for students who have passed in STAT1603 Introductory statistics, or already enrolled in this course; Not for students who have passed in STAT2901 Probability and statistics: foundations of actuarial science, or already enrolled in this course; and Not for BSc(ActuarSc) students.	Y	Y	1, 2	Dec, May	---	Dr Y K Chung, Statistics and Actuarial Science	2012 Major in Risk Management 2012 Major in Statistics	2012 Minor in Actuarial Studies 2012 Minor in Risk Management 2012 Minor in Statistics

Course Code	Title	Credit	Pre-requisite	Available in		Semester offered in 2012-2013	Exam held in 2012-2013	Quota	Course Coordinator	Major / Minor (The Major/Minor that this course appears as a required course)	
				2012-2013	2013-2014	0=year long 1=1st sem * 2=2nd sem S=summer TBC=To be confirmed	TBC= To be confirmed			Compulsory Course (Must Take)	Core Course (With Choices)
Department of Statistics & Actuarial Science (Cont'd)											
STAT2602	Probability and statistics II	6	Pass in STAT2601 Probability and statistics I	Y	Y	2	May	---	Dr K S Chong, Statistics and Actuarial Science	2012 Major in Risk Management 2012 Major in Statistics	2012 Minor in Actuarial Studies 2012 Minor in Risk Management 2012 Minor in Statistics
STAT2603	Data management with SAS	6	Pass in STAT1600 Statistics: ideas and concepts, or already enrolled in this course	N	Y	---	---	---	TBC, Statistics and Actuarial Science	2012 Major in Risk Management 2012 Major in Statistics	2012 Minor in Risk Management 2012 Minor in Statistics
STAT2605	Introduction to demographic and socio-economic statistics	6	(Level 2 or above in HKDSE Mathematics or Level 2 or above in HKDSE Exended Module 1 or 2 of Mathematics or equvialent); and Pass in or already enrolled in any of these courses: BIOL2102 Biostatistics, ECON1280 Analysis of economic data, STAT1601 Elementary statistical methods, STAT1602 Business statistics, STAT2601 Probability and statistics I, STAT1603 Introductory statistics, STAT2901 Probability and statistics: foundations of actuarial science	N	Y	---	---	---	TBC, Statistics and Actuarial Science		2012 Minor in Actuarial Studies 2012 Minor in Statistics
STAT2901	Probability and statistics: foundations of actuarial science	6	(Pass in MATH1821 Mathematical methods for actuarial science I (for BSc(ActuarSc) students) or already enrolled in this course) or (Pass in MATH1013 University mathematics II 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 Elementary statistical methods, STAT1602 Business statistics, STAT2601 Probability and statistics I, STAT1603 Introductory statistics	Y	Y	2	May	---	Prof H L Yang, Statistics and Actuarial Science	2012 BSc in Actuarial Science	2012 Minor in Actuarial Studies
STAT2902	Financial mathematics	6	Pass in STAT2901 Probability and statistics: foundations of actuarial science or already enrolled in this course; and Not for students who have passed in STAT3615 Practical mathematics for investment, or already enrolled in this course.	Y	Y	2	May	---	Prof K C Yuen, Statistics and Actuarial Science	2012 BSc in Actuarial Science	

Course Code	Title	Credit	Pre-requisite	Available in		Semester offered in 2012-2013	Exam held in 2012-2013	Quota	Course Coordinator	Major / Minor (The Major/Minor that this course appears as a required course)	
				2012-2013	2013-2014	0=year long 1=1st sem * 2=2nd sem S=summer TBC=To be confirmed	TBC= To be confirmed			Compulsory Course (Must Take)	Core Course (With Choices)
Common Core Courses											
CCCH9020	Science and Technology: Lessons from China	6	NIL	Y	Y	2	May	120	Prof L S Chan, Earth Sciences		
CCGL9016	Feeding the World	6	NIL	Y	Y	1	No exam	156	Dr H Corke, Biological Sciences		
CCGL9017	Food: Technology, Trade and Culture	6	NIL	Y	Y	2	May	120	Dr H Corke, Biological Sciences		
CCGL9033	Weapons of Mass Destruction: Science, Proliferation and Terrorism	6	NIL	Y	Y	1	No exam	156	Dr K H Lemke, Earth Sciences		
CCST9011	Biotechnology - Science and Impacts	6	NIL	Y	Y	1	No exam	144	Prof F C C Leung, Biological Sciences		
CCST9012	Our Place in the Universe	6	NIL	Y	Y	2	May	120	Prof S Kwok, 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	Y	Y	1	No exam	120	Dr H F Chau, Physics		
CCST9017	Hidden Order in Daily Life: A Mathematical Perspective	6	NIL	Y	Y	1	No exam	144	Dr T W Ng, Mathematics		
CCST9018	Origin and Evolution of Life	6	NIL	Y	Y	1	No exam	120	Dr S B Pointing, Biological Sciences		
CCST9019	Understanding Climate Change	6	NIL	Y	Y	1	No exam	156	Dr Z H Liu, Earth Sciences		
CCST9021	Hong Kong: Our Marine Heritage	6	NIL	Y	Y	2	No exam	120	Dr K M Y Leung, Biological Sciences		
CCST9022	How the Mass Media Depicts Science, Technology and the Natural World	6	NIL	Y	Y	2	No exam	120	Dr H F Chau, Physics		
CCST9023	The Oceans: Science and Society	6	NIL	Y	Y	2	No exam	120	Dr S C Chang, Earth Sciences		
CCST9026	Scientific Revolutions and their Impact on Modern Societies	6	NIL	Y	Y	1	No exam	144	Prof K S Cheng, Physics		
CCST9028	Critical Thinking About Science and Technology	6	NIL	Y	Y	2	May	120	Dr A B Djurišić, Physics		
CCST9030	Forensic Science: Unmasking Evidence, Mysteries and Crimes	6	NIL	Y	Y	2	No exam	120	Prof D L Phillips, Chemistry		
CCST9036	Material World: Past, Present, and Future	6	NIL	Y	Y	2	No exam	120	Prof W K Chan, Chemistry		
CCST9037	Mathematics: A Cultural Heritage	6	NIL	Y	Y	2	No exam	120	Dr N K Tsing, Mathematics		
CCST9038	Science and Science Fiction	6	NIL	Y	Y	1	No exam	144	Dr A B Djurišić, Physics		
CCST9039	Statistics and Our Society	6	NIL	Y	Y	2	May	120	Dr K C Cheung, Statistics and Actuarial Science		
CCST9043	It's All About Time	6	NIL	N	Y	---	---	---	Prof J G Malpas, Earth Sciences		

* As the 1st semester of 2012-13 will be shortened to cater for the double cohorts of UG freshmen, the teaching and learning activities for 1st semester courses will be adjusted accordingly. Assessment methods and weighting may also be adjusted which would be announced by the teachers at class. Written examination (if any) may be extended beyond the Xmas and the New Year holidays, up to January 5, 2013 if necessary.

SECTION IV

Equivalency of HKDSE and other qualifications

SCIENCE

SECTION IV Equivalency of HKDSE and other qualifications

Table of Equivalence between HKDSE and Other Qualifications

HKDSE	Grade	Equivalent Qualification to HKDSE				
		IB	**GCE**	**SATII**	**AP**	**Gao Kao (高考)**
Biology	3 or above	Biology (SL/HL)	Biology (AL)	Biology	Biology	Equivalent to fulfillment of all HKDSE requirements
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	
Mathematics	2 or above	Mathematics (SL)/Mathematical Studies (SL)	Mathematics (AL)	Mathematics Level 1 or 2		
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 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.

SECTION V

Science Majors on offer in 2012/13

SCIENCE

SECTION V Science Majors on offer in 2012/13

Majors offered by Science Faculty

Majors (15)

Astronomy
Biochemistry
Biological Sciences
Chemistry
Earth System Science
Ecology & Biodiversity
Environmental Science
Food & Nutritional Science
Geology
Mathematics
Mathematics/Physics
Molecular Biology & Biotechnology
Physics
Risk Management
Statistics

Major Title	Major in Astronomy
Offered to students admitted to Year 1 in	**2012**

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:

(1) identify and describe astrophysical phenomena with their professional knowledge
(by means of coursework and tutorial classes in the curriculum)
(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)
(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)
(4) communicate and collaborate with people effectively in scientific issues
(by means of group projects, tutorial sessions and presentation opportunities in the curriculum)
(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 Combination:
Minor in Astronomy

Required courses (96 credits)

1. Introductory level courses (48 credits)

Science Foundation Courses (12 credits)

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

Disciplinary 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	Modern physics (6)

2. Advanced level courses (42 credits)

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)
PHYS6650	Stellar atmospheres (6)

Plus at least 12 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS6XXX level), subject to prerequisite requirements.

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

PHYS3950	Directed studies in physics (6)
PHYS4950	Physics project (6)
PHYS4951	Physics internship (6)
PHYS4952	Research methods in physics (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 ('must take') 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 ("must take") 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) 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 in the second major must be taken to fulfill the credit requirement of the capstone experience.

4. Courses at the advanced level and capstone requirements are subject to change.

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:
Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected primary science major in order to satisfy the degree graduation requirements.

Major Title	Major in Biochemistry
Offered to students admitted to Year 1 in	**2012**

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:

(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)
(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)
(3) interpret and communicate scientific data and literature using appropriate scientific language
(by means of literature-based coursework and debate)
(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)
(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 Combination:
Minor in Biochemistry

Required courses (96 credits)

1. Introductory level courses (48 credits)

Science Foundation Courses (12 credits)

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

Disciplinary Courses (36 credits)

BIOC1600	Perspectives in biochemistry (6)
BIOL1110	From molecules to cells (6)
CHEM1042	General chemistry (6)
BIOC2600	Basic biochemistry (6)
CHEM2441	Organic chemistry I (6)
CHEM2541	Physical chemistry I (6)

2. Advanced level courses (42 credits)

BIOC3601	Metabolism (6)
BIOC3604	Essential techniques in biochemistry and molecular

	biology (6)
BIOL3401	Molecular biology (6)
BIOC4610	Advanced biochemistry I (6)
BIOC4613	Advanced techniques in biochemistry & molecular biology (6)

Plus at least 12 credits selected from the following courses:

BIOC3602	Understanding metabolism diseases (6)
BIOC3605	Sequence bioinformatics (6)
BIOC3606	Molecular medicine (6)
BIOL3402	Cell biology and cell technology (6)
BIOL3403	Immunology (6)
BIOL3404	Protein structure and function (6)
BIOL3408	Genetics (6)
CHEM3145	Principles of chemical biology (6)
CHEM3441	Organic chemistry II (6)
BIOC4611	Advanced biochemistry II (6)
BIOC4612	Molecular biology of the gene (6)
BIOL4417	'Omics' and systems biology (6)
CHEM4145	Medicinal chemistry (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

BIOC3607	Directed studies in biochemistry (6)
BIOC3616	Biochemistry internship (6)
BIOC4614	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 ('must take') 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 ("must take") 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) 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 in the second major must be taken to fulfill the credit requirement of the capstone experience.

4. Courses at the advanced level and capstone requirements are subject to change.

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:
Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected primary science major in order to satisfy the degree graduation requirements.

Major Title	Major in Biological Sciences
Offered to students admitted to Year 1 in	**2012**

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:

(1) understand concepts underpinning advances in cell biology and genetics, physiology and systems biology, diversity of life and environmental biology, and applied biology
(by means of coursework, tutorial classes and laboratory-based learning in the curriculum)
(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)
(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)
(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)
(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)
(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 Combination:
Major in Ecology & Biodiversity
Major in Food & Nutritional Science
Major in Molecular Biology & Biotechnology

Required courses (96 credits)

1. Introductory level courses (48 credits)

Science Foundation Courses (12 credits)

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

Disciplinary Courses (36 credits)

BIOL1110	From molecules to cells (6)
BIOL1111	Introductory microbiology (6)
BIOL1309	Evolutionary diversity (6)
BIOL2102	Biostatistics (6)
BIOL2103	Biological sciences laboratory course (6)
BIOL2306	Ecology and evolution (6)

2. Advanced level courses (at least 42 credits)

Students must select at least 1 course from each of the following area A, B, C & D:

(A) Genetics and cell biology

BIOL3401	Molecular biology (6)
BIOL3402	Cell biology and cell technology (6)
BIOL3403	Immunology (6)
BIOL3408	Genetics (6)

(B) Physiology and systems biology

BIOL3105	Animal physiology and environmental adaptation (6)
BIOL3107	Plant physiology (6)
BIOL3108	Microbial physiology (6)
BIOL3205	Human physiology (6)

(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 ecology (6)
BIOL3409	Business aspects of biotechnology (6)
BIOL4301	Fisheries and mariculture (6)
BIOL4401	Medical microbiology and applied immunology (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

BIOL3112	Biological sciences field course (6)
BIOL3113	Directed studies in biological sciences (6)
BIOL4113	Biological sciences project (12)
BIOL4114	Biological sciences internship (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 ('must take') 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 ("must take") 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) 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 in the second major must be taken to fulfill the credit requirement of the capstone experience.

4. Courses at the advanced level and capstone requirements are subject to change.

Remarks:
Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected primary science major in order to satisfy the degree graduation requirements.

Major Title	Major in Chemistry
Offered to students admitted to Year 1 in	**2012**

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:

(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)
(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)
(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)
(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)
(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)
(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 Combination:
Minor in Chemistry

Required courses (96 credits)

1. Introductory level courses (42 credits)

Science Foundation Courses (12 credits)

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

Disciplinary Courses (30 credits)

CHEM1042	General chemistry (6)
CHEM2241	Analytical chemistry I (6)
CHEM2341	Inorganic chemistry I (6)
CHEM2441	Organic chemistry I (6)
CHEM2541	Physical chemistry I (6)

2. Advanced level courses (48 credits)

CHEM3146	Principles and applications of spectroscopic techniques (6)	
CHEM3241	Analytical chemistry II: chemical instrumentation (6)	
CHEM3341	Inorganic chemistry II (6)	
CHEM3441	Organic chemistry II (6)	
CHEM3541	Physical chemistry II: introduction to quantum chemistry (6)	

Plus at least 12 credits selected from the following 18 credits of courses in two different areas:

CHEM4341	Advanced inorganic chemistry (6)	
CHEM4441	Advanced organic chemistry (6)	May take either CHEM4443 or CHEM4441 to fulfill this 12 credits requirement, but not both.
CHEM4443	Integrated organic synthesis (6)	May take either CHEM4443 or CHEM4441 to fulfill this 12 credits requirement, but not both.
CHEM4541	Physical chemistry III: statistical thermodynamics and kinetic theory (6)	

Plus at least 6 credits of advanced level Chemistry courses (CHEM3XXX or CHEM4XXX level, excluding CHEM3144 Directed studies in chemistry, CHEM4146 Chemistry literacy and research, CHEM4988 Chemistry internship and CHEM4941 HKUtopia: capstone experience for chemistry undergraduates), subject to pre-requisite requirements.

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

CHEM3144	Directed studies in chemistry (6)
CHEM4141	Chemistry project (12)
CHEM4146	Chemistry literacy and research (6)
CHEM4941	HKUtopia: capstone experience for chemistry undergraduates (6)
CHEM4988	Chemistry internship (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 ('must take') 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 ("must take") 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) 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 in the second major must be taken to fulfill the credit requirement of the capstone experience.

4. Courses at the advanced level and capstone requirements are subject to change.

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:
Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected primary science major in order to satisfy the degree graduation requirements.

Major Title	Major in Earth System Science
Offered to students admitted to Year 1 in	**2012**

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:

(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)
(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)
(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)
(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)
(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)
(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 Combination:
Minor in Earth Sciences

Required courses (96 credits)

1. Introductory level courses (48 credits)

Science Foundation Courses (12 credits)

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

Disciplinary Courses (36 credits)

BIOL1309	Evolutionary diversity (6)
EASC1401	Blue planet (6)
EASC1402	Principles of geology (6)
EASC2401	Fluid/Solid interactions in earth processes (6)
EASC2402	Field methods (6)
EASC2406	Geochemistry (6)

2. Advanced level courses (42 credits)

EASC3405	Earth observation (6)
EASC3411	Solid earth, ocean, amosphere interactions (6)
EASC4403	Biogeochemical cycles (6)
EASC4404	Earth system history (6)

Plus at least 18 credits selected from the following courses:

EASC3400	Directed studies in earth sciences (6)
EASC3403	Sedimentary environments (6)
EASC3406	Reconstruction of past climate (6)
EASC3408	Geophysics (6)
EASC3410	Hydrogeology (6)
EASC3412	Earth resources (6)
ENVS3007	Natural hazards and mitigation (6)
EASC4400	Earth sciences project (12)
EASC4408	Special topics in earth sciences (6)

3. Capstone requirement (6 credits)

EASC4405	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 ('must take') 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 ("must take") 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) 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 in the second major must be taken to fulfill the credit requirement of the capstone experience.

4. Courses at the advanced level and capstone requirements are subject to change.

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:
Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected primary science major in order to satisfy the degree graduation requirements.

Major Title	Major in Ecology & Biodiversity
Offered to students admitted to Year 1 in	**2012**

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:

(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)
(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)
(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)
(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)
(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)
(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)
(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 Combination:
Major in Biological Sciences
Minor in Ecology & Biodiversity

Required courses (96 credits)

1. Introductory level courses (42 credits)

Science Foundation Courses (12 credits)

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

Disciplinary 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)

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

Plus at least 36 credits selected from the following courses:

BIOL3109	Environmental microbiology (6)
BIOL3301	Marine biology (6)
BIOL3304	Fish biology (6)
BIOL3313	Freshwater ecology (6)
BIOL3314	Plant structure and evolution (6)
BIOL3318	Experimental intertidal ecology (6)
BIOL3319	Terrestrial ecology (6)
BIOL3320	The biology of marine mammals (6)
BIOL4301	Fisheries and mariculture (6)
BIOL4302	Ecological impact assessment (6)
BIOL4303	Animal behaviour (6)
BIOL4305	Conservation in practice (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

BIOL3112	Biological sciences field course (6)
BIOL3113	Directed studies in biological sciences (6)
BIOL4113	Biological sciences project (12)
BIOL4114	Biological sciences internship (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 ('must take') 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 ("must take") 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) 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 in the second major must be taken to fulfill the credit requirement of the capstone experience.

4. Courses at the advanced level and capstone requirements are subject to change.

Remarks:
Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected primary science major in order to satisfy the degree graduation requirements.

Major Title	Major in Environmental Science
Offered to students admitted to Year 1 in	**2012**

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:

(1) identify and describe different components of the environmental systems and key issues in environmental science
(by means of lectures, coursework, tutorial classes and laboratory-based learning in the curriculum)
(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 laboratory-based learning in the curriculum)
(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 laboratory-based learning in the curriculum)
(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 laboratory-based, project-based, presentation opportunities and capstone learning in the curriculum)

Impermissible Combination:
Minor in Environmental Science

Required courses (96 credits)

1. Introductory level courses (48 credits)

Science Foundation Courses (12 credits)

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

Disciplinary Courses (36 credits)

ENVS1401	Introduction to environmental science (6)	
STAT1601	Elementary statistical methods (6)	May take either STAT1601 or STAT1603 to fulfill this 36 credits requirement, but not both.
STAT1603	Introductory statistics (6)	May take either STAT1601 or STAT1603 to fulfill this 36 credits requirement, but not both.

Plus at least 12 credits selected from the following courses (Level 1):

CHEM1042	General chemistry (6)
EASC1401	Blue planet (6)

ENVS1301	Environmental life science (6)

Plus at least 12 credits selected from the following courses (Level 2):

BIOL2102	Biostatistics (6)
CHEM2041	Principles of chemistry (6)
EASC2404	Introduction to atmosphere and hydrosphere (6)
ENVS2015	Global change ecology (6)

2. Advanced level courses (42 credits)

ENVS3004	Environment, society and economics (6)

Plus at least 36 credits selected from the following courses:

BIOL3303	Conservation ecology (6)
CHEM3141	Environmental chemistry (6)
CHEM3241	Analytical chemistry II: chemical instrumentation (6)
EASC3405	Earth observation (6)
ENVS3003	Demographic principles in ecology and evolution (6)
ENVS3006	Environmental radiation (6)
ENVS3007	Natural hazards and mitigation (6)
ENVS3010	Sustainable energy and environment (6)
ENVS3042	Pollution (6)
ENVS3313	Environmental oceanography (6)
MATH3408	Computational methods and differential equations with applications (6)
STAT3611	Computer-aided data analysis (6)
ENVS4014	Environmental risk assessment and management (6)
ENVS4103	Ecological demography in changing environments (6)
ENVS4110	Environmental remediation (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

ENVS3018	Directed studies in envrionmental science (6)
ENVS4015	Environmental science project (6)
ENVS4016	Environmental science in practice (6)
ENVS4988	Environmental science internship (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 ('must take') 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 ("must take") 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) 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 in the second major must be taken to fulfill the credit requirement of the capstone experience.

4. Courses at the advanced level and capstone requirements are subject to change.

Remarks:
Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected primary science major in order to satisfy the degree graduation requirements.

Major Title	Major in Food & Nutritional Science
Offered to students admitted to Year 1 in	**2012**

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 safety 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:

(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)
(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)
(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)
(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)
(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)
(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 Combination:
Major in Biological Sciences
Minor in Food & Nutritional Science

Required courses (96 credits)

1. Introductory level courses (48 credits)

Science Foundation Courses (12 credits)

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

Disciplinary Courses (36 credits)

BIOL1110	From molecules to cells (6)
BIOL1201	Introduction to food and nutrition (6)
BIOL2102	Biostatistics (6)
BIOL2103	Biological sciences laboratory course (6)

BIOL2220	Introduction to biochemistry (6)
BIOL2306	Ecology and evolution (6)

2. Advanced level courses (42 credits)

BIOL3201	Food chemistry (6)
BIOL3202	Nutritional biochemistry (6)
BIOL3203	Food microbiology (6)

Plus at least 24 credits selected from the following courses:

BIOL3204	Nutrition and the life cycle (6)
BIOL3205	Human physiology (6)
BIOL3206	Clinical nutrition (6)
BIOL3207	Food and nutritional toxicology (6)
BIOL3208	Food safety and quality management (6)
BIOL3209	Food and nutrient analysis (6)
BIOL3210	Grain production and utilization (6)
BIOL3211	Nutrigenomics (6)
BIOL4201	Public health nutrition (6)
BIOL4204	Diet, brain function and behavior (6)
BIOL4205	Food processing and engineering (6)
BIOL4207	Meat and dairy sciences (6)
BIOL4209	Functional foods (6)
BIOL4210	Food product development (6)
BIOL4411	Plant and food biotechnology (6)

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

BIOL3112	Biological sciences field course (6)
BIOL3113	Directed studies in biological sciences (6)
BIOL4113	Biological sciences project (12)
BIOL4114	Biological sciences internship (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 ('must take') 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 ("must take") 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) 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 in the second major must be taken to fulfill the credit requirement of the capstone experience.

4. Courses at the advanced level and capstone requirements are subject to change.

5. Students who wish to specialize in a certain area may choose to emphasize selection of courses from the following lists:
(a) Food Science and Technology: BIOL3207 Food and nutritional toxicology; BIOL3208 Food safety and quality management; BIOL3209 Food and nutrient analysis; BIOL3210 Grain production and utilization; BIOL4205 Food processing and engineering; BIOL4207 Meat and dairy sciences; BIOL4209 Functional foods; BIOL4210 Food product development; BIOL4411 Plant and food biotechnology.
(b) Nutrition and Health Science: BIOL3204 Nutrition and the life cycle, BIOL3205 Human physiology; BIOL3206 Clinical nutrition; BIOL3207 Food and nutritional toxicology; BIOL3208 Food safety and quality management; BIOL3211 Nutrigenomics; BIOL4201 Public health nutrition.

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:
Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected primary science major in order to satisfy the degree graduation requirements.

Major Title	Major in Geology
Offered to students admitted to Year 1 in	**2012**

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:

(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)
(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)
(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)
(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)
(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 Combination:
Minor in Earth Sciences

Required courses (96 credits)

1. Introductory level courses (42 credits)

Science Foundation Courses (12 credits)

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

Disciplinary Courses (30 credits)

EASC1402	Principles of geology (6)
EASC2401	Fluid/Solid interactions in earth processes (6)
EASC2402	Field methods (6)
EASC2406	Geochemistry (6)
EASC2407	Mineralogy (6)

2. Advanced level courses (48 credits)

EASC3402	Petrology (6)
EASC3403	Sedimentary environments (6)
EASC3404	Structural geology (6)

EASC3408	Geophysics (6)
EASC3409	Igneous and metamorphic petrogenesis (6)
EASC4406	Earth dynamics (6)

Plus at least 12 credits selected from the following courses:

EASC3400	Directed studies in earth sciences (6)
EASC3406	Reconstruction of past climate (6)
EASC3410	Hydrogeology (6)
EASC3412	Earth resources (6)
EASC3413	Engineering geology (6)
EASC3414	Soil and rock mechanics (6)
ENVS3007	Natural hazards and mitigation (6)
EASC4400	Earth sciences project (12)
EASC4407	Regional geology (6)
EASC4408	Special topics in earth sciences (6)

3. Capstone requirement (6 credits)

EASC4401	Integrated field studies (6)

Notes:
1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('must take') 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 ("must take") 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) 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 in the second major must be taken to fulfill the credit requirement of the capstone experience.

4. Courses at the advanced level and capstone requirements are subject to change.

Remarks:
Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected primary science major in order to satisfy the degree graduation requirements.

Major Title	Major in Mathematics
Offered to students admitted to Year 1 in	**2012**

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, logistics, management, research and further studies.

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

(1) describe and present fundamental concepts in mathematics
(by means of coursework and learning activities in the major or minor curriculum)
(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)
(3) communicate in mathematical language and present scientific arguments
(by means of coursework, seminars, guided studies and projects)
(4) collaborate and work with other students in an effective manner
(by means of guided studies, projects and seminars)
(5) appreciate the beauty and power of mathematics
(by means of guided studies, projects and seminars)

Impermissible Combination:
Major in Mathematics/Physics
Minor in Computational & Financial Mathematics
Minor in Mathematics

Required courses (96 credits)

1. Introductory level courses (48 credits)

Science Foundation Courses (12 credits)

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

Disciplinary 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)

MATH3301	Algebra I (6)
MATH3401	Analysis I (6)
MATH3403	Functions of a complex variable (6)

Plus at least 24 credits advanced level Mathematics courses (MATH3XXX or MATH4XXX or MATH6XXX level), at least 12 credits of which should be from MATH4XXX or MATH6XXX level, excluding MATH4988 Mathematics internship, subject to pre-requisite requirements.

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

MATH4988	Mathematics internship (6)
MATH4999	Mathematics project (12)

Notes:
1. Double-counting of courses up to a maximum of 24 credits is permissible when a student with a science major opts to undertake a second major in science. The double-counted courses must include SCNC1111 Scientific method and reasoning (6 credits) and SCNC1112 Fundamentals of modern science (6 credits). Additional credits to be double-counted must be for courses required ('must take') 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 ("must take") 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) 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 in the second major must be taken to fulfill the credit requirement of the capstone experience.

4. Courses at the advanced level and capstone requirements are subject to change.

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.

Remarks:
Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected primary science major in order to satisfy the degree graduation requirements.

Major Title	Major in Mathematics/Physics
Offered to students admitted to Year 1 in	**2012**

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:

(1) identify and describe physical systems with a rigorous representation using their professional knowledge
(by means of coursework and tutorial classes in the curriculum)
(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)
(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)
(4) communicate and collaborate with people effectively in scientific issues
(by means of group projects, tutorial sessions and presentation opportunities in the curriculum)
(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 Combination:
Major in Mathematics
Major in Physics
Minor in Mathematics
Minor in Physics

Required courses (96 credits)

1. Introductory level courses (48 credits)

Science Foundation Courses (12 credits)

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

Disciplinary Courses (36 credits)

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

2. Advanced level courses (42 credits)

MATH3301	Algebra I (6)

MATH3401	Analysis I (6)
PHYS3350	Classical mechanics (6)
PHYS3351	Quantum mechanics (6)
MATH4501	Geometry (6)
PHYS4351	Advanced quantum mechanics (6)

Plus at least 6 credits of advanced level Mathematics or Physics courses (MATH3XXX or MATH4XXX or MATH6XXX or PHYS3XXX or PHYS4XXX or PHYS6XXX level), subject to prerequisite requirements.

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

MATH3888	Directed studies in mathematics (6)
PHYS3950	Directed studies in physics (6)
MATH4999	Mathematics project (12)
PHYS4950	Physics project (6)
PHYS4951	Physics internship (6)
PHYS4952	Research methods in physics (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 ('must take') 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 ("must take") 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) 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 in the second major must be taken to fulfill the credit requirement of the capstone experience.

4. Courses at the advanced level and capstone requirements are subject to change.

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.

Remarks:
Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected primary science major in order to satisfy the degree graduation requirements.

Major Title	Major in Molecular Biology & Biotechnology
Offered to students admitted to Year 1 in	**2012**

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:

(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)
(2) apply laboratory techniques essential to modern molecular science
(by means of coursework and laboratory-based and/or research-based opportunities in the curriculum)
(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)
(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)
(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 Combination:
Major in Biological Sciences
Minor in Molecular Biology & Biotechnology

Required courses (96 credits)

1. Introductory level courses (42 credits)

Science Foundation Courses (12 credits)

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

Disciplinary Courses (30 credits)

BIOL1110	From molecules to cells (6)	
BIOL2220	Introduction to biochemistry (6)	May take either BIOL2220 or BIOC2600 to fulfill this 30 credits requirement, but not both.
BIOC2600	Basic biochemistry (6)	May take either BIOL2220 or BIOC2600 to fulfill this 30 credits requirement, but not both.
BIOL2102	Biostatistics (6)	
BIOL2103	Biological sciences laboratory course (6)	

BIOL2306	Ecology and evolution (6)

2. Advanced level courses (48 credits)

BIOL3401	Molecular biology (6)
BIOL3402	Cell biology and cell technology (6)
BIOL4402	Microbial biotechnology (6)
BIOL4411	Plant and food biotechnology (6)
BIOL4415	Healthcare biotechnology (6)

Plus at least 18 credits selected from the following courses:

BIOL3403	Immunology (6)
BIOL3404	Protein structure and function (6)
BIOL3405	Molecular microbiology (6)
BIOL3406	Reproduction and reproductive biotechnology (6)
BIOL3407	Fermentation technology (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:

BIOL3112	Biological sciences field course (6)
BIOL3113	Directed studies in biological sciences (6)
BIOL4113	Biological sciences project (12)
BIOL4114	Biological sciences internship (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 ('must take') 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 ("must take") 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) 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 in the second major must be taken to fulfill the credit requirement of the capstone experience.

4. Courses at the advanced level and capstone requirements are subject to change.

Remarks:
Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected primary science major in order to satisfy the degree graduation requirements.

Major Title	Major in Physics
Offered to students admitted to Year 1 in	**2012**

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:

(1) identify and describe physical systems with their professional knowledge
(by means of coursework and tutorial classes in the curriculum)
(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)
(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)
(4) communicate and collaborate with people effectively in scientific issues
(by means of group projects, tutorial sessions and presentation opportunities in the curriculum)
(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 Combination:
Major in Mathematics/Physics
Minor in Physics

Required courses (96 credits)

1. Introductory level courses (48 credits)

Science Foundation Courses (12 credits)

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

Disciplinary 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	Modern physics (6)

2. Advanced level courses (42 credits)

PHYS3350	Classical mechanics (6)
PHYS3351	Quantum mechanics (6)
PHYS3450	Electromagnetism (6)
PHYS3550	Statistical mechanics & thermodynamics (6)

Plus at least 18 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS6XXX level), subject to prerequisite requirements.

3. Capstone requirement (6 credits)

At least 6 credits selected from the following courses:

PHYS3950	Directed studies in physics (6)
PHYS4950	Physics project (6)
PHYS4951	Physics internship (6)
PHYS4952	Research methods in physics (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 ('must take') 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 ("must take") 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) 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 in the second major must be taken to fulfill the credit requirement of the capstone experience.

4. Courses at the advanced level and capstone requirements are subject to change.

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:
Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected primary science major in order to satisfy the degree graduation requirements.

Major Title	Major in Risk Management
Offered to students admitted to Year 1 in	**2012**

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:

(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)
(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)
(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)
(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)
(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)
(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 Combination:
Major in Statistics
Minor in Risk Management
Minor in Statistics

Required courses (96 credits)

1. Introductory level courses (42 credits)

Science Foundation Courses (12 credits)

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

Disciplinary Courses (30 credits)

MATH1013	University mathematics II (6)
STAT1600	Statistics: ideas and concepts (6)
STAT2601	Probability and statistics I (6)
STAT2602	Probability and statistics II (6)
STAT2603	Data management with SAS (6)

2. Advanced level courses (48 credits)

STAT3600	Linear statistical analysis (6)
STAT3609	The statistics of investment risk (6)

STAT3615	Practical mathematics for investment (6)
STAT4601	Time-series analysis (6)

Plus at least 24 credits selected from the following courses:

STAT3603	Probability modelling (6)
STAT3610	Risk management and insurance (6)
STAT3612	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:

STAT4671	Directed studies in statistics (6)
STAT4672	Statistics project (12)
STAT4673	Statistics internship (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 ('must take') 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 ("must take") 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) 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 in the second major must be taken to fulfill the credit requirement of the capstone experience.

4. Courses at the advanced level and capstone requirements are subject to change.

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.

Remarks:
Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the selected primary science major in order to satisfy the degree graduation requirements.

Major Title	Major in Statistics
Offered to students admitted to Year 1 in	**2012**

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:

(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)
(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)
(3) equip with hands-on experience in data analysis using commercial statistical software, and be competent for data-analytic jobs which require advanced computational skills
(by means of coursework, tutorial classes and/or project-based learning in the curriculum)
(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)
(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)
(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 Combination:
Major in Risk Management
Minor in Risk Management
Minor in Statistics

Required courses (96 credits)

1. Introductory level courses (42 credits)

Science Foundation Courses (12 credits)

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

Disciplinary Courses (30 credits)

MATH1013	University mathematics II (6)
STAT1600	Statistics: ideas and concepts (6)
STAT2601	Probability and statistics I (6)
STAT2602	Probability and statistics II (6)
STAT2603	Data management with SAS (6)

2. Advanced level courses (48 credits)

STAT3600	Linear statistical analysis (6)

STAT3616	Advanced SAS programming (6)
STAT4601	Time-series analysis (6)
STAT4602	Multivariate data analysis (6)

Plus at least 24 credits from Lists A and B, among which at least 6 credits from List A:

List A:

STAT3602	Statistical inference (6)
STAT3603	Probability modelling (6)
STAT3604	Design and analysis of experiments (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	Data mining (6)
STAT3613	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:

STAT4671	Directed studies in statistics (6)
STAT4672	Statistics project (12)
STAT4673	Statistics internship (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 ('must take') 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 ("must take") 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) 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 in the second major must be taken to fulfill the credit requirement of the capstone experience.

4. Courses at the advanced level and capstone requirements are subject to change.

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.

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.

SECTION VI

Science Minors on offer in 2012/13

SCIENCE

SECTION VI Science Minors on offer in 2012/13

Minors offered by Science Faculty

Minors (16)

Actuarial Studies
Astronomy
Biochemistry
Chemistry
Computational & Financial Mathematics
Earth Sciences
Ecology & Biodiversity
Environmental Science
Food & Nutritional Science
Marine Biology
Mathematics
Molecular Biology & Biotechnology
Physics
Plant Science
Risk Management
Statistics

Minor Title	Minor in Actuarial Studies
Offered to students admitted to Year 1 in	**2012**

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:

(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)
(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 Combination:
Bachelor of Science in Actuarial Science

Required courses (42 credits)

1. Introductory level courses (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	Introduction to demographic and socio-economic statistics (6)
STAT2901	Probability and statistics: foundations of actuarial science (6)

2. Advanced level courses (30 credits)

At least 30 credits selected from the following courses:

STAT3615	Practical mathematics for investment (6)
STAT3901	Life contingencies (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)

Notes:
1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("must take") in the major-minor or double-minors, students have to make up the credits by taking replacement course in 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. Courses at the advanced level are subject to change.

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 Astronomy
Offered to students admitted to Year 1 in	**2012**

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:

(1) identify and describe astrophysical phenomena with fundamental knowledge in physics
(by means of coursework and tutorial classes in the curriculum)
(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)
(3) communicate and collaborate with people effectively in scientific issues
(by means of group projects, tutorial sessions and presentation opportunities in the curriculum)

Impermissible Combination:
Major in Astronomy

Required courses (42 credits)

1. Introductory level courses (18 credits)

PHYS1250	Fundamental physics (6)
PHYS1650	Nature of the universe (6)
PHYS2265	Modern physics (6)

2. Advanced level courses (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)
PHYS6650	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 ("must take") in the major-minor or double-minors, students have to make up the credits by taking replacement course in 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. Courses at the advanced level are subject to change.

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.

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 Biochemistry
Offered to students admitted to Year 1 in	**2012**

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:

(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)
(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)
(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 Combination:
Major in Biochemistry

Required courses (36 credits)

1. Introductory level courses (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)

At least 24 credits selected from the following courses:

BIOC3601	Metabolism (6)
BIOC3602	Understanding metabolism diseases (6)
BIOC3604	Essential techniques in biochemistry and molecular biology (6)
BIOC3605	Sequence bioinformatics (6)
BIOC3606	Molecular medicine (6)
BIOC3607	Directed studies in biochemistry (6)
BIOL3401	Molecular biology (6)
BIOL3402	Cell biology and cell technology (6)
BIOL3403	Immunology (6)
BIOL3404	Protein structure and function (6)
CHEM3145	Principles of chemical biology (6)
BIOC4610	Advanced biochemistry I (6)
BIOC4611	Advanced biochemistry II (6)

BIOC4612	Molecular biology of the gene (6)
BIOC4613	Advanced techniques in biochemistry & molecular biology (6)
BIOL4417	'Omics' and systems 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 ("must take") in the major-minor or double-minors, students have to make up the credits by taking replacement course in 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. Courses at the advanced level are subject to change.

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 Chemistry
Offered to students admitted to Year 1 in	**2012**

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:

(1) understand and apply the basic concepts of chemistry
(by means of coursework and laboratory-based learning in the curriculum)
(2) apply chemistry concepts in other subjects
(by means of coursework and laboratory-based learning in the curriculum)
(3) transfer the basic concepts to complement their major area of study
(by means of coursework and laboratory-based learning in the curriculum)

Impermissible Combination:
Major in Chemistry

Required courses (42 credits)

1. Introductory level courses (18 credits)

CHEM1042	General chemistry (6)	

Plus 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 and CHEM2442 are mutually exclusive.
CHEM2442	Fundamentals of organic chemistry (6)	CHEM2441 and CHEM2442 are mutually exclusive.
CHEM2541	Physical chemistry I (6)	

2. Advanced level courses (24 credits)

At least 24 credits of advanced level Chemistry courses (CHEM3XXX or CHEM4XXX level), subject to prerequisite requirements.

Notes:
1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("must take") in the major-minor or double-minors, students have to make up the credits by taking replacement course in 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. Courses at the advanced level are subject to change.

3. 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:
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 Computational & Financial Mathematics
Offered to students admitted to Year 1 in	**2012**

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:

(1) understand and describe fundamental concepts in computational and financial mathematics
(by means of coursework, tutorial classes and project-based learning in the curriculum)
(2) apply mathematical methods and analysis to real life problems
(by means of coursework, tutorial classes and project-based learning in the curriculum)
(3) communicate and discuss scientific issues related to mathematics
(by means of coursework, tutorial classes and presentation opportunities in the curriculum)

Impermissible Combination:
Major in Mathematics
Minor in Mathematics

Required courses (42 credits)

1. Introductory level courses (18 credits) (note 4)

MATH1013	University mathematics II (6)
MATH2101	Linear algebra I (6)
MATH2211	Multivariable calculus (6)

2. Advanced level courses (24 credits)

MATH3601	Numerical analysis (6)
MATH3906	Financial calculus (6)

Plus 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 ("must take") in the major-minor or double-minors, students have to make up the credits by taking replacement course in 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. Courses at the advanced level are subject to change.

3. 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.

4. Students having completed the two courses MATH1821 Mathematical methods for actuarial science I and MATH2822 Mathematical methods for actuarial science II are deemed to have satisfied the 18 credits Introductory Level Courses requirement of Computational & Financial Mathematics Minor. Such students should, however, take at least 30 credits of advanced courses in order to fulfil the credit requirement of the Minor.

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 Earth Sciences
Offered to students admitted to Year 1 in	**2012**

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:

(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)
(2) understand and describe the basic nomenclature used in Earth Sciences
(by means to coursework, tutorial classes and field-based learning in the curriculum)
(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 Combination:
Major in Earth System Science
Major in Geology

Required courses (36 credits)

1. Introductory level courses (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)

At least 24 credits of advanced level Earth Sciences courses (EASC3XXX or EASC4XXX level), subject to prerequisite requirements.

Notes:
1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("must take") in the major-minor or double-minors, students have to make up the credits by taking replacement course in 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. Courses at the advanced level are subject to change.

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 Ecology & Biodiversity
Offered to students admitted to Year 1 in	**2012**

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:

(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)
(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)
(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 Combination:
Major in Ecology & Biodiversity

Required courses (36 credits)

1. Introductory level courses (12 credits)

BIOL1309	Evolutionary diversity (6)
BIOL2306	Ecology and evolution (6)

2. Advanced level courses (24 credits)

BIOL3301	Marine biology (6)
BIOL3302	Systematics and phylogenetics (6)
BIOL3303	Conservation ecology (6)
BIOL3304	Fish biology (6)
BIOL3313	Freshwater ecology (6)
BIOL3314	Plant structure and evolution (6)
BIOL3318	Experimental intertidal ecology (6)
BIOL3319	Terrestrial ecology (6)
BIOL3320	The biology of marine mammals (6)
BIOL4301	Fisheries and mariculture (6)
BIOL4302	Ecological impact assessment (6)
BIOL4303	Animal behaviour (6)
BIOL4305	Conservation in practice (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 ("must take") in the major-minor or double-minors, students have to make up the credits by taking replacement course in 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. Courses at the advanced level are subject to change.

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 Environmental Science
Offered to students admitted to Year 1 in	**2012**

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:

(1) identify and describe different components of the environmental systems and key issues in environmental science
(by means of coursework, tutorial classes and laboratory-based learning in the curricululm)
(2) observe, describe, measure and analyze physical, biological and chemical characteristics of natural and man-made environments
(by means of coursework, tutorial classes and laboratory-based learning in the curricululm)
(3) appropriately use and critically analyze a range of forms and sources of environmental data, and assess environmental problems
(by means of coursework, tutorial classes and laboratory-based learning in the curricululm)
(4) gain skills in scientific inquiry and effective communication of global environmental problems, issues of resource management, policies and management methods
(by means of labtoratory-based, project-based, presentation opportunities and capstone learning in the curriculum)

Impermissible Combination:
Major in Environmental Science

Required courses (42 credits)

1. Introductory level courses (18 credits)

ENVS1401 Introduction to environmental science (6)

Plus at least 6 credits selected from the following courses (Level 1):

CHEM1042 General chemistry (6)

EASC1401 Blue planet (6)

ENVS1301 Environmental life science (6)

Plus at least 6 credits selected from the following courses (Level 2):

BIOL2102 Biostatistics (6)

CHEM2041 Principles of chemistry (6)

EASC2404 Introduction to atmosphere and hydrosphere (6)

ENVS2015 Global change ecology (6)

2. Advanced level courses (24 credits)

ENVS3004 Environment, society and economics (6)

Plus at least 18 credits selected from the following courses:

BIOL3303 Conservation ecology (6)

CHEM3141 Environmental chemistry (6)

CHEM3241 Analytical chemistry II: chemical instrumentation (6)

EASC3405 Earth observation (6)

ENVS3003	Demographic principles in ecology and evolution (6)
ENVS3006	Environmental radiation (6)
ENVS3007	Natural hazards and mitigation (6)
ENVS3010	Sustainable energy and environment (6)
ENVS3042	Pollution (6)
ENVS3313	Environmental oceanography (6)
MATH3408	Computational methods and differential equations with applications (6)
STAT3611	Computer-aided data analysis (6)
ENVS4014	Environmental risk assessment and management (6)
ENVS4103	Ecological demography in changing environments (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 ("must take") in the major-minor or double-minors, students have to make up the credits by taking replacement course in 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. Courses at the advanced level are subject to change.

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 Food & Nutritional Science
Offered to students admitted to Year 1 in	**2012**

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:

(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)
(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)
(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)
(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 Combination:
Major in Food & Nutritional Science

Required courses (36 credits)

1. Introductory level courses (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	Introduction to biochemistry (6)

2. Advanced level courses (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	Food and nutritional toxicology (6)
BIOL3208	Food safety and quality management (6)
BIOL3209	Food and nutrient analysis (6)
BIOL3210	Grain production and utilization (6)
BIOL3211	Nutrigenomics (6)
BIOL4201	Public health nutrition (6)
BIOL4204	Diet, brain function and behavior (6)

BIOL4205	Food processing and engineering (6)
BIOL4207	Meat and dairy sciences (6)
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 ("must take") in the major-minor or double-minors, students have to make up the credits by taking replacement course in 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. Courses at the advanced level are subject to change.

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 Marine Biology
Offered to students admitted to Year 1 in	**2012**

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:

(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)
(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)
(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)
(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)
(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 Combination:
NIL

Required courses (36 credits)

1. Introductory level courses (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)

BIOL3301	Marine biology (6)
ENVS3313	Environmental oceanography (6)

Plus at least 12 credits selected from the following courses:

BIOL3303	Conservation ecology (6)
BIOL3304	Fish biology (6)
BIOL3318	Experimental intertidal ecology (6)
BIOL3320	The biology of marine mammals (6)
BIOL4301	Fisheries and mariculture (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 ("must take") in the major-minor or double-minors, students have to make up the credits by taking replacement course in 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. Courses at the advanced level are subject to change.

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 Mathematics
Offered to students admitted to Year 1 in	**2012**

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:

(1) understand and describe fundamental concepts of mathematics
(by means of coursework, tutorial classes and project-based learning in the curriculum)
(2) apply mathematical methods and analysis to real life problems
(by means of coursework, tutorial classes and project-based learning in the curriculum)
(3) communicate and discuss scientific issues related to mathematics.
(by means of coursework, tutorial classes and presentation opportunities in the curriculum)

Impermissible Combination:
Major in Mathematics
Major in Mathematics/Physics
Minor in Computational and Financial Mathematics

Required courses (36 credits)

1. Introductory level courses (18 credits) (note 5)

MATH1013	University mathematics II (6)
MATH2101	Linear algebra I (6)
MATH2211	Multivariable calculus (6)

2. Advanced level courses (18 credits)

At least 18 credits of advanced level Mathematics courses (MATH3XXX or MATH4XXX or MATH6XXX level), subject to pre-requisite requirements.

Notes:
1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("must take") in the major-minor or double-minors, students have to make up the credits by taking replacement course in 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. Courses at the advanced level are subject to change.

3. 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.

4. 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.

5. Students having completed the two courses MATH1821 Mathematical methods for actuarial Science I and MATH2822 Mathematical methods for actuarial science II are deemed to have satisfied the 18 credits introductory level courses requirement of Mathematics minor. Such students should, however, take at least 24 credits of advanced courses in order to fulfil the credit requirement of the minor.

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 Molecular Biology & Biotechnology
Offered to students admitted to Year 1 in	**2012**

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:

(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)
(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)
(3) understand and describe the issues and concerns fundamental to the field
(by means of coursework and laboratory-based learning in the curriculum)

Impermissible Combination:
Major in Molecular Biology & Biotechnology

Required courses (36 credits)

1. Introductory level courses (12 credits)

At least 12 credits selected from the following courses:

BIOL1110	From molecules to cells (6)	
BIOL2220	Introduction to biochemistry (6)	May take either BIOL2220 or BIOC2600 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.
BIOL2102	Biostatistics (6)	
BIOL2103	Biological sciences laboratory course (6)	
BIOL2306	Ecology and evolution (6)	

2. Advanced level courses (24 credits)

BIOL3401	Molecular biology (6)

Plus at least 18 credits selected from the following courses:

BIOL3402	Cell biology and cell technology (6)
BIOL3403	Immunology (6)
BIOL3407	Fermentation technology (6)
BIOL3409	Business aspects of biotechnology (6)
BIOL4401	Medical microbiology and applied immunology (6)
BIOL4402	Microbial biotechnology (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 ("must take") in the major-minor or double-minors, students have to make up the credits by taking replacement course in 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. Courses at the advanced level are subject to change.

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 Physics
Offered to students admitted to Year 1 in	**2012**

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:

(1) identify and describe physical systems with fundamental knowledge in physics
(by means of coursework and tutorial classes in the curriculum)
(2) analyze some physics problems qualitatively and quantitatively
(by means of coursework, tutorial classes and laboratory works in the curriculum)
(3) communicate and collaborate with people effectively in scientific issues
(by means of group projects, tutorial sessions and presentation opportunities in the curriculum)

Impermissible Combination:
Major in Mathematics/Physics
Major in Physics

Required courses (42 credits)

1. Introductory level courses (18 credits)

PHYS1250	Fundamental physics (6)
PHYS2250	Introductory mechanics (6)
PHYS2265	Modern physics (6)

2. Advanced level courses (24 credits)

At least 24 credits of advanced level Physics courses (PHYS3XXX or PHYS4XXX or PHYS6XXX level), subject to prerequisite requirements.

Notes:
1. Double counting of credits is not permissible for major-minor or double-minors combinations. For a course appears as a core course ("must take") in the major-minor or double-minors, students have to make up the credits by taking replacement course in 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. Courses at the advanced level are subject to change.

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.

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 Plant Science
Offered to students admitted to Year 1 in	**2012**

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:

(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)
(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)
(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 Combination:
NIL

Required courses (36 credits)

1. Introductory level courses (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)

2. Advanced level courses (24 credits)

At least 24 credits selected from the following courses:

BIOL3107	Plant physiology (6)
BIOL3111	Economic botany (6)
BIOL3210	Grain production and utilization (6)
BIOL3314	Plant structure and evolution (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 ("must take") in the major-minor or double-minors, students have to make up the credits by taking replacement course in 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. Courses at the advanced level are subject to change.

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 Risk Management
Offered to students admitted to Year 1 in	**2012**

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:

(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)
(2) apply elementary methods and models for risk assessment and management
(by means of coursework, tutorial classes and project-based learning in the curriculum)
(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 Combination:
Major in Risk Management
Major in Statistics
Minor in Statistics

Required courses (42 credits)

1. Introductory level courses (12 credits)

At least 6 credits selected from the following courses:

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

Plus at least 6 credits selected from the following courses:

STAT2602	Probability and statistics II (6)
STAT2603	Data management with SAS (6)

2. Advanced level courses (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	Data mining (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 ("must take") in the major-minor or double-minors, students have to make up the credits by taking replacement course in 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. Courses at the advanced level are subject to change.

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	**2012**

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:

(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)
(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)
(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 Combination:
Major in Risk Management
Major in Statistics
Minor in Risk Management

Required courses (42 credits)

1. Introductory level courses (12 credits)

At least 6 credits selected from the following courses:

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

Plus at least 6 credits selected from the following courses:

STAT2602	Probability and statistics II (6)
STAT2603	Data management with SAS (6)
STAT2605	Introduction to demographic and socio-economic statistics (6)

2. Advanced level courses (30 credits)

At least 30 credits selected from the following courses:

STAT3600	Linear statistical analysis (6)
STAT3602	Statistical inference (6)
STAT3603	Probability modelling (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	Data mining (6)
STAT3613	Marketing engineering (6)
STAT3614	Business forecasting (6)
STAT3616	Advanced SAS programming (6)
STAT3617	Sample survey methods (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 ("must take") in the major-minor or double-minors, students have to make up the credits by taking replacement course in 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. Courses at the advanced level are subject to change.

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.

SECTION VII

Students taking double Majors,

Major-Minor or double Minors with overlapping course requirements

SCIENCE

SECTION VII 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 when a student with a science major opts to undertake a second major in science.

2. 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 ('must take') by both majors.

3. 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.

4. If more than 24 credits (including SCNC1111 & SCNC1112) are listed as required courses ("must take") 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) in the second major. The replacement course(s) must have the same prefix and at the same or higher level as the double-counted course(s).

5. Double counting of credits is not permissible for major–minor or double-minors combinations. When a course is required ("must take") both by the major and minor or by both minors, the student must take a replacement course for the minor. The replacement course must have the same prefix and at the same or higher level as the course to be replaced.

6. For situations 4 and 5 above, students have to complete the form "Application for Taking a Replacement Course for the Course Required in Two Different Majors/Minors."

SECTION VIII

Course Descriptions of BSc, Language,
Common Core Courses on offer in 2012-13

SCIENCE

BIOC1600 Perspectives in biochemistry (6 credits)		**Academic Year**	**2012**
Offering Department	Biochemistry	**Quota**	---
Course Co-ordinator	Dr J Tanner, Biochemistry *(jatanner@hku.hk)*		
Teachers Involved	Dr S Bevan, Biochemistry Dr L Y L Cheng, Biochemistry Dr J Tanner, Biochemistry Dr B C W Wong, Biochemistry		
Course Objectives	- Teach students a biochemical perspective on each of the Basic Sciences focusing on concepts fundamental to 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.		
Course Contents & Topics	A Biochemical Perspective on the Basic Sciences A. Chemistry for Biochemistry Revisiting the elements and bonding (from carbon to Coenzyme A); Resonance and orbital theory (a focus on the electron); Structure and conformation (thinking in 3 dimensions); Isomerism (from mirrors to thalidomide); Water (the universal biochemical solvent); Quantitation in chemistry (who was Avogadro anyway?). B. Biology for Biochemistry The basic building blocks of life (proteins, DNA, lipids, carbohydrate); The Central Dogma of Molecular Biology; Evolution (considering molecular evolution); Origins of life (the chicken-egg paradox of proteins and DNA) C. Physics and Mathematics for Biochemistry Thermodynamics from a Biological Perspective; Introduction to molecular recognition and binding (DNA melting); Statistics for biochemistry (applied statistics for what you really need to know); Thinking numbers (exponentials, logs and the limits of life). D. Inspiring Biochemistry The protein (from Perutz to the frontier of proteomics); The gene (from the double helix to the human genome project and how it failed to live up to its expectations); Vitamins and disease (stories of scientific discovery motivated by human suffering); Synthetic biology (a cure to the world's energy problems or misplaced trust in dangerous technology); The challenges of modern-day genetics (will we ever really understand individuality; Drugs-successes, failures, and perhaps the most challenging business on earth.		
Course Learning Outcomes	On successful completion of this course, students should be able to: 1. Describe the basics of biomolecular structure from a chemical perspective, thereby integrating the basic sciences of biology, chemistry and physics into a biochemical perspective. 2. Apply knowledge of biomolecular structure to review major discoveries and contemporary issues in molecular biology. 3. Interpret scientific data and discuss major issues in biochemistry using the scientific literature. 4. Demonstrate skills in working and collaborating together with colleagues in practicals and in presentation of scientific ideas. 5. Relate how biochemistry intersects with the three basic sciences of biology, chemistry and physics, and recognize the transition from school to university level study.		
Pre-requisites (and Co-requisites and Impermissible combination)	Level 3 or above in HKDSE Biology, Chemistry, or Combined Science with Biology or Chemistry component, or equivalent		
Offer in 2012 - 2013	Y 1st sem	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

A	Exceptionally good performance demonstrating comprehensive understanding of the subject matter; critical insight into use of scientific data and the scientific literature; superior presentation and group collaboration skills.
B	Good performance demonstrating full understanding of the subject matter; coherent insight into use of scientific data and the scientific literature; good presentation and group collaboration skills.
C	Satisfactory performance demonstrating adequate understanding of the subject matter; some insight into use of scientific data and the scientific literature; some presentation and group collaboration skills.
D	Limited performance demonstrating some understanding of basic subject matter; some ability to use scientific data and the scientific literature; limited presentation and group collaboration skills.
Fail	Poor understanding of subject matter; with little to no insight into use of scientific data; no understanding of the scientific literature and unable to present or collaborate.

Course Type	Lecture-based course

Course Teaching & Learning Activities

Activities	**Details**	**No. of Hours**
Lectures - contact hours		36
Tutorials - contact hours		12
Group work - contact hours		6
Project work - contact hours		6
Reading / Self study		70
Assessment		10

Assessment Methods and Weighting	**Methods**	**Details**	**Weighting in final course grade (%)**
	Test	mid-term	30
	Assignments	including practical writeup	40
	Project reports	outreach project	30
Required/recommended reading and online materials	TBC		

BIOL1110 From molecules to cells (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	280
Course Co-ordinator	Prof B K C Chow, Biological Sciences *(bkcc@hku.hk)*		
Teachers Involved	Prof B K C Chow, Biological Sciences Dr S B Pointing, Biological Sciences Dr W Y Lui, Biological Sciences Dr C S C Lo, Biological Sciences		
Course Objectives	This course aims to provide basic conceptual understanding of the biology of molecules and cells to underpin later studies in applied biology, genetics, biochemistry, nutrition, biotechnology, microbiology, plant and animal physiology and developmental biology.		
Course Contents & Topics	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 divided into 4 parts and the following is a list of some of the questions to be asked and discussed: Genes and inheritance: How do children resemble their parents? What is the central dogma of biology? What are the rules of genetic inheritance? What determines gender and sexuality? Why is that children resemble, but not identical to, their parents? What happen if some genes are non-functional or mutated? Metabolism and Health: How are diets related to good health? Do all humans have the same dietary requirements? Why can't we live without plants? Cells and cell division: What are the common features in a cell? How do cells communicate and assemble themselves to form tissues and organs? What is a cell cycle and how it is regulated? What happens if cell-cycle control system goes wrong? How newly formed cells commit themselves for differentiation? Genetic engineering and modern biology: To what extent can genes be modified? Is gene therapy the future of medicines? Is genetically modified food safe for consumption? What are the Genome Projects and why have they been important?		
Course Learning Outcomes	On successful completion of this course, students should be able to: 1. Understand the relationships between genes in a genome and the inherited phenotypes expressed in a living organism. 2. Learn the underlying principle on how mutation of a gene can lead to the development of a genetic disease. 3. Understand the importance of dietary intake of biomolecules in relationship to good health. 4. Describe various stages in a cell division and that disturbance of this process may result in cancer development. 5. Describe concepts used in genetic engineering. 6. Know some applications of genetic engineering in gene therapy and production of genetically modified food.		
Pre-requisites (and Co-requisites and Impermissible combination)	NIL		
Offer in 2013 - 2014	Y 2nd sem	**Examination**	May
Offer in 2014 - 2015	Y		
Course Grade	A+ to F		

Grade Descriptors

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. 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.
Fail	Demonstrate little or no evidence of command of knowledge required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organizational skills are minimally effective or ineffective. Writings reveal an absence of intellectual engagement with concepts or theories. Writings are irrelevant or superficial.

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 (%)**
Examination		80
Project reports	group project	20

BIOL1111 Introductory microbiology (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	80
Course Co-ordinator	Dr V Dvornyk, Biological Sciences *(dvornyk@hku.hk)*		
Teachers Involved	Dr V Dvornyk, Biological Sciences		
Course Objectives	To introduce students to the diversity and function of microorganisms; and relate this to their importance in the natural environment, disease and public health, food production and spoilage and the biotechnology industry.		
Course Contents & Topics	Evolutionary diversity of bacteria, archaea, eukarya and viruses; Metabolic strategies, cell biology and genetics; Microbial ecology, marine microbiology, terrestrial microbiology; Microbial interactions with animals and plants; The human microbiome; Medical microbiology and immunology; Biotechnology applications; Food spoilage and food fermentations.		
Course Learning Outcomes	On successful completion of this course, students should be able to: 1. Describe the key features of the major microbial phyla and place them in an evolutionary context. 2. Explain the major physiological and genetic processes in prokaryotes and eukaryotic microorganisms and compare the similarities and differences between these two domains. 3. Identify the microorganisms involved and their role in ecological processes, human disease and medicine, food production and spoilage, and biotechnology.		
Pre-requisites (and Co-requisites and Impermissible combination)	NIL		
Offer in 2012 - 2013	Y 1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

A	(85-100%) Meets the standard of excellence. All criteria are addressed. Organization of ideas and clarity are excellent. Additional reading or research is evident. Ideas show an exceptional understanding of concepts. Arguments are highly persuasive and show excellent judgment and prioritization of issues. Presentation is highly creative and appealing.
B	(70-84%) Approaches the standard of excellence. All criteria are addressed. Organization of ideas and clarity are very good. Ideas show a complete understanding of concepts. Arguments are persuasive and prioritize major issues. Presentation is creative and appealing.
C	(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. Inability to identify major criteria. Very weak organization of ideas and clarity. Ideas show a lack of understanding of concepts. No coherent argument. Presentation lacks creativity or is unappealing.

Course Type	Lecture with laboratory component course

Course Teaching & Learning Activities

Activities	**Details**	**No. of Hours**
Lectures - contact hours		24
Laboratory - contact hours		24
Tutorials - contact hours		6
Reading / Self study		100

Assessment Methods and Weighting

Methods	**Details**	**Weighting in final course grade (%)**
Examination		70
Laboratory reports		30

Required/recommended reading and online materials	Brock Biology of Microorganisms, Pearson Benjamin Cummings, 12th Edition, 2009 [HKU library call number 576.B86].
Additional Course Information	Website: HKU Portal

BIOL1201 Introduction to food and nutrition (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	110
Course Co-ordinator	Dr E T S Li, Biological Sciences *(etsli@hku.hk)*		
Teachers Involved	Dr E T S Li, Biological Sciences Dr J W F Wan, Biological Sciences Prof N P Shah, Biological Sciences		
Course Objectives	To enable student to appreciate the multidisciplinary nature of the study of Food and Nutrition. From the farmer's field to the dinner table, a basic understanding of food production, processing and storage will be covered. Food safety, food selection behaviour as well as balanced nutrition as part of life style instrumental to good health will be discussed. This is an independent course which can be taken by students from various disciplines. It also prepares students for further studies in Food and Nutritional Science.		
Course Contents & Topics	Topics will include food composition and functional properties of major components; food additives; food hygiene, safety and regulation; determinants of food choice; examples of complex processed foods; healthy eating-concepts and practice; essential nutrients; dietary supplements; fad diets.		
Course Learning Outcomes	On successful completion of this course, students should be able to: 1. Understand the key components of food and be able to discuss their functional properties. 2. Understand the significance of food safety and be able to identify sources of contamination. 3. Understand the concept of a balanced diet. 4. Critically assess and identify quack or fad diets.		
Pre-requisites (and Co-requisites and Impermissible combination)	NIL		
Offer in 2012 - 2013	Y 1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

A	Demonstrate thorough grasp of the subject matter covered. Show exceptional ability to articulate concepts and integrate knowledge. Demonstrate highly effective organization / writing skills.
B	Demonstrate substantial grasp of the subject matter covered. Show full capacity to use the appropriate concepts and assimilate the materials to solve problems. Demonstrate effective organization / writing skills.
C	Demonstrate general but incomplete grasp of the subject matter covered. Show ability to apply concepts to solve simple problems. 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. Ability to apply concepts and solve simple problems is limited. Demonstrate basic organization / writing skills.
Fail	Demonstrate little or no grasp, with retention of little relevant information, of the subject matter covered. Fail to understand concepts and show minimal competence in problem solving. Demonstrate poor organization and writing skills.

Course Type: Lecture-based course

Course Teaching & Learning Activities

Activities	**Details**	**No. of Hours**
Lectures - contact hours		36
Tutorials - contact hours	student-centered learning	12
Reading / Self study		100

Assessment Methods and Weighting

Methods	**Details**	**Weighting in final course grade (%)**
Examination		60
Test		20
Assignments		20

Required/recommended reading and online materials

Hotchkiss J.H. & Porter N.N. Food Science. Chapman & Hall, 1995
Fenema O.R. Food Chemistry. Marcel Dekker, 1996
Brown A. Understanding Food : Principles and Preparation. Wadsworth, Cengage Learning, 2011
Whitney E. & Rolfes S.R. Understanding Nutrition. Wadsworth, Cengage Learning, 2011

BIOL1309 Evolutionary diversity (6 credits)		**Academic Year**	**2012**
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 Prof Y Sadovy, Biological Sciences Dr L Karczmarski, Biological Sciences Dr M Yasuhara, Biological Sciences Dr D Thomson, Biological Sciences		
Course Objectives	To provide students with an introduction to the diversity of plant and animal life. Recent research has resulted in fundamental changes in our understanding of evolutionary history (phylogeny). Current evolutionary trees will be used as the basis for a survey of different groups in phylogenetic sequence, and for understanding how structures, processes and behaviours have changed through time.		
Course Contents & Topics	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 successful completion of this course, students should be able to: 1. Interpret phylogenies in order to understand the relatedness of taxonomic groups and the pattern of evolutionary changes in structures, processes and behaviours. 2. Describe the characteristics of different evolutionary lineages of plants and animals and recall the names of the main taxonomic groups. 3. Explain the possible selective advantages of the highlighted structures, processes and behaviours.		
Pre-requisites (and Co-requisites and Impermissible combination)	NIL		
Offer in 2012 - 2013	Y 2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

A	Demonstrate thorough mastery at an advanced level of extensive knowledge required for attaining most or all of the course learning outcomes, with extensive use of named examples. Show evidence of significant critical abilities and logical thinking. Apply highly effective presentation skills.
B	Demonstrate substantial command of knowledge required for attaining most of the course learning outcomes, with some use of named examples. Show evidence of critical abilities and logical thinking. Apply effective presentation skills.
C	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes, with only limited use of named examples. Show evidence of some critical abilities and logical thinking. Apply moderately effective presentation skills.
D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes, with insufficient use of named examples. Show evidence of limited critical abilities and logical thinking. Apply limited presentation skills.
Fail	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes, without use of named examples. Show little or no evidence of critical abilities and logical thinking. Presentational skills are minimally effective or ineffective.

Course Type	Lecture with laboratory component course

Course Teaching & Learning Activities

Activities	**Details**	**No. of Hours**
Lectures - contact hours		24
Laboratory - contact hours		36
Reading / Self study		100

Assessment Methods and Weighting

Methods	**Details**	**Weighting in final course grade (%)**
Examination		70
Laboratory reports		30

Required/recommended reading and online materials	P. H. Raven, R. F. Evert & S. E. Eichhorn: Biology of Plants (Freeman & Worth, New York, 2005, 7th ed.) E. E. Ruppert & R. D. Barnes: Invertebrate Zoology (Saunders, 2003, 7th ed.) TBC
Course Website	http://www.biosch.hku.hk/ecology/lsc/biol0604/

BIOL2102 Biostatistics (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	60
Course Co-ordinator	Dr K M Y Leung, Biological Sciences *(kmyleung@hku.hk)*		
Teachers Involved	Dr K M Y Leung, Biological Sciences		
Course Objectives	To introduce students to experimental design and statistical data analysis at an elementary to intermediate level, with an emphasis on practical applications of statistical methods to experimental and observational data in biology, biochemistry, biotechnology, food and nutritional science, ecology and environmental sciences. Students will explore the process by which scientists formulate research questions, set null hypotheses, design experiments, collect data and apply statistics to test the hypotheses.		
Course Contents & Topics	Sampling and experimental design; descriptive statistics; hypothesis testing; analysis of frequency distributions; probability distributions (e.g. Normal, binominal and Poisson) and their applications; testing of goodness of fit and contingency tables; analysis of variance and multiple comparisons; correlation and regression techniques; power analyses; non-parametric methods; introduction to multivariate statistics; use of appropriate computer software packages for data processing, analysis and graphical presentation. To illustrate each statistical method, examples will be drawn from real cases.		
Course Learning Outcomes	On successful completion of this course, students should be able to: 1. Formulate biological questions into statistical questions. 2. Design experiments effectively. 3. Make quantitative estimation of biologically meaningful parameters. 4. Use EXCEL and SPSS to carry out most of the statistical computations. 5. Understand the assumptions of commonly used statistical methods. 6. Think critically.		
Pre-requisites (and Co-requisites and Impermissible combination)	Pass in BIOC1600 Perspectives in biochemistry or BIOL1110 From molecules to cells or BIOL2306 Ecology and evolution or ENVS1301 Environmental life science		
Offer in 2012 - 2013	Y 2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

A	Demonstrate thorough grasp of the subject and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought. Apply highly effective computational skills and techniques for basic statistical analyses. Be able to critically use data and statistical results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills.
B	Demonstrate substantial grasp of the subject and skills required for attaining at least most of the course learning outcomes. Present evidence of analytical and critical abilities and logical thinking. Apply effective computational skills and techniques for basic statistical analyses. Be able to correctly use data and statistical results to draw appropriate conclusions. Apply effective organizational and presentational skills.
C	Demonstrate general but incomplete grasp of the subject and skills required for attaining some of the course learning outcomes. Present evidence of some analytical and critical abilities and logical thinking. Apply moderately effective computational skills and techniques for basic statistical analyses. Demonstrate mostly correct but some erroneous use of data and statistical results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.
D	Demonstrate partial and limited grasp of the subject and skills required for attaining some of the course learning outcomes. Present evidence of some coherent 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	Demonstrate evidence of little or no grasp of the subject and skills required for attaining any of the course learning outcomes. Present evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Apply minimally effective or ineffective computational skills and techniques for basic statistical analyses. Demonstrate misuse of data and statistical results and/or unable to draw appropriate conclusions. Apply minimally effective or ineffective organizational and presentational skills.

Course Type: Lecture with laboratory component course

Course Teaching & Learning Activities

Activities	**Details**	**No. of Hours**
Lectures - contact hours		24
Laboratory - contact hours	computer laboratory/tutorial/projects	40
Reading / Self study		100

Assessment Methods and Weighting

Methods	**Details**	**Weighting in final course grade (%)**
Examination		50
Assignments	course assignments/projects/quizzes	50

Required/recommended reading and online materials: Zar, J. H.: Biostatistical Analysis (Prentice-Hall / Englewood Cliffs, N.J., 1999, 4th edition)

Course Website: http://www.biosch.hku.hk/ecology/lsc/biol1608/

ENVS1301 Environmental life science (6 credits)		**Academic Year**	**2012**
Offering Department	Biological Sciences	**Quota**	40
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, and climate change.		
Course Contents & Topics	This course is a combination of lectures, group discussion/debate and field trips cum tutorials. We first explore the fundamental interactions between organisms and their environment. We then explore environmental constraints on life at various ecosystems (like marine, freshwater, and terrestrial). Students will also learn how factors such as urbanization, climate change, and anthropogenic impacts affect life at population and ecosystem levels. Similarly, students will be exposed to the incredible interrelationships that are basic to ecological principles and the impact that human development has upon these interrelationships. After learning basics of environmental life science, students will be stimulated to think about current life science issues such as biodiversity loss, organisms adaptation to climate change, tragedy of commons (human ecology) and applied life science topics such as biomaterial science.		
Course Learning Outcomes	On successful completion of this course, students should be able to: 1. Understand: Life, Environment and their interactions. 2. Appreciate: Species and ecosystem responses to human-induced environmental change. 3. Attain: Ability to critically think and discuss about current environ-life science issues. 4. Be motivated and equipped: to tackle biological environmental science questions and to choose advanced environmental science courses.		
Pre-requisites (and Co-requisites and Impermissible combination)	NIL		
Offer in 2012 - 2013	Y 1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

A	Evidence of original thought during the analysis of environmental life science 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 real environmental life science issues. Show highly effective organizational, presentational and field trip skills.
B	Show substantial knowledge and thought during the analysis of environmental life science issues. Show some evidence of some analytical, critical and multidimensional thinking about the study subject. Good knowledge and skills required for attaining all the course learning outcomes. Demonstrate good ability to apply what you have learned in the class room to critically analyze the real environmental life science issues. Show effective organizational, presentational and field trip skills.
C	Show general but incomplete knowledge and original thought during the analysis of environmental life science issues. Fair knowledge and skills required for attaining all the course learning outcomes. Demonstrate fair ability to apply what you have learned in the class room to critically analyze the real environmental life science issues. Show considerable organizational, presentational and field trip skills.
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 with laboratory component course

Course Teaching & Learning Activities

Activities	**Details**	**No. of Hours**
Lectures - contact hours		24
Field work - contact hours	3-12 hours field work	12
Group work - contact hours		3
Tutorials - contact hours		8
Reading / Self study		100

Assessment Methods and Weighting

Methods	**Details**	**Weighting in final course grade (%)**
Examination		70
Test		10
Assignments		10
Presentation	group presentation	10

Required/recommended reading and online materials	Appropriate reading materials/handouts will be provided during the course.
Course Website	http://www.biosch.hku.hk/ecology/lsc/envs1002/

CAES1000 Core University English (6 credits)		**Academic Year**	**2012**
Offering Department	English	**Quota**	---
Course Co-ordinator	Mr P D Desloge, English *(pdesloge@hkucc.hku.hk)*		
Teachers Involved	Mr P D Desloge, Centre for Applied English Studies		
Course Objectives			
Course Contents & Topics	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. Students will also complete four online-learning modules through the Moodle platform on academic grammar, academic vocabulary, citation and referencing skills and understanding and avoiding plagiarism. This course will help students to participate more effectively in their first-year university studies in English, thereby enriching their first-year experience.		
Course Learning Outcomes	On successful completion of the course, students should be able to: 1. Identify and distinguish between main ideas and supporting details in lectures and written texts and demonstrate an understanding of the arguments / facts expressed; 2. Form and express personal opinions through critical reading and listening; 3. Argue for and defend a position in a clear and structured way using academic sources, through writing and speaking; and 4. Demonstrate control of grammatical accuracy and lexical appropriacy in academic communication.		
Pre-requisites (and Co-requisites and Impermissible combination)	NIL		
Offer in 2012 - 2013	Y 1st sem 2nd sem	**Examination**	Dec May
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

A	Excellent to outstanding result. Students are able to produce spoken and written academic texts which are at all times appropriately structured. Students can clearly and concisely explain academic concepts and critically argue for a detailed position. Students always use appropriate academic sources to support their ideas in writing and speaking. They cite and reference correctly at all times. Students demonstrate an ability to fully comprehend and critically interpret spoken and written texts. Written language contains very few, if any, systematic errors in grammar and vocabulary. Spoken language is always comprehensible and fluent.
B	Good to very good result. Students are able to produce spoken and written academic texts which are appropriately structured with only minor errors. Students can almost always clearly and concisely explain academic concepts and almost always critically argue for a detailed position. Students almost always use appropriate academic sources to support their ideas in writing and speaking. They cite and reference correctly with only a few non-systematic errors. Students can comprehend and interpret texts with ease, although they may miss some implied meanings and opinions. Written language is mostly accurate but contains a few systematic errors in complex grammar and vocabulary. Spoken language is mostly comprehensible and fluent.
C	Satisfactory to reasonably good result. Spoken and written academic texts produced by students are sometimes not-well structured but there is some evidence of this ability. Students are sometimes unable to clearly and concisely explain academic concepts. While they can argue for a position, it is not very detailed and tend to be simplistic rather than critical. Students sometimes use sources which are nonacademic and/or not appropriate to support their ideas in writing and speaking. There are some systematic errors in citation and referencing but also evidence of correct systematic use. Students have some difficulty comprehending and critically interpreting texts. They can always understand the main ideas but may miss some of the writer's views and attitudes. Written language is sometimes inaccurate, although errors, when they occur, are more often in complex grammar and vocabulary and there is some evidence of control of simple grammatical structures. Spoken language is generally comprehensible and fluent but at times places strain on the listener.
D	Barely satisfactory result. Spoken and written academic texts produced by students are often inappropriately structured but there may be some evidence of this ability. Students are often unable to clearly and concisely explain academic concepts and argue for a position. There is some evidence of an ability to explain academic concepts but not to critically argue for a position. Students often use sources which are nonacademic and/or not appropriate to support their ideas in writing and speaking. There are many systematic errors in citation and referencing however there is evidence of an understanding of some of the conventions of citation and referencing. Students often have difficulty comprehending and interpreting texts, sometimes failing to understand the main ideas and writer's views and attitudes. Written language is often inaccurate containing errors in a range of simple and complex grammar and vocabulary. Spoken language is only sometimes comprehensible and fluent, and strain is frequently placed 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-based course

Course Teaching & Learning Activities

Activities	**Details**	**No. of Hours**
Lectures - contact hours		30
Tutorials - contact hours		6
Reading / Self study		84

Assessment Methods and Weighting

Methods	**Details**	**Weighting in final course grade (%)**
Examination		40
Assignments		60

CHEM1041 Foundations of chemistry (6 credits)		Academic Year	2012
Offering Department	Chemistry	**Quota**	150
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 who do not have HKDSE Chemistry or an equivalent background but are interested in exploring Chemistry further, with an understanding of the essential fundamental principles and concepts of chemistry.		
Course Contents & Topics	Topic 1: Chemistry: Matter and Measurement (2 hours) Elements, compounds, and mixtures; physical properties of matter; chemical changes and chemical properties; measuring mass, length, volume and temperature; atomic structure and subatomic particles; the mole concept and stoichiometry; solutions and concentrations; uncertainty in measurement and significant figures. Topic 2: Gases: Their Properties and Behaviour (6 hours) Gas pressure; the gas laws; the ideal gas law and reaction stiochiometry; the kinetic-molecular theory of gases. Topic 3: Chemical Bonding and Structures (7 hours) Covalent, ionic and metallic bonds; bond energy and chemical change; electronegativity and bond polarity; Lewis structures of molecules and ions; VSEPR Theory and molecular shape. Topic 4: Intermolecular Forces: Liquids, Solids, and Phase Changes (8 hours) Physical states and phase changes; types of intermolecular forces; properties of liquid state; the solid state: structure, properties, and bonding; advanced materials e.g. electronic materials, liquid crystals, ceramic materials and polymeric materials. Topic 5: Chemical Equilibrium (4 hours) The equilibrium state and the equilibrium constant; the equilibrium law: calculation of equilibrium constants and reaction quotient; Le Chelier? Principle Topic 6: Introductory Organic Chemistry (9 hours) Homologous series and nomenclature; isomerism; typical reactions of selected functional groups.		
Course Learning Outcomes	On successful completion of this course, students should be able to: 1. Demostrate knowledge and understanding in relation to some chemical vocabulary, terminology and conventions. 2. Demonstrate knowledge and understanding of chemical stoichiometry, the properties of liquids and solids, the nature of gases, phase changes, chemical bonding and structures, and the nature of chemical equilibria. 3. Demonstrate a basic knowledge of nomenclature, isomerism, and typical reactions of various functional groups of organic compounds. 4. Apply the theories and concepts introduced in the course to solve problems, perform calculations, make predictions and rationalize trends. 5. Organize and present chemical ideas in a clear, logical and coherent way. 6. Demonstrate awareness and appreciation of the relevant applications of chemistry in society and in everyday life.		
Pre-requisites (and Co-requisites and Impermissible combination)	Level 3 or above in HKDSE Combined Science with Chemistry component or Integrated Science, or equivalent. Not for students with Level 3 or above in HKDSE Chemistry.		
Offer in 2012 - 2013	Y 1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

A	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show thorough grasp of the subject. Demonstrate strong analytical and critical abilities and logical thinking, with ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. 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.
C	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show general but incomplete grasp of the subject. Demonstrate evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.
D	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	Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Show evidence of little or no grasp of the knowledge and understanding of the subject. 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 & Learning Activities

Activities	Details	No. of Hours
Lectures - contact hours		36
Tutorials - contact hours		12
Reading / Self study		100

Assessment Methods and Weighting	<table><tr><th>Methods</th><th>Details</th><th>Weighting in final course grade (%)</th></tr><tr><td>Examination</td><td></td><td>65</td></tr><tr><td>Test</td><td></td><td>15</td></tr><tr><td>Assignments</td><td></td><td>20</td></tr></table>
Required/recommended reading and online materials	1) Petrucci; Herring; Madura; Bissonnette: General Chemistry: Principles and Modern Applications, latest edition, Pearson 2) Moore; Stanitski; Jurs: Chemistry: The Molecular Science, latest edition, Brookes/Cole 3) Zumdahl; Zumdahl: Chemistry, latest edition, Brookes/Cole
Additional Course Information	Suggested follow-up course: CHEM1042 General Chemistry

CHEM1042 General chemistry (6 credits)		Academic Year	2012
Offering Department	Chemistry	**Quota**	180
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 principles and concepts of chemistry. It also provides students with hands-on training of basic laboratory skills and techniques including volumetric analysis, preparation, purification and characterization of chemical substances and some basic instrumental methods. Students will be equipped with a good foundation of theoretical and practical knowledge and skills for further studies in Chemistry.		
Course Contents & Topics	Chemistry: its nature and method: physical properties; chemical changes and chemical properties; elements and compounds; measuring mass, length, volume and temperature; atomic structure and subatomic particles; the mole concept and stoichiometry; solutions and concentrations; uncertainty in measurement and significant figures. Atoms: the quantum world: electromagnetic radiation and matter; Planck's quantum theory; the Bohr model of the hydrogen atom; the quantum mechanical model of the atom; quantum numbers, energy levels, and atomic orbitals; shapes of atomic orbitals; electron configurations; periodic trends: atomic radii, ionic radii, ionization energies, and electron affinities. Chemical bonding and structures: review on covalent, ionic and metallic bond. Covalent bonds and molecular structures (VSEPR, VB theory, MO theory). Energetics and kinetics of reactions: heat and work; the first law of thermodynamics; heat of reactions; spontaneity of changes. Reaction rate; factors that influence reaction rate; rate laws: differential and integrated rate laws; temperature and reaction rate; reaction mechanisms; catalysis. Solutions and their properties: solutions; energy changes and the solution process; factors affecting solubility. Acid-Base equilibria: acid-base concepts; equilibria in solutions of weak acids and in weak bases; ionization constants; molecular properties and acid strength; acid-base properties of salt solutions; buffer solutions; acid-base titrations.		
Course Learning Outcomes	On successful completion of this course, students should be able to: 1. Demonstrate a basic knowledge and understanding of the microscopic nature of atomic structure and concepts of chemical bonding and their relationships with the bulk properties of matter. 2. Demonstrate knowledge and understanding in relation to thermodynamics and kinetics of reactions as well as aqueous equilibria including acid-base equilibria. 3. Apply the theories and concepts introduced in the course to solve problems, perform calculations, make predictions and rationalize trends. 4. Carry out chemical experiments with proper procedures, record experimental oberservations accurately, and interpret and evaluate the experimental data. 5. Organize and present chemical ideas in a clear, logical and coherent way. 6. Demonstrate awareness and appreciation of the relevant applications of chemistry in society and in everyday life.		
Pre-requisites (and Co-requisites and Impermissible combination)	Level 3 or above in HKDSE Chemistry or equivalent; students without Level 3 or above in HKDSE Chemistry but having a pass in CHEM1041 Foundations of Chemistry may be allowed to take this course.		
Offer in 2012 - 2013	Y 1st sem 2nd sem	**Examination**	Dec May
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

A	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show thorough grasp of the subject. Demonstrate strong analytical and critical abilities and logical thinking, with ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Show highly effective lab skills and techniques. 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. Show effective lab skills and techniques. Apply effective organizational and presentational skills.
C	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show general but incomplete grasp of the subject. Demonstrate evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Show moderately effective lab skills and techniques. 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 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. Demonstrate partially effective lab skills and techniques. 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. Show evidence of little or no grasp of the knowledge and understanding of the subject. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Demonstrate minimally effective or ineffective lab skills and techniques. Organization and presentational skills are minimally effective or ineffective.

Course Type	Lecture with laboratory component course

Course Teaching & Learning Activities

Activities	Details	No. of Hours
Lectures - contact hours		24
Laboratory - contact hours		24
Tutorials - contact hours		6
Reading / Self study		100

Assessment Methods

and Weighting	**Methods**	**Details**	**Weighting in final course grade (%)**
	Examination		60
	Test		15
	Laboratory reports		25
Required/recommended reading and online materials	1) Petrucci; Herring; Madura; Bissonnette: General Chemistry: Principles and Modern Applications, latest edition, Pearson 2) Moore; Stanitski; Jurs: Chemistry: The Molecular Science, latest edition, Brookes/Cole 3) Zumdahl; Zumdahl: Chemistry, latest edition, Brookes/Cole		

CHEM2041 Principles of chemistry (6 credits)		Academic Year	2012
Offering Department	Chemistry	**Quota**	120
Course Co-ordinator	Dr I K Chu, Chemistry *(ivankchu@hku.hk)*		
Teachers Involved	Dr E L M Wong, Chemistry Dr I K Chu, Chemistry		
Course Objectives	This course is designed for non-chemistry major students covering basic principles of chemistry.		
Course Contents & Topics	Gas Laws and the Kinetic Theory of Gases Thermodynamics: work, heat, the zeroth and first law of thermodynamics, internal energy, enthalpy, heat 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, chemical potential; liquid/liquid systems; Introduction to acids and bases: calculation on concentration of different chemical species in a solution, diprotic 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-spin coupling multiplicities; Mass Spectrometry, isotopic distribution, determination of molecular formulae.		
Course Learning Outcomes	On successful completion of this course, students should be able to: 1. Explain the principles of the thermochemistry, chemical kinetics, chemical equilibrium, physical properties of solutions and gases. 2. Explain the principles of the spectroscopy, and spectrometry.		
Pre-requisites (and Co-requisites and Impermissible combination)	Pass in CHEM1042 General Chemistry; and Not for students who have passed in CHEM2341 Inorganic Chemistry I or have already enrolled in this course; and Not for students who have passed in CHEM2441 Organic Chemistry I or have already enrolled in this course; and Not for students who have passed in CHEM2541 Physical Chemistry I, or have already enrolled in this course; and Not for Chemistry major students.		
Offer in 2012 - 2013	Y 2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

A	Demonstrate thorough knowledge and understanding of essential facts, concepts, principles and theories relating to the modern chemistry, instrumentations and applications of spectrometry and spectroscopy for chemical analysis. Show strong ability to apply and integrate knowledge and theory, and strong ability to analyze problems related to general chemistry and spectroscopy.
B	Demonstrate substantial command of knowledge and understanding of essential facts, concepts, principles and theories relating to the modern chemistry, instrumentations and applications of spectrometry and spectroscopy for chemical analysis. Show evidence to apply and integrate knowledge and theory, and ability to analyze problems related to general chemistry and spectroscopy.
C	Demonstrate general but incomplete command of knowledge and understanding of essential facts, concepts, principles and theories relating to the modern chemistry, instrumentations and applications of spectrometry and spectroscopy for chemical analysis. Show evidence of some abilities to apply and integrate knowledge and theory, and to analyze problems to most familiar situations to general chemistry and spectroscopy.
D	Demonstrate partial but limited command of knowledge and understanding of essential facts, concepts, principles and theories relating to the modern chemistry, instrumentations and applications of spectrometry and spectroscopy for chemical analysis. Show evidence of limited abilities to apply and integrate knowledge and theory, and limited ability to analyze problems to most familiar situations related to general chemistry and spectroscopy.
Fail	Demonstrate little or no evidence of command of knowledge and understanding of essential facts, concepts, principles and theories relating to the modern chemistry, instrumentations and applications of spectrometry and spectroscopy for chemical analysis. Show 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 general chemistry and spectroscopy.

Course Type	Lecture-based course

Course Teaching & Learning Activities

Activities	Details	No. of Hours
Lectures - contact hours		36
Tutorials - contact hours		12
Reading / Self study		100

Assessment Methods and Weighting

Methods	Details	Weighting in final course grade (%)
Examination		75
Assignments		25

Required/recommended reading and online materials	Spectroscopy for the biological science, by Gordon G. Hammes, Wiley-Interscience (2005)

CHEM2241 Analytical chemistry I (6 credits)		Academic Year	2012
Offering Department	Chemistry	**Quota**	80
Course Co-ordinator	Dr W T Chan, Chemistry *(wtchan@hku.hk)*		
Teachers Involved	Dr W T Chan, Chemistry		
Course Objectives	The course aims to introduce the basic principles of chemical analysis. The principles of chemical measurement, including error analysis, quality assurance and calibration, data acquisition and processing, will be discussed with reference to methods of chemical analysis that are based on chemical equilibrium and stoichiometric reactions. The laboratory classes will include experiments demonstrating modern approaches of data acquisition and processing as well as chemical analysis based on chemical equilibrium.		
Course Contents & Topics	Measurement: analog and digital measurement, accuracy and precision, comparing means and deviations, calibration curves and least square method for linear plots Quality assurance: validation of analytical procedures Chemical equilibrium and chemical analysis: aqueous solution and chemical equilibrium; analysis by acid-base reactivity, complexation reactivity, precipitation reactivity		
Course Learning Outcomes	On succesful completion of this course, students should be able to: 1. Explain the basic principles of chemical measurements. 2. Explain the principles of classical methods of chemical analysis including neutralization, complexation, and precipitation titrimetry. 3. Use laboratory apparatus for chemical analysis.		
Pre-requisites (and Co-requisites and Impermissible combination)	Pass in CHEM1042 General Chemistry		
Offer in 2012 - 2013	Y 2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

A	Demonstrate thorough grasp of the subject. Show evidence of strong analytical abilities, logical and independent thinking, and ablility 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.
B	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 analytical abilities, logical and independent thinking, and very little or no ability to apply knowledge to solve problems. Demonstrate minimally effective or ineffective lab skills and techniques and misuse of data and results and/or unable to draw appropriate conclusions. Demonstrate incoherent organization and poor presentation skills.

Course Type	Lecture with laboratory component course

Course Teaching & Learning Activities

Activities	Details	No. of Hours
Lectures - contact hours		24
Laboratory - contact hours		24
Tutorials - contact hours		6
Reading / Self study		100

Assessment Methods and Weighting

Methods	Details	Weighting in final course grade (%)
Examination		65
Test		10
Assignments		5
Laboratory reports		20

Required/recommended reading and online materials	Skoog, West, Holler and Crouch, "Fundamentals of Analytical Chemistry", latest edition, Cengage Learning.

CHEM2341 Inorganic chemistry I (6 credits)		Academic Year	2012
Offering Department	Chemistry	**Quota**	130
Course Co-ordinator	Prof V W W Yam, Chemistry *(wwyam@hku.hk)*		
Teachers Involved	Prof V W W Yam, Chemistry Prof H Z Sun, Chemistry		
Course Objectives	To provide students with the basic principles and knowledge of inorganic chemistry and to introduce their relevance to biological processes and materials science. This course provides the foundation for further studies in inorganic chemistry.		
Course Contents & Topics	Acid-base concept; structure and bonding of transition metal complexes and main group compounds; electronic absorption and magnetic properties of metal complexes; chemical reactions of metal complexes: redox and substitution; chemistry of selected main group elements and transition metal complexes and their relevance to biology and materials.		
Course Learning Outcomes	On successful completion of this course, students should be able to: 1. Understand the basic principles and concepts of inorganic chemistry and appreciate their relevance to selected examples of biological processes and materials science. 2. Demonstrate knowledge and understanding of the acid-base concept and definition. 3. Demonstrate knowledge and understanding of the structure and bonding of main group compounds and transition metal complexes and their relevance to the electronic absorption and magnetic properties of transition metal complexes. 4. Demonstrate knowledge and understanding of the thermodynamic stability of metal complex formation and the thermodynamic and kinetic aspects of substitution and redox reactions. 5. Demonstrate knowledge and understanding of the role of main group elements and transition metal complexes in bioinorganic chemistry.		
Pre-requisites (and Co-requisites and Impermissible combination)	Pass in CHEM1042 General Chemistry		
Offer in 2012 - 2013	Y 2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

A	Demonstrate thorough 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 strong ability to apply and integrate knowledge and theory relating to the basic foundation knowledge of inorganic chemistry. Show strong ability to analyze novel problems and critical use of data and experimental results to draw appropriate and insightful conclusions relating to the basic principles and knowledge of inorganic chemistry. Demonstrate highly effective basic laboratory skills and techniques, especially in the synthesis and characterization 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.
C	Demonstrate general but incomplete 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 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.
D	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 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 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 little or no evidence of abilities to apply and integrate knowledge and theory relating to the basic foundation knowledge of inorganic chemistry. Show little or no ability to analyze problems to most familiar situations and erroneous use of data and experimental results to draw appropriate conclusions relating to the basic principles and knowledge of inorganic chemistry. Demonstrate minimally effective basic laboratory skills and techniques, especially in the synthesis and characterization of inorganic compounds and metal complexes.

Course Type	Lecture with laboratory component course

Course Teaching & Learning Activities

Activities	Details	No. of Hours
Lectures - contact hours		24
Laboratory - contact hours		24

	Tutorials - contact hours		6
	Reading / Self study		100

Assessment Methods and Weighting	**Methods**	**Details**	**Weighting in final course grade (%)**
	Examination		65
	Test		20
	Assignments		5
	Laboratory reports		10

Required/recommended reading and online materials	F. A. Cotton ; G. Wilkinson ; P. L. Gaus : Basic Inorganic Chemistry (John Wiley & Sons, 1995, 3rd ed.) P. Atkins, T. Overton, J. Rourke, M. Weller and F. Armstrong: Shriver & Atkins Inorganic Chemistry (Oxford University Press, 2006, 4th ed.)

EASC1401 Blue planet (6 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	---
Course Co-ordinator	Dr P Bach, Earth Sciences *(pabach@hku.hk)*		
Teachers Involved	Prof J Malpas, Earth Sciences Dr P Bach, Earth Sciences		
Course Objectives	The aim is to provide those students who are taking a first course in Earth 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)		
Course Learning Outcomes	On successful completion of this course, students should be able to: 1. Understand the terminology and nomenclature appropriate to the introductory study of Earth Sciences. 2. Demonstrate knowledge and understanding of the underlying concepts associated with the study of the Earth Systems and their dynamic interactive processes. 3. Understand the extent and nature of global change and environmental concerns around us. 4. Demonstrate the ability to make and record observations on Earth Systems processes in natural field environments. 5. Develop skills to synthesize observation and knowledge in a report in essay form.		
Pre-requisites (and Co-requisites and Impermissible combination)	NIL		
Offer in 2012 - 2013	Y 1st sem 2nd sem	**Examination**	Dec May
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

A	Demonstrate thorough mastery of extensive knowledge / competencies/skills at an Earth Science introductory level required for attaining most or all of the course learning outcomes. Shows clear understanding of introductory terminology and concepts and strong abilities to apply and relate them in a range of complex interactive processes between Earth Systems. Demonstrates highly effective observational skills in field as well as organizational skills to present important observations made and uses them to draw appropriate and insightful conclusions with an impressive level of depth and original thoughts.
B	Demonstrate substantial command of knowledge / competencies/skills at an Earth Science introductory level required for attaining most of the course learning outcomes. Shows evidence for understanding of introductory terminology and concepts and some abilities to apply and relate them in a range of complex interactive processes between Earth Systems. Demonstrates effective observational skills in field as well as organizational skills to present important observations made and uses them to draw appropriate and insightful conclusions with some level of depth.
C	Demonstrate general but incomplete command of knowledge / competencies/skills at an Earth Science introductory level required for attaining most of the course learning outcomes. Shows evidence for some understanding of introductory terminology and concepts and some abilities to apply and relate them in some interactive processes between Earth Systems. Demonstrates moderately effective observational skills in field as well as organizational skills to present observations made mostly correct but with some erroneous use and results to draw appropriate conclusions.
D	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	Demonstrate little or no evidence of command of knowledge / competencies/skills at an Earth Science introductory level required for attaining the course learning outcomes. Shows little or no evidence of understanding of introductory terminology and concepts and little or no abilities to apply and relate them in interactive processes between Earth Systems. Demonstrates poor observational skills in field. Applies incoherent organizational and poor presentational skills. Ineffective presentation of observed details and facts and unable to draw appropriate conclusions.

Course Type	Lecture with laboratory component course

Course Teaching & Learning Activities

Activities	**Details**	**No. of Hours**
Lectures - contact hours		24
Laboratory - contact hours		24
Field work - contact hours	2-day field camp	16
Reading / Self study		100

Assessment Methods and Weighting

Methods	**Details**	**Weighting in final course grade (%)**
Examination		40
Test	Quizzes	10
Laboratory reports		20

	Project report	Field project report	30
Required/recommended reading and online materials	Skinner B.J and Porter S.C.: The Blue Planet (1999) Murphy, B and Damian N.: Earth Science Today (1999)		

EASC1402 Principles of geology (6 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	---
Course Co-ordinator	Prof L S Chan, Earth Sciences *(chanls@hku.hk)*		
Teachers Involved	Prof L S Chan, Earth Sciences Prof M Sun, Earth Sciences		
Course Objectives	This course is an introduction to fundamental principles and concepts in geology.		
Course Contents & Topics	- 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 - Radiometric dating methods		
Course Learning Outcomes	On successful completion of this course, students should be able to: 1. Recite the rock cycle and the rock material in the earth's crust. 2. Describe the overall structure of the earth and the key external and internal processes. 3. Explain the major geological phenomena in the context of plate tectonics theory. 4. Describe the methods in geological dating. 5. Name the major events in earth's history.		
Pre-requisites (and Co-requisites and Impermissible combination)	NIL		
Offer in 2012 - 2013	Y 1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

A	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.
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: Lecture with laboratory component course

Course Teaching & Learning Activities

Activities	**Details**	**No. of Hours**
Lectures - contact hours	12 sessions x 2 hours	24
Laboratory - contact hours	laboratory practical on rocks and minerals, earthquakes, fossil identifcation	12
Field work - contact hours	2 field trips	14
Group work - contact hours	1 group project with presentation	3
Reading / Self study		100

Assessment Methods and Weighting

Methods	**Details**	**Weighting in final course grade (%)**
Examination	2-hour written exam	50
Laboratory reports	Practical reports	25
Project report		15
Presentation		10

Required/recommended reading and online materials: TBC

EASC1404 Early life on earth (6 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	50
Course Co-ordinator	Dr K H Lemke, Earth Sciences *(kono@hku.hk)*		
Teachers Involved	Dr K H Lemke, Earth Sciences		
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	This course will cover the following topics: the composition and properties of the early Earth and Earth's first oceans; the central role of water in life; abundance of biological elements on the early Earth and elsewhere in the Solar system; possible conditions for the synthesis of life's first building blocks; the (geo) chemical roots of early life on Earth and the search for life's signatures in the solar system and beyond.		
Course Learning Outcomes	On successful completion of this course, students should be able to: 1.Describe the basic physical and chemical conditions on the early Earth. 2.Explain and describe the role of water and extreme geochemical conditions in the synthesis of biological molecules. 3.Understand the role that different geological environments played during the origins of life. 4.Identify challenges associated with each step in the origins of life. 5.Investigate a current origins of life topic.		
Pre-requisites (and Co-requisites and Impermissible combination)	NIL		
Offer in 2012 - 2013	Y 2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

A	Student demonstrates thorough mastery at an advanced level of extensive knowledge and skills required for attaining all course learning outcomes. Shows strong analytical and critical abilities and logical thinking, with evidence of original thought, and the ability to apply his/her knowledge to a wide range of problems that center around “origins of life” topics, and at the same, can combine knowledge from the natural sciences to better understand potential early Life processes on Earth and elsewhere. Student shows the ability to apply highly effective organizational and presentational skills.
B	Student demonstrates substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and apply his/her knowledge to a range of problems in the field of the “origins of life”, and at the same, is capable to combine knowledge from the natural sciences to better understand potential early Life processes on Earth and elsewhere. Student shows the ability to apply effective organizational and presentational skills.
C	Student demonstrates general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply his/her knowledge to a range of problems in the field of the “origins of life”. Student shows the ability to apply moderately effective organizational and presentational skills.
D	Student demonstrates partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability understand key topics in the “origins of life” field. Student shows the ability to apply limited or barely effective organizational and presentational skills.
Fail	Student demonstrates little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Shows very little or no ability to apply knowledge to understand basic topics related to the origins of life. Organization and presentational skills are minimally effective or ineffective.

Course Type: Lecture with laboratory component course

Course Teaching & Learning Activities

Activities	**Details**	**No. of Hours**
Lectures - contact hours		24
Laboratory - contact hours		24
Reading / Self study		100

Assessment Methods and Weighting

Methods	**Details**	**Weighting in final course grade (%)**
Examination	2-hour written examination	40
Assignments	1 midterm, group presentations, short-essay	60

Required/recommended reading and online materials: 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)

EASC2402 Field methods (6 credits)		**Academic Year**	**2012**
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	This course is hands-on field and class-based that introduces basic geological field and mapping techniques and the use of geological equipment and air photographs, an overview of the geology of Hong Kong.		
Course Contents & Topics	-Maps and map reading, map reference system (1 week) -Interpretation of geological maps: topographic and geological cross sections, geological structures from outcrop patterns and structural contour lines (horizontal, inclined strata, folded, and faulted strata, unconformities) (3 weeks) -Interpretation and use of air photographs (1 week) -Geological field techniques and equipment, field observation and description of rocks and outcrops (7 field days)		
Course Learning Outcomes	On successful completion of this course, students should be able to: 1. Read geological maps and comprehend 3-D geological structures from 2-D geological maps. 2. Construct a geological cross section showing interpreted subsurface rocks and structures. 3. Demonstrate techniques for basic field observations, measurements and identifications. 4. Create and interpret an internally consistent geological map from a set of collected field observations and data. 5. Develop skills in integrating geological field data in determining a geological history and writing a structured field report.		
Pre-requisites (and Co-requisites and Impermissible combination)	Pass in EASC1402 Principles of Geology		
Offer in 2012 - 2013	Y 2nd sem	**Examination**	No Exam
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

A	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.
B	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.
C	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	Demonstrate little or no grasp of the subject required for most of the learning outcome. Little or no evidence of ability to record observations on earth processes in the field and show very little or no ability to apply knowledge to solve problems. Evidence of little or lack of analytical and critical abilities, coherent and logical thinking. Shows very little or no ability to synthesize observations made and knowledge in a field report and geological map with incoherent organizational and poor presentational skills.

Course Type: Field camps

Course Teaching & Learning Activities

Activities	**Details**	**No. of Hours**
Lectures - contact hours	12 sessions x 1 hour	12
Field work - contact hours	5-day field camp & 2 day trips	56
Laboratory work - contact hours	12 hours paper exercises	12
Reading / Self study		100

Assessment Methods and Weighting

Methods	**Details**	**Weighting in final course grade (%)**
Test		20
Assignments	Lab Assignments	10
Report	Field Work Assessment	70

Required/recommended reading and online materials: Comprehensive Course Notes provided.
John Barnes: Basic Geological Mapping (Wiley, 1995, 3rd edition)

EASC2408 Planetary geology (6 credits)		**Academic Year**	**2012**
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 Outcomes	On successful completion of this course, students should be able to: 1. Describe the basic features of our Solar System and its constituents. 2. Explain how this knowledge is acquired through observations and experiments. 3. Demonstrate knowledge and understanding of the key geological, physical and chemical processes governing the structure, formation and evolution of planetary bodies. 4. Compare and contrast our own planet Earth with other planetary bodies.		
Pre-requisites (and Co-requisites and Impermissible combination)	Pass in EASC1401 Blue planet or EASC1402 Principles of geology or PHYS1650 Nature of the universe		
Offer in 2012 - 2013	Y 2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

A	Demonstrate thorough mastery of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.
B	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.
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 with laboratory component course

Course Teaching & Learning Activities

Activities	**Details**	**No. of Hours**
Lectures - contact hours	12 sessions x 2 hours	24
Laboratory - contact hours	12 sessions x 2 hours	24
Reading / Self study		100

Assessment Methods and Weighting

Methods	**Details**	**Weighting in final course grade (%)**
Examination		50
Test		15
Assignments		20
Presentation		15

Required/recommended reading and online materials: TBC

ENVS1401 Introduction to environmental science (6 credits)		**Academic Year**	**2012**
Offering Department	Earth Sciences	**Quota**	---
Course Co-ordinator	Dr Y Zong, Earth Sciences *(yqzong@hku.hk)*		
Teachers Involved	Dr Y Zong, Earth Sciences Dr C Dingle, Earth Sciences		
Course Objectives	To provide students with an inter-disciplinary introduction to Environmental Science with key questions to highlight the interconnections between biological, geological and chemical processes. To convey the basic science behind environmental interactions and place it within the context of human impacts and dependence on the natural world. To better understand how humans interact, manage and sustain the environment within the context of our economies, governments and individual choices.		
Course Contents & Topics	The teaching and learning will be organized around key issues: application of science to solve environmental problems; human population growth as the underlying environmental problem; ways to restore damaged ecosystems; the appropriate use and misuse of forest and wildlife; the problems in feeding the world without destroying the environment; the difficulty in assuring a sustainable supply of energy; ways to maintain water resources for future generations; our contribution to global climate change; problem of air pollution in cities; waste management; the reasons for natural hazards becoming disasters and catastrophes; prices on scenic beauty; ways to plans, and achieve, a sustainable environment.		
Course Learning Outcomes	On successful completion of this course, students should be able to: 1. Explain and describe connections between the physical and biological stresses in the environment, discuss the impact of human society on the environment. 2. Explain the concept of environmental sustainability, give examples of how society can adapt behavior to achieve sustainability. 3. Compare different approaches to resolving specific problems presented in class.		
Pre-requisites (and Co-requisites and Impermissible combination)	NIL		
Offer in 2012 - 2013	Y 1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

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 some unfamiliar situations. Show evidence of logical thinking abilities. Coursework completed on time and to a good academic standard.
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	Demonstrate partial but limited grasp of the subject and a limited ability to apply knowledge to some familiar situations. Show only able to apply knowledge to simple examples. Show little evidence of logical thinking. Coursework submitted late to a poor standard.
Fail	Demonstrate little or no understanding of the subject and very little or no ability to apply knowledge to familiar situations. Show no evidence of logical or coherent thinking. Coursework missing or substandard.

Course Type	Lecture-based course

Course Teaching & Learning Activities

Activities	**Details**	**No. of Hours**
Lectures - contact hours		24
Tutorials - contact hours	group discussion and class debate	24
Field work - contact hours	a one-day field trip	8
Reading / Self study		112

Assessment Methods and Weighting

Methods	**Details**	**Weighting in final course grade (%)**
Examination		50
Assignments		50

Required/recommended reading and online materials	Miller: Living in the Environment (Thomson, 2007, 15th ed.) Keller and Botkin: Essential Environmental Science (Wiley, 2008) NIL

MATH1011 University mathematics I (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Dr K H Law, Mathematics *(lawkaho@maths.hku.hk)*		
Teachers Involved	Dr K H Law, Mathematics		
Course Objectives	This course aims at students with only HKDSE Mathematics (or equivalent) background and provides them with basic knowledge of mathematics that serves as essential foundation in various disciplines. It is expected to be followed by MATH1013 University mathematics II.		
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 - Integration by substitution - Trapezoidal rule with error estimation		
Course Learning Outcomes	On successful completion of this course, students should be able to: 1. Use the set notations; calculate probabilities; and prove by induction. 2. Solve problems involving exponential, logarithmic and trigonometric functions. 3. Evaluate limits and derivatives. 4. Compute simple definite and indefinite integrals. 5. Solve practical problems such as determining maxima and minima; finding area.		
Pre-requisites (and Co-requisites and Impermissible combination)	Level 2 or above in HKDSE Mathematics or equivalent. Not for students with Level 2 or above in Module 1 or Module 2 of HKDSE Mathematics or equivalent.		
Offer in 2012 - 2013	Y 1st sem 2nd sem	**Examination**	Dec May
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

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	Demonstrates 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-based course

Course Teaching & Learning Activities

Activities	**Details**	**No. of Hours**
Lectures - contact hours		36
Tutorials - contact hours		12
Reading / Self study		100

Assessment Methods and Weighting

Methods	**Details**	**Weighting in final course grade (%)**
Examination		50
Test	3 tests	50

Required/recommended reading and online materials	To be decided
Course Website	http://hkumath.hku.hk/course/MATH1011/

MATH1013 University mathematics II (6 credits)		**Academic Year**	**2012**
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	This course aims at students with Core Mathematics plus Module 1 or Core Mathematics plus Module 2 background and provides them with basic knowledge of calculus and some linear algebra that can be applied in various disciplines. It is expected to be followed by courses such as MATH2012 (Fundamental concepts of mathematics), MATH2101 (Linear Algebra I), MATH2102 (Linear Algebra II), MATH2211 (Multivariable calculus), and MATH2241 (Introduction to mathematical analysis).		
Course Contents & Topics	- Functions; graphs; inverse functions - Limits, continuity and differentiability - Mean value theorem; implicit differentiation; L'Hopital's rule - Higher order derivatives, maxima and minima, graph sketching - Radian, calculus of trigonometric functions - Improper integrals, partial fractions, integration by parts - Complex numbers, polar form, de Moivre's formula - Basic matrix and vector (of order 2 and 3) operations, determinants - First order ordinary differential equations		
Course Learning Outcomes	On successful completion of this course, students should be able to: 1. Describe properties of a function and an inverse function. 2. Evaluate various kinds of limits, and determine continuity and differentiability of functions. 3. Apply advanced rules/techniques of differentiation and integration to compute derivatives and; integrals; sketch graphs of functions. 4. Solve problems involving complex numbers. 5. Perform matrix and vector operations, compute determinants. 6. Solve simple first order ordinary differential equations.		
Pre-requisites (and Co-requisites and Impermissible combination)	Level 2 or above in Module 1, or Module 2 of HKDSE Mathematics or equivalent. Students who do not fulfill this requirement are advised to take MATH1011 University mathematics I. Not for students who have passed MATH1821, or have already enrolled in this course.		
Offer in 2012 - 2013	Y 1st sem 2nd sem	**Examination**	Dec May
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

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	Demonstrates 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-based course

Course Teaching & Learning Activities

Activities	**Details**	**No. of Hours**
Lectures - contact hours		36
Tutorials - contact hours		12
Reading / Self study		100

Assessment Methods and Weighting

Methods	**Details**	**Weighting in final course grade (%)**
Examination		50
Test	2 tests	40
Assignments		10

Required/recommended reading and online materials	To be decided
Course Website	http://hkumath.hku.hk/course/MATH1013/

MATH1641 Mathematical laboratory and modeling (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	20
Course Co-ordinator	Dr K H Chan, Mathematics *(mkhchan@hku.hk)*		
Teachers Involved	Dr K H Chan, Mathematics		
Course Objectives	This course introduces a powerful and free computer software Scilab for scientific research. The programming language will be taught via a number of mathematical models in Physics, Chemistry, Biology, Ecology, Statistics and Management. Some basic and important techniques in Calculus and Linear Algebra will also be covered.		
Course Contents & Topics	Scilab. Elementary mathematical modeling, predator-prey models, epidemic models, host-parasite model etc. Data fitting models and simulation of simple random variable. Random walk models and inventory models. Differentiation and integration of one variable. Elementary linear algebra.		
Course Learning Outcomes	On successful completion of this course, students should be able to: 1. Recognize the importance of numerical methods in mathematical modeling. 2. Demonstrate basic algebraic and arithmetic computations in the Scilab environment. 3. Write and interpret programs in Scilab programming language. 4. Solve simple numerical problems using interactive Scilab commands. 5. Solve moderately complicated numerical problems by writing Scilab programs.		
Pre-requisites (and Co-requisites and Impermissible combination)	NIL		
Offer in 2012 - 2013	Y 2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

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.
B	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.
C	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	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	Demonstrates 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-based course

Course Teaching & Learning Activities

Activities	**Details**	**No. of Hours**
Lectures - contact hours		36
Tutorials - contact hours		12
Reading / Self study		100

Assessment Methods and Weighting

Methods	**Details**	**Weighting in final course grade (%)**
Examination		50
Assignments		50

Required/recommended reading and online materials	To be decided by the course instructor. F. R. Giordano, M. D. Weir, W. P. Fox: A first course in mathematical modeling, (Pacific Grove, CA: Brooks/Cole Thomson Learning, 2003)
Course Website	http://hkumath.hku.hk/course/MATH1641/

MATH1821 Mathematical methods for actuarial science I (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Dr J T Chan, Mathematics *(jtchan@hku.hk)*		
Teachers Involved	Dr J T Chan, Mathematics		
Course Objectives	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 on 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 & Topics	- Functions; graphs; inverse functions - 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 - Complex numbers, polar form, de Moivre's formula - Basic matrix and vector (of order 2 and 3) operations, determinants - Simple differential equations		
Course Learning Outcomes	On successful completion of this course, students should be able to: 1. Describe properties of a function and an inverse function. 2. Evaluate various kinds of limits, and determine continuity and differentiability of functions. 3. Apply advanced rules/techniques of differentiation and integration to compute derivatives and integrals; sketch graphs of functions. 4. Approximate integrals by numerical methods. 5. Perform matrix and vector operations, compute determinants. 6. Solve simple first and second order ordinary differential equations.		
Pre-requisites (and Co-requisites and Impermissible combination)	Level 4 or above in HKDSE Mathematics plus Module 1, or Level 4 or above in HKDSE Mathematics plus Module 2, or equivalent. Not for students who have passed MATH1013, or have already enrolled in this course.		
Offer in 2012 - 2013	Y 1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

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	Demonstrates 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-based course

Course Teaching & Learning Activities

Activities	**Details**	**No. of Hours**
Lectures - contact hours		36
Tutorials - contact hours		12
Reading / Self study		100

Assessment Methods and Weighting

Methods	**Details**	**Weighting in final course grade (%)**
Examination		50
Test	2 tests	50

Required/recommended reading and online materials	George B. Thomas; as revised by Maurice D. Weir and Joel Hass: Thomas' Calculus, 12th edition (Addison Wesley) Steven J. Leon: Linear Algebra with Applications (Pearson Prentice Hall) NIL
Course Website	http://hkumath.hku.hk/course/MATH1821/

MATH1851 Calculus and ordinary differential equations (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	460
Course Co-ordinator	Prof K M Tsang, Mathematics *(kmtsang@maths.hku.hk)*		
Teachers Involved	Prof K M Tsang (Course coordinator of 1st sem), Mathematics Dr S Wu (Course coordinator of 2nd sem), Mathematics Prof K W Chow (1st & 2nd sem), Mechanical Engineering		
Course Objectives	In this course, students will be introduced to some important topics of mathematics commonly used in many engineering fields. A concrete foundation of engineering 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) - Ordinary Differential Equations - Laplace Transforms For more information, please refer to http://hkumath.hku.hk/MathWWW/ucourse.php?provisional.MATH1851.description		
Course Learning Outcomes	On successful completion of this course, students should be able to: 1. Demonstrate knowledge and understanding of the basic engineering mathematics as well as their relationship with some typical engineering applications. 2. Apply mathematical skills to model and solve some basic engineering problems. 3. Have a general grasp on the interrelation among mathematical theory, result and the engineering problem. 4. Be well prepared to cope with a higher level of engineering mathematics required in different engineering disciplines. For more information, please refer to http://hkumath.hku.hk/MathWWW/ucourse.php?provisional.MATH1851.description		
Pre-requisites (and Co-requisites and Impermissible combination)	NIL (This course is exclusive for Engineering students.)		
Offer in 2012 - 2013	Y 1st sem 2nd sem	**Examination**	Dec May
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

A	Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and methods and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.
B	Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and methods and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems and methods or their applications and presentation or with some minor computational errors.
C	Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems and methods, but with some inadequacies in applying them through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.
D	Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems and methods, but with substantial inadequacies in applying them through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.
Fail	Demonstrates 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.

Course Type	Lecture-based course

Course Teaching & Learning Activities

Activities	**Details**	**No. of Hours**
Lectures - contact hours		39
Tutorials - contact hours		13
Reading / Self study		100

Assessment Methods and Weighting

Methods	**Details**	**Weighting in final course grade (%)**
Examination		80
Test	2 tests	20

Required/recommended reading and online materials	S.J. Leon: Linear Algebra with Applications (Pearson Education, 2006, 7th ed.) G. James, et al.: Modern Engineering Mathematics (Pearson Education, 2008, 4th ed.) C. Rorres and H. Anton: Applications of Linear Algebra (Wiley, 1984, 3rd ed.) G.B. Thomas, et al.: Thomas' Calculus (Pearson Education, 2005, 11th ed.) G.B. Thomas and R.L. Finney: Calculus and Analytic Geometry (Addison-Wesley, 1996, 9th ed.) R.K. Nagle, et al.: Fundamentals of Differential Equations and Boundary Value Problems (Pearson Education, 2008, 5th ed.) W.E. Boyce and R.C. DiPrima: Elementary Differential Equations (Wiley, 1997, 6th ed.) S.L. Ross: Introduction to Ordinary Differential Equations (Wiley, 1989, 4th ed.) E. Kreyzig: Advanced Engineering Mathematics (Wiley, 2006, 9th ed.)
Course Website	http://hkumath.hku.hk/course/MATH1851/
Additional Course Information	There will be no 'make-up' for a missed quiz or assignment under normal circumstances.

	Students are not allowed to take MATH1851 and MATH1853 together in the same semester. This course is offered by the Department of Mathematics and the Faculty of Engineering.

MATH1853 Linear algebra, probability and statistics (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	460
Course Co-ordinator	Dr W K Ching, Mathematics *(wching@hkucc.hku.hk)*		
Teachers Involved	Dr W K Ching (Course coordinator of 1st sem), Mathematics Dr G Han (Course coordinator of 2nd sem), Mathematics Dr Y C Wu (1st sem), Electrical & Electronic Engineering Dr A Choi (2nd sem), Electrical & Electronic Engineering		
Course Objectives	As the consecutive 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 skill to analytically tackle some typical engineering problems to prepare for all the engineering subjects.		
Course Contents & Topics	- Vector Algebra; Matrix Algebra; Eigenvalues Problems - Elementary Complex Variables - Basic Probability Laws; Random Variables, Probability Distribution, Expectation and Variance - Binomial, Geometric, and Poisson Distribution; Normal Distribution - Sampling distribution, Point Estimates and Confidence Interval For more information, please refer to http://hkumath.hku.hk/MathWWW/ucourse.php?provisional.MATH1853.description		
Course Learning Outcomes	On successful completion of this course, students should be able to: 1. Demonstrate knowledge and understanding of the essential engineering mathematics as well as their relationship to the engineering problems in general. 2. Model an engineering problem into a mathematical form or a mathematical model, which can be an algebraic equation, a differential equation, a graph, or some other mathematical expression. 3. Solve the model by selecting and applying a suitable mathematical method, skill or technique learned. 4. Have a general grasp on the interrelation among mathematical theory, result and the engineering problem. For more information, please refer to http://hkumath.hku.hk/MathWWW/ucourse.php?provisional.MATH1853.description		
Pre-requisites (and Co-requisites and Impermissible combination)	NIL This course is exclusively for Engineering students.		
Offer in 2012 - 2013	Y 1st sem 2nd sem	**Examination**	Dec May
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

A	Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and methods and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.
B	Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and methods and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems and methods or their applications and presentation or with some minor computational errors.
C	Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems and methods, but with some inadequacies in applying them through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.
D	Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems and methods, but with substantial inadequacies in applying them through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.
Fail	Demonstrates 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.

Course Type	Lecture-based course

Course Teaching & Learning Activities

Activities	**Details**	**No. of Hours**
Lectures - contact hours		39
Tutorials - contact hours		13
Reading / Self study		100

Assessment Methods and Weighting

Methods	**Details**	**Weighting in final course grade (%)**
Examination		80
Assignments		20

Required/recommended reading and online materials	D.C. Lay: Linear Algebra and its Applications (Addison-Wesley, 2012, 4th ed.) S.J. Leon: Linear Algebra with Applications (Pearson Education, 2006, 7th ed.) G. James, et al.: Modern Engineering Mathematics (Pearson Education, 2008, 4th ed.) C. Rorres and H. Anton: Applications of Linear Algebra (Wiley, 1984, 3rd ed.) E. Kreyzig: Advanced Engineering Mathematics (Wiley, 2006, 9th ed.)
Course Website	http://hkumath.hku.hk/course/MATH1853/
Additional Course Information	There will be no 'make-up' for a missed quiz or assignment under normal circumstances. Students are not allowed to take MATH1851 and MATH1853 together in the same semester. This course is offered by the Department of Mathematics and the Faculty of Engineering.

MATH2012 Fundamental concepts of mathematics (6 credits)		**Academic Year**	**2012**
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 mathematics and methods of mathematical proofs. Such concepts and methods are important for subsequent studies in all higher level courses in mathematics. This course can be taken concurrently with other Level 2 or above courses.		
Course Contents & Topics	- elementary set theory - statement calculus - mathematical proofs - relations and functions - finite and infinite sets - natural numbers and mathematical induction - axiomatic systems in mathematics - real numbers and the limit of a sequence - examples of groups		
Course Learning Outcomes	On successful completion of this course, students should be able to: 1. Understand the definition of a set and apply set theory in simple daily life problems. 2. Construct the truth table of a given statement. 3. Apply different proof strategies (e.g. proof by contradiction and mathematical induction) in proving a mathematical statement. 4. Demonstrate the basic properties of equivalence relations. 5. Understand the definition of the limit of a sequence of real numbers. 6. Demonstrate the operational properties of groups.		
Pre-requisites (and Co-requisites and Impermissible combination)	Pass in MATH1013 University mathematics II		
Offer in 2012 - 2013	Y 1st sem 2nd sem	**Examination**	Dec May
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

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	Demonstrates 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-based course

Course Teaching & Learning Activities

Activities	**Details**	**No. of Hours**
Lectures - contact hours		36
Tutorials - contact hours		12
Reading / Self study		100

Assessment Methods and Weighting

Methods	**Details**	**Weighting in final course grade (%)**
Examination		50
Assignments		50

Required/recommended reading and online materials	Gray Chartrand, Albert D Polimeni and Ping Zhang: Mathematical Proofs: A Transition to Advanced Mathematics Boston (Pearson/Addison-Wesley, 2008)
Course Website	http://hkumath.hku.hk/course/MATH2012/
Additional Course Information	Students with good grades in HKDSE Math Module 1 or Math Module 2 and have strong interests in math may also apply.

MATH2211 Multivariable calculus (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Dr G Han, Mathematics *(ghan@maths.hku.hk)*		
Teachers Involved	Dr G Han (1st sem), Mathematics Dr S P Yung (2nd sem), Mathematics		
Course Objectives	Students of this course will learn the theory of multivariable calculus in a rather rigorous manner, and learn how to apply the theory to solve practical problems. This is a required course for students taking major in Mathematics or Mathematics/Physics, and is suitable for all students who will use multivariable calculus in their area of study. Students taking minor in Mathematics may take this course as one of the required courses. This course is a pre-requisite of many mathematics courses of more advanced level.		
Course Contents & Topics	- Vectors: vectors in 2-, 3-, and n-dimensions; dot product and cross product; lines and planes; polar, cylindrical, and spherical coordinates - Differentiation in several variables: limits and derivatives; the chain rule; directional derivatives and gradients - Vector-valued functions: parametrized curves; arc-length; vector fields; gradient, divergence, curl, and the del operator - Maxima and minima: differentials and Taylor's Theorem of several variables; extrema of functions; Lagrange multipliers; applications of extrema - Multiple integration: double and triple integrals; change of variables; applications - Line integrals: scalar and vector line integrals; Green's Theorem; conservative vector fields - Surface integrals and vector analysis: parametrized surfaces; surface integrals; Stoke's and Gauss's Theorems		
Course Learning Outcomes	On successful completion of this course, students should be able to: 1. Understand and demonstrate the basic theory of calculus of functions in several real variables. 2. Evaluate partial derivatives and multiple integrals; compute line integrals and surface integrals. 3. Apply the knowledge to solve some practical problems, such as constrained optimization problems and other problems involving differentiation and integration of multivariable functions.		
Pre-requisites (and Co-requisites and Impermissible combination)	Pass in MATH1013 University mathematics II		
Offer in 2012 - 2013	Y 1st sem 2nd sem	**Examination**	Dec May
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

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	Demonstrates 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-based course

Course Teaching & Learning Activities

Activities	**Details**	**No. of Hours**
Lectures - contact hours		36
Tutorials - contact hours		12
Reading / Self study		100

Assessment Methods and Weighting

Methods	**Details**	**Weighting in final course grade (%)**
Examination		50
Assignments		50

Required/recommended reading and online materials	Vector Calculus, 3rd Edition, by Susan Jane Colley, 2006, Pearson Prentice Hall
Course Website	http://hkumath.hku.hk/course/MATH2211/
Additional Course Information	Students are assumed to have mastered calculus of one-variable prior to taking this course.

MATH2241 Introduction to mathematical analysis (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Dr J T Chan, Mathematics *(jtchan@hku.hk)*		
Teachers Involved	Dr J T Chan (1st sem), Mathematics Dr K H Law (2nd sem), Mathematics		
Course Objectives	To introduce students to the basic ideas and techniques of mathematical analysis.		
Course Contents & Topics	- 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	On successful completion of the course, students should be able to: 1. Comphrehend and use abstract mathematical arguments such as the epsilon-delta argument. 2. Demonstrate convergence or non-convergence of a sequence/series using properties of convergent sequences/series. 3. Elucidate important properties of continuous functions such as the extreme value theorem and the intermediate value theorem. 4. Articulate the construction of the Riemann integral and its relation to differentiation.		
Pre-requisites (and Co-requisites and Impermissible combination)	Pass in MATH1013 University mathematics II		
Offer in 2012 - 2013	Y 1st sem 2nd sem	**Examination**	Dec May
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

A	Demonstrate a thorough mastery of the mathematical notions and proof techniques taught in the course by being able to handle abstract mathematical arguments, to apply appropriate theorems correctly, and to make use of those proof techniques in novel situations. Ability to present solutions clearly and logically, and the use of innovative ideas in solving problems are expected.
B	Demonstrate a substantial command of the mathematical notions and proof techniques taught in the course by being able to handle abstract mathematical arguments, to apply appropriate theorems correctly, and, with guidance, to make use of those proof techniques in novel situations. Ability to present solutions clearly and logically, and evidence of innovative ideas in solving problems are expected.
C	Demonstrate a good understanding of the mathematical notions and proof techniques taught in the course by being able to handle abstract mathematical arguments and to apply appropriate theorems correctly. Ability to present solutions clearly and logically is expected.
D	Demonstrate some understanding of the mathematical notions taught in the course by being able to correctly identify appropriate theorems for applications and to carry out logical arguments that are leading to complete solutions.
Fail	Demonstrates poor and inadequate understanding by not being able to identify appropriate theorems for applications, or not being able to apply the theorems correctly.

Course Type	Lecture-based course

Course Teaching & Learning Activities

Activities	**Details**	**No. of Hours**
Lectures - contact hours		36
Tutorials - contact hours		12
Reading / Self study		100

Assessment Methods and Weighting

Methods	**Details**	**Weighting in final course grade (%)**
Examination		50
Assignments		50

Required/recommended reading and online materials	Elementary Analysis: The Theory of Calculus, by Kenneth A. Ross, 1980, Springer
Course Website	http://hkumath.hku.hk/course/MATH2241/

MATH2822 Mathematical methods for actuarial science II (6 credits)		**Academic Year**	**2012**
Offering Department	Mathematics	**Quota**	---
Course Co-ordinator	Dr J T Chan, Mathematics *(jtchan@hku.hk)*		
Teachers Involved	Dr J T Chan, Mathematics		
Course Objectives	This course is the second of the two mathematics courses designed to provide actuarial science students with a solid background of calculus of one and several variables and an introduction to linear algebra. The course focuses on multivariable calculus and linear algebra. It aims at students with MATH1821. It can be followed by other 2000 or 3000 level mathematics courses.		
Course Contents & Topics	- 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, systems of nonlinear equations, Newton's method - Maxima and minima; Lagrange multipliers - Double and triple integrals, areas and volumes		
Course Learning Outcomes	On successful completion of this course, students should be able to: 1. Understand various topics in linear algebra such as the basic arithmetic of matrices, determinants, systems of linear equations, eigenvalues and eigenvectors, diagonalizable matrices, basis and dimension, and the rank-nullity theorem. 2. Understand various topics in functions of several variables including partial differentiation, the Hessian test for local extrema, Newton's method for solving systems of nonlinear equations, 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 combination)	Pass in MATH1821 Mathematical methods for actuarial science I		
Offer in 2012 - 2013	Y 2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

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	Demonstrates 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-based course

Course Teaching & Learning Activities

Activities	**Details**	**No. of Hours**
Lectures - contact hours		36
Tutorials - contact hours		12
Reading / Self study		100

Assessment Methods and Weighting

Methods	**Details**	**Weighting in final course grade (%)**
Examination		50
Test	2 tests	50

Required/recommended reading and online materials

K Binmore and J Davies: Calculus - Concepts and Methods (Cambridge University Press, 2001)
George B. Thomas; as revised by Maurice D. Weir and Joel Hass: Thomas' Calculus, 12th edition (Addison Wesley)
Steven J. Leon: Linear Algebra with Applications (Pearson Prentice Hall)
NIL

Course Website: http://hkumath.hku.hk/course/MATH2822/

PHYS1050 Physics for engineering students (6 credits)		Academic Year	2012
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Prof M H Xie, Physics *(mhxie@hku.hk)*		
Teachers Involved	Prof M H Xie, Physics Dr H S Wu, Physics		
Course Objectives	This course offers a comprehensive training of physics for engineers. It covers the major physical laws on mechanics, electricity and magnetism. A calculus-based approach is adopted.		
Course Contents & Topics	This course will introduce and discuss the following topics: Units and Dimensional Analysis, Motion of a Particle in One and Two Dimensions, Newton's Laws of Motion, Friction, Curvilinear and Circular Motion on a Plane, Force, Impulse and Momentum, Force Polygon and Static Equilibrium, Work and Energy, System of Particles, Moment of Inertia and Rotation of a Rigid Body, Simple Harmonic Motion and Pendulum; Electrostatic Fields and Potential, Gauss's Law, DC circuits, Magnetic field due to Moving Charges, Force on a Moving Charge in Magnetic Field, Biot-Savart law, Ampere's law, Electromagnetic Induction, Faraday's Law, Eddy Currents, AC circuits, Phases in Capacitive and Inductive Circuits, Power, DC and AC Generators, Transformer.		
Course Learning Outcomes	On successful completion of this course, students should be able to: 1. Describe and explain the physical principles of mechanics, electricity and magnetism. 2. Apply these principles to situations of the physical and engineering world. 3. Analyze and solve basic problems using the calculus-based approach. 4. Acquire and interpret experimental data to examine the physical laws.		
Pre-requisites (and Co-requisites and Impermissible combination)	Level 3 or above in HKDSE Physics or Combined Science with Physics components or equivalent (This course is exclusive for Engineering students.)		
Offer in 2013 - 2014	Y 1st sem	**Examination**	Dec
Offer in 2014 - 2015	Y		
Course Grade	A+ to F		

Grade Descriptors

A	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions.
B	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions.
C	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.
D	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 with laboratory component course

Course Teaching & Learning Activities

Activities	Details	No. of Hours
Lectures - contact hours		36
Laboratory - contact hours		12
Tutorials - contact hours		12
Reading / Self study		72

Assessment Methods and Weighting

Methods	Details	Weighting in final course grade (%)
Examination		70
Test		10
Assignments		10
Laboratory reports		10

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)

PHYS1055 How things work (6 credits)		Academic Year	2012
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Dr M K Yip, Physics *(mankit@bohr.physics.hku.hk)*		
Teachers Involved	Dr M K Yip, Physics		
Course Objectives	This course is designed for students in all disciplines and all years who are curious about science in daily life. The course covers the working principles and mechanisms of the things and phenomena around us. Logical thinking and appreciation of science are emphasized with mathematics kept at a minimum. Students are trained to develop scientific intuition and to understand that many "magical" things in everyday life can be predictable.		
Course Contents & Topics	Topics include: the science in the household and the science of driving, sports and amusement. Daily applications are explored with simple and lucid explanations. Developments in optical recording, medical imaging for diagnosis and the magnetic levitated trains in public transportation are introduced as examples of the modern technology. Contents of the course are constantly updated to reflect the advances in modern science and technology.		
Course Learning Outcomes	On successful completion of this course, students should be able to: 1. Describe and discuss the physical principles that are behind the household appliances and the scientific issues in daily life. 2. Demonstrate their knowledge to related topics qualitatively. 3. Criticize and express views in logical and effective ways. 4. Recognize the significance of science and technology.		
Pre-requisites (and Co-requisites and Impermissible combination)	NIL		
Offer in 2012 - 2013	Y 2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

A	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.
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: Lecture-based course

Course Teaching & Learning Activities

Activities	Details	No. of Hours
Lectures - contact hours		36
Tutorials - contact hours		12
Reading / Self study		80

Assessment Methods and Weighting

Methods	Details	Weighting in final course grade (%)
Examination		50
Assignments		25
Presentation		25

Required/recommended reading and online materials: Lecture notes provided by Course Coordinator
L. A. Bloomfield: How Things Work: The Physics of Everyday Life (John Wiley & Sons, Inc, 2008, 3rd edition)

PHYS1056 Weather and climate (6 credits)		Academic Year	2012
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 T C Lee, Hong Kong Observatory Dr P W Li, 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 this course, we shall introduce to students the fundamentals of weather, climate and climate changes, to arouse their interests in the scientific and 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. They will also supervise course projects that involve a visit to the HKO to study the meteorological facilities and understand the operational activities on weather and climate.		
Course Learning Outcomes	On successful completion of this course, students should be able to: 1. Recall the basic principles of weather and climate. 2. Apply the principles to interpret weather / climate information, for example from the HKO web site, internet or media. 3. Identify and explain the differences of weather and climate in Hong Kong as compared to other parts of the world. 4. Explain the basic causes of climate change and its potential impacts. 5. Describe and discuss the daily operational activities in the HKO.		
Pre-requisites (and Co-requisites and Impermissible combination)	NIL		
Offer in 2012 - 2013	Y 1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

A	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.
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: Lecture-based course

Course Teaching & Learning Activities

Activities	Details	No. of Hours
Lectures - contact hours		36
Tutorials - contact hours		12
Reading / Self study		72

Assessment Methods and Weighting

Methods	Details	Weighting in final course grade (%)
Examination		50
Test		25
Assignments		25

Required/recommended reading and online materials: Lecture notes provided by Course Coordinator
Frederick Lutgens and Edward Tarbuck: The Atmosphere (Pearson Prentice Hall, 2010)

PHYS1150 Problem solving in physics (6 credits)		**Academic Year**	**2012**
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 course provides a basic training on the methods and tools that are commonly used in physics. It prepares students the necessary knowledge to learn the subject. Students will explore the basic ideas, methods and skills through tackling physical problems. It is complete in itself, or may also be followed by Methods in Physics I. This course can be regarded as a survival guide in physics study.		
Course Contents & Topics	This course introduces the principles and theories of various tools that are useful to read physics and solve its problems. Topics include: Dimensional analysis, algebraic method, vectorial method, graphical method, calculus approach and geometric approach, etc. Applications to physical systems and various problem solving skills are discussed.		
Course Learning Outcomes	On successful completion of this course, students should be able to: 1. State physical systems by the language of mathematics and employ mathematical logic and reasoning to read physics. 2. Apply calculus to solve problems. 3. Review the features of various solving tools in physics as well as plan and select appropriate tools when solving physical problems. 4. Describe the connections between mathematical equations and physical problems. 5. Formulate and operate physical problems both qualitatively and quantitatively. 6. Interpret and judge the physical meaning of result after calculations.		
Pre-requisites (and Co-requisites and Impermissible combination)	Level 3 or above in HKDSE Physics or equivalent; Students without Level 3 or above in HKDSE Physics but having a pass in PHYS1240 Physics by inquiry may be allowed to take this course		
Offer in 2012 - 2013	Y 2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

A	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills. Apply highly effective observation 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 observation 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.
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 with laboratory component course

Course Teaching & Learning Activities

Activities	**Details**	**No. of Hours**
Lectures - contact hours		36
Laboratory - contact hours		6
Tutorials - contact hours		18
Reading / Self study		60

Assessment Methods and Weighting

Methods	**Details**	**Weighting in final course grade (%)**
Examination		50
Test		20
Assignments		20
Laboratory reports		10

Required/recommended reading and online materials: Lecture notes provided by Course Coordinator

PHYS1240 Physics by inquiry (6 credits)		**Academic Year**	**2012**
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Dr F K Chow, Physics *(judychow@hkucc.hku.hk)*		
Teachers Involved	Dr F K Chow, 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.		
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 quantitative analysis. The course contents cover: Mechanics, Heat, Optics, Waves, Electricity and Magnetism.		
Course Learning Outcomes	On successful completion of the course, students should be able to: 1. Describe and distinguish the concepts and principles in introductory study of physics. 2. Recognize the underlying physical principles behind various daily life phenomena. 3. Explain physical phenomena using proper physical laws and theories. 4. Apply the fundamental techniques for quantitative analysis in solving physics problems. 5. Collect and analyse the data of physics experiments.		
Pre-requisites (and Co-requisites and Impermissible combination)	NIL Not for students with level 3 or above in HKDSE Physics; and Not for students who have passed in PHYS1050 Physics for Engineering students or already enrolled in this course; and Not for students who have passed in PHYS1250 Fundamental Physics or already enrolled in this course.		
Offer in 2012 - 2013	Y 1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

A	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to 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: Lecture-based course

Course Teaching & Learning Activities

Activities	**Details**	**No. of Hours**
Lectures - contact hours		36
Tutorials - contact hours		12
Reading / Self study		72

Assessment Methods and Weighting

Methods	**Details**	**Weighting in final course grade (%)**
Examination		50
Test		35
Assignments		15

Required/recommended reading and online materials

Lecture notes provided by Course Coordinator
John D. Cutnell and Kenneth W. Johnson: Essentials of Physics (John Wiley & Sons, Inc., 2006)
Paul G. Hewitt: Conceptual Physics (Addison Wesley, 2009, 11th edition)
Raymond A. Serway and Chris Vuille: College Physics (Brooks Cole, 2011, 9th edition)

PHYS1250 Fundamental physics (6 credits)		Academic Year	2012
Offering Department	Physics	**Quota**	---
Course Co-ordinator	Dr M K Yip, Physics *(mankit@bohr.physics.hku.hk)*		
Teachers Involved	Dr M K Yip, Physics		
Course Objectives	This course covers the fundamental blocks in physics in one semester. It serves as a first course to students who are planning to take physics, astronomy, or mathematics/physics as major. It also serves students who intend to take physics or astronomy as minor. Conceptual ideas in physics are emphasized and the mathematical treatment is moderate.		
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: 1. Describe and explain the fundamental physical principles. 2. Apply these principles, together with logical and mathematical reasoning, to situations of the physical world. 3. Analyse and solve problems with the aids of mathematics. 4. Acquire and interpret experimental data to examine the physical laws.		
Pre-requisites (and Co-requisites and Impermissible combination)	Level 3 or above in HKDSE Physics or equivalent; Students without Level 3 or above in HKDSE Physics but having a pass in PHYS1240 Physics by inquiry may be allowed to take this course; Not for students who have passed in PHYS1050 Physics for Engineering Students or already enrolled in this course.		
Offer in 2012 - 2013	Y 1st sem 2nd sem	**Examination**	Dec May
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

A	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills. Apply highly effective lab skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions.
B	Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills. Apply effective lab skills and techniques. Correct use of data of results to draw appropriate conclusions.
C	Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills. Apply moderately effective lab skills and techniques. Mostly correct but some erroneous use of data and results to draw appropriate conclusions.
D	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 with laboratory component course

Course Teaching & Learning Activities

Activities	Details	No. of Hours
Lectures - contact hours		36
Laboratory - contact hours		6
Tutorials - contact hours		12
Reading / Self study		80

Assessment Methods and Weighting

Methods	Details	Weighting in final course grade (%)
Examination		50
Assignments	assignment and quiz	35
Laboratory reports		15

Required/recommended reading and online materials

Lecture notes provided by Course Coordinator
Raymond A. Serway and John W. Jewett: Physics for Scientists and Engineers (Thomson, 2011, 8th edition)
James S. Walker: Physics (Prentice Hall, 2009, 4th edition)

PHYS1650 Nature of the universe (6 credits)		Academic Year	2012
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 general education course is designed for students in all disciplines and all years. No prior knowledge in astronomy, physics, and higher mathematics is required, but will help.		
Course Contents & Topics	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, blackholes, and cosmology. It also provides students with a basic understanding of the relationship of astronomy to life and how our nature works on the macroscopic level. Students are expected to participate actively in the night sky observations.		
Course Learning Outcomes	On successful completion of this course, students should be able to: 1.Identify and describe the major objects in our Solar System and our universe (including stars and galaxies), and explain their main properties. 2. Use the celestial sphere model to describe the apparent trajectories of celestial objects. 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. 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. 5. Explain the evolution of stars and the evolution of the universe. 6. Review communicate astronomical problems and solutions using appropriate astronomical terminology and good English.		
Pre-requisites (and Co-requisites and Impermissible combination)	NIL		
Offer in 2012 - 2013	Y 1st sem 2nd sem	**Examination**	Dec May
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

A	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills. Apply highly effective observation 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 observation 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 observation 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 observation skills and techniques. Misuse of data and results and/or unable to draw appropriate conclusions.

Course Type: Lecture with laboratory component course

Course Teaching & Learning Activities

Activities	Details	No. of Hours
Lectures - contact hours		36
Laboratory - contact hours		12
Tutorials - contact hours		12
Reading / Self study		60

Assessment Methods and Weighting

Methods	Details	Weighting in final course grade (%)
Examination		50
Assignments		25
Presentation		25

Required/recommended reading and online materials: E. Chaisson and S. McMillan: Astronomy Today (Pearson, 2010)

SCNC1111 Scientific method and reasoning (6 credits)		Academic Year	2012
Offering Department	Faculty	**Quota**	---
Course Co-ordinator	Dr N K Tsing, Mathematics *(nktsing@hku.hk)*		
Teachers Involved	Dr N K Tsing, Mathematics Dr K F Lam, Statistics & Actuarial Science Dr D J Mitchell, Faculty of Science		
Course Objectives	The objectives are to give students a holistic view of the science discipline in terms of its nature, concepts and impact on civilization and society; to equip students with basic skills of logical and quantitative reasoning; and to introduce to students mathematical and statistical methods for science studies and research.		
Course Contents & Topics	Part I: The nature and methodology of science - Demarcation between science and non-science - Shared features of the sciences - Scientific method - The role of mathematics in the historical development of science Part II: Quantitative Reasoning a. Mathematics - Foundation of mathematics - Mathematics and advancement of science - an introduction - Mathematical modelling - an introduction - Guesstimation - Difference equations - Linear algebra and matrices - Calculus and differential equations - Graph theory - Fractals - Chaos b. Statistics - Probability rules - Probabilistic methods - Random processes and Markov models - Statistical inference - Hypothesis testing - Decision making with statistics - Statistical modelling, and use and misuse of statistics		
Course Learning Outcomes	On successful completion of this course, students should be able to: 1. Describe key aspects of scientific methodology. 2. Describe the key elements of the foundation of mathematics and statistics. 3. Identify the mathematics that underlies scientific problems. 4. Apply logical and quantitative reasoning to re-formulate both real life and scientific problems in mathematical terms, and to interpret their solutions.		
Pre-requisites (and Co-requisites and Impermissible combination)	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.)		
Offer in 2012 - 2013	Y 1st sem 2nd sem	**Examination**	Dec May
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

A	Demonstrate thorough mastery of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, and ability to apply knowledge to a wide range of familiar and unfamiliar situations. Carry out computations carefully and correctly. 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. Carry out computations mostly in a careful and correct way, but commit some minor computational errors. 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. Commit a number of minor computational errors. Apply moderately effective organizational and presentational skills.
D	Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning 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 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. Commit serious computational errors. Organization and presentational skills are minimally effective or ineffective.

Course Type	Lecture-based course

Course Teaching & Learning Activities

Activities	Details	No. of Hours
Lectures - contact hours		33
Tutorials - contact hours		8
Reading / Self study		100

Assessment Methods and Weighting	**Methods**	**Details**	**Weighting in final course grade (%)**
	Examination	2-hour examination	40
	Test		40
	Assignments		20
Required/recommended reading and online materials	TBC		

SCNC1112 Fundamentals of modern science (6 credits)		Academic Year	2012
Offering Department	Faculty	**Quota**	---
Course Co-ordinator	Dr J C S Pun, Physics *(jcspun@hku.hk)*		
Teachers Involved	Dr J C S Pun (1st sem), Physics Prof A S C Cheung (1st & 2nd sem), Chemistry Dr K M Y Leung (1st & 2nd sem), Biological Sciences Dr M H Lee (2nd sem), Earth Sciences		
Course Objectives	This course aims to provide students an overview of the giant web of knowledge that makes up science. This course adopts an integrated approach and encompasses physics, astronomy, earth sciences, chemistry, and biology, and focuses on the general principles and unifying concepts of science used in various disciplines to describe the diverse phenomena and objects in the natural world. The fundamental laws of each discipline, the historical developments and the modern frontiers, and the interconnectedness of different science disciplines will be introduced and highlighted.		
Course Contents & Topics	(1) Universal principles and unifying concepts of science (2) Fundamental structure of matter - Structure of matter - The quantum world - Elementary particles and standard model (3) Atoms and molecules - Matters and atoms: The periodic table - Chemical bonds and chemical reactions - Important molecules: water, carbon, molecular cluster - Nanoscience and nanotechnology (4) DNA/Genetic - Molecules of life - Genomics and DNA; Genetics and inheritance (5) Cells and systems (6) Organism and environment - The origin and evolution of life - Ecology and environment (7) Earth and Beyond - Solid Earth, Earth's atmosphere and hydrosphere - Earth's motion in space - Planets, the Sun, and the solar system - Cosmology		
Course Learning Outcomes	On successful completion of this course, students should be able to: 1. Acquire an understanding of the historical development of modern science, the essence and spirit of scientific inquiry methods, and the role of science in the advancement of civilization over time. 2. Understand and be familiar with the fundamental scientific principles and concepts. 3. Appreciate the diversity of different scientific disciplines and develop multidisciplinary and interdisciplinary perspectives on scientific issues. 4. Critically and creatively appraise received ideas and established knowledge. 5. Develop curiosity in science and an appreciation of sciences as related to different Science Majors and as a form of life-long learning.		
Pre-requisites (and Co-requisites and Impermissible combination)	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.)		
Offer in 2012 - 2013	Y 1st sem 2nd sem	**Examination**	Dec May
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

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 lab skills and techniques. Critical use of data and results to draw appropriate and insightful conclusions Apply highly effective organizational and presentational skills.
B	Demonstrate substantial command of a broad range of knowledge 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 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 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. 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.
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. 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	Lecture with laboratory component course

Course Teaching & Learning Activities

Activities	Details	No. of Hours

	Lectures - contact hours		33
	Laboratory - contact hours		2
	Tutorials - contact hours		12
	Reading / Self study		94
	Assessment	1 hour in-class quiz	1

Assessment Methods and Weighting

Methods	Details	Weighting in final course grade (%)
Examination		40
Test		10
Assignments	tutorials and homework	20
Laboratory reports		10
Presentation	project presentation	20

Required/recommended reading and online materials

Textbook: Sciences: An Integrated Approach by Trefil & Hazen 6th Edition (2010, Wiley)
References: Integrated Science by Tillery, Enger, & Ross 5th Edition (2011, McGrawHill)
Biology: Concepts and Connections by Campbell, Mitchell, & Reece 2nd Edition (1999, Benjamin/Cummings)

STAT1600 Statistics: ideas and concepts (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Prof W K Li, Statistics and Actuarial Science *(hrntlwk@hku.hk)*		
Teachers Involved	Prof W K Li, Statistics & Actuarial Science Dr Philip Yu, Statistics & Actuarial Science Mr K P Wat, 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 - Modelling: 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 Outcomes	On successful completion of this course, students should be able to: 1. Understand the role of statistics as a tool for scientific reasoning. 2. Present data in a useful and informative way. 3. Acquire basic concepts and perspectives of statistical modelling and inference. 4. Distinguish between good and bad statistical practices. 5. Pursue a major study in Statistics or Risk Management with a well-established conceptual foundation.		
Pre-requisites (and Co-requisites and Impermissible combination)	Pass in MATH1013 University mathematics II, or have already enrolled in this course.		
Offer in 2012 - 2013	Y 1st sem 2nd sem	**Examination**	Dec May
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

A	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.
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: Lecture-based course

Course Teaching & Learning Activities

Activities	**Details**	**No. of Hours**
Lectures - contact hours		36
Tutorials - contact hours		12
Reading / Self study		100

Assessment Methods and Weighting

Methods	**Details**	**Weighting in final course grade (%)**
Examination		50
Assignments		50

Required/recommended reading and online materials

Albright, S. C. and Winston, W. L. and Zappe, C. J. (2009). Data Analysis and Decision Making with Microsoft Excel. South-Western Cengage Learning.
Moore, D. S. and Notz, W. I. (2006). Statistics: Concepts and Controversies. Freeman: New York.

Course Website: webct.hk.hk

STAT1601 Elementary statistical methods (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr E A L Li, Statistics and Actuarial Science *(ericli@saas.hku.hk)*		
Teachers Involved	Dr E A L Li, Statistics & Actuarial Science Dr Y H S Ho, Statistics & Actuarial Science		
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 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, Elementary Time Series, Index Numbers		
Course Learning Outcomes	On successful completion of this course, students should be able to: 1. Select and use appropriate statistical methods to analyze data. 2. Perform statistical analysis with calculator and Microsoft Excel. 3. Understand and apply basic concepts of probability. 4. Gain familiarity with the fundamental concepts of random variables. 5. Make inferences on a population based on sample data. 6. Determine the most appropriate statistical method to use for a given statistical problem. 7. Write appropriate conclusions based on the statistical results. 8. Understand the basic principles of simple linear regression and correlation and their applications to practical problems.		
Pre-requisites (and Co-requisites and Impermissible combination)	Level 2 or above in HKDSE Mathematics or equivalent; and Not for students with Level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics; and Not for students who have passed or already enrolled in any of the following courses: STAT2901 Probability and statistics: foundations of actuarial science, STAT1602 Business statistics, STAT2601 Probability and statistics I, STAT1603 Introductory statistics, ECON1280 Analysis of economic data		
Offer in 2012 - 2013	Y 1st sem 2nd sem	**Examination**	Dec May
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

A	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.
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	Lecture-based course

Course Teaching & Learning Activities

Activities	**Details**	**No. of Hours**
Lectures - contact hours		36
Tutorials - contact hours		12
Reading / Self study		100

Assessment Methods and Weighting

Methods	**Details**	**Weighting in final course grade (%)**
Examination		75
Assignments		25

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	webct.hku.hk
Additional Course Information	Calculator: CASIO fx-50FH (This model has SD-MODE, REG-MODE, nCr and Normal Probability Function which is very suitable for this course.)

STAT1602 Business statistics (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr Y K Chung, Statistics and Actuarial Science *(yukchung@hku.hk)*		
Teachers Involved	Dr Y K Chung, 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	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 Outcomes	On successful completion of this course, students should be able to: 1. Understand the methods for describing sets of data. 2. Perform statistical analysis with calculator and Microsoft Excel. 3. Draw conclusions from data using numerical summaries. 4. Understand and apply basic concepts of probability. 5. Gain familiarity with the fundamental concepts of random variables. 6. Make inferences on a population based on sample data. 7. Determine the most appropriate statistical method to use for a given statistical problem. 8. Gain familiarity with the fundamental concepts of statistical inference as they apply to a variety of problems. 9. 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 combination)	Not for students who have passed or already enrolled in any of the following courses: STAT1601 Elementary statistical methods, STAT2601 Probability and statistics I, STAT1603 Introductory statistics, STAT2901 Probability and statistics: foundations of actuarial science, ECON1280 Analysis of economic data (This course is exclusive for School of Business students.)		
Offer in 2012 - 2013	Y 1st sem 2nd sem	**Examination**	Dec May
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

A	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.
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: Lecture-based course

Course Teaching & Learning Activities

Activities	**Details**	**No. of Hours**
Lectures - contact hours		36
Tutorials - contact hours		12
Reading / Self study		100

Assessment Methods and Weighting

Methods	**Details**	**Weighting in final course grade (%)**
Examination		75
Assignments		25

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: webct.hku.hk

STAT1603 Introductory statistics (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr G C S Lui, Statistics and Actuarial Science *(csglui@hku.hk)*		
Teachers Involved	Dr G C S Lui, Statistics & Actuarial Science		
Course Objectives	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	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 Outcomes	On successful completion of this course, students should be able to: 1. Compute different measures of central tendency and dispersion. 2. Make use of the basic probability theory and techniques to solve practical problem. 3. Know how to construct confidence intervals and use hypotheses testing to carry out inference on the population. 4. Use linear regression and correlation methods to solve problems in science and in social and business environment.		
Pre-requisites (and Co-requisites and Impermissible combination)	(Level 2 or above in HKDSE Extended Module 1 or 2 of Mathematics or equivalent) or (Pass in MATH1011 University Mathematics I, or already enrolled in this course); and Not for students who have passed or already enrolled in any of these courses: STAT1601 Elementary statistical methods, STAT1602 Business statistics, STAT2601 Probability and statistics I, STAT2901 Probability and statistics: foundations of actuarial science		
Offer in 2012 - 2013	Y 1st sem	**Examination**	Dec
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

A	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.
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	Lecture-based course

Course Teaching & Learning Activities

Activities	**Details**	**No. of Hours**
Lectures - contact hours		36
Tutorials - contact hours		12
Reading / Self study		100

Assessment Methods and Weighting

Methods	**Details**	**Weighting in final course grade (%)**
Examination		75
Assignments		25

Required/recommended reading and online materials	Miller, I. and Miller, M.: John E. Freund's Mathematical Statistics with Applications (Prentice Hall, New Jersey, 2004, 7th edition) Larson, R. and Farber, B.: Elementary Statistics - Picturing the World (Prentice Hall, 2006, 3rd edition) Bluman, A. G.: Elementary Statistics - A Step by Step Approach (The McGraw-Hill Companies, Inc., 2004, 5th edition) Triola, M. F.: Elementary Statistics (Addiso Wesley Longman, Inc., 1998, 7th edition)
Course Website	webct.hku.hk
Additional Course Information	Students who intend to major in "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 Probability and statistics I (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr Y K Chung, Statistics and Actuarial Science *(yukchung@hku.hk)*		
Teachers Involved	Dr Y K Chung, Statistics & Actuarial Science Mr K P Wat, Statistics & Actuarial Science		
Course Objectives	The discipline of statistics is concerned with situations in which uncertainty and variability play an essential role and forms an important descriptive and analytical tool in many practical problems. Against a background of motivating problems this course develops relevant probability models for the description of such uncertainty and variability.		
Course Contents & Topics	Sample spaces; Operations of events; Probability and probability laws; Conditional probability; Independence; Discrete random variables; Cumulative distribution function (cdf); Probability mass function (pmf); Bernoulli, binomial, 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 Outcomes	On successful completion of this course, students should be able to: 1. Understand the basic concepts in probability theory. 2. Gain some insights to statistics and inference. 3. Solve real-world problem by using probability calculations. 4. Pursue their further studies in statistics.		
Pre-requisites (and Co-requisites and Impermissible combination)	Pass in MATH1013 University mathematics II, or already enrolled in this course; or Pass in MATH1851 Calculus and ordinary differential equations and MATH1853 Linear algebra, probability and statistics; and Not for students who have passed in STAT1603 Introductory statistics, or already enrolled in this course; Not for students who have passed in STAT2901 Probability and statistics: foundations of actuarial science, or already enrolled in this course; and Not for BSc(ActuarSc) students.		
Offer in 2013 - 2014	Y 1st sem 2nd sem	**Examination**	Dec May
Offer in 2014 - 2015	Y		
Course Grade	A+ to F		

Grade Descriptors

A	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.
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: 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 (%)**
Examination		75
Assignments	Coursework (assignments, tutorials, and class test(s))	25

Required/recommended reading and online materials

Rice, J. A.: Mathematical Statistics and Data Analysis (Duxbury, Belmont, California, 2nd ed.)
Berry, D. A. & Lindgren, B. W.: Statistics: Theory and Methods (Duxbury, Belmont, 1996)
Freund, J. E.: Mathematical Statistics (Prentice Hall, Englewood Cliffs, N.J., 1992)
Hogg, R. V. & Tanis E. A.: Probability and Statistical Inference (Prentice Hall, Upper Saddle River, N. J., 2001)

Course Website: webct.hk.hk

STAT2602 Probability and statistics II (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Dr K S Chong, Statistics and Actuarial Science *(kschong@hku.hk)*		
Teachers Involved	Dr K S Chong, Statistics & Actuarial Science		
Course Objectives	This course builds on STAT1301, introducing further the concepts and methods of statistics. Emphasis is on the two major areas of statistical analysis: estimation and hypothesis testing. Through the disciplines of statistical modelling, inference and decision making, students will be equipped with both quantitative skills and qualitative perceptions essential for making rigorous statistical analysis of real-life data.		
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-Rao Lower Bound; efficiency; method of moments; maximum likelihood estimator; 3. Hypothesis testing: types of hypotheses; test statistics; p-value; size; power; likelihood ratio test; Neyman-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 Outcomes	On successful completion of this course, students should be able to: 1. Apprehend the objectives of statistics and its relation to probability theory. 2. Relate a real-life problem to a formal framework for statistical inference. 3. Conduct standard parametric statistical inference by means of estimation and hypothesis testing. 4. Reckon the general applicability of statistics in a broad range of subject areas.		
Pre-requisites (and Co-requisites and Impermissible combination)	Pass in STAT2601 Probability and statistics I		
Offer in 2012 - 2013	Y 2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

A	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.
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: Lecture-based course

Course Teaching & Learning Activities

Activities	**Details**	**No. of Hours**
Lectures - contact hours		36
Tutorials - contact hours		12
Reading / Self study		100

Assessment Methods and Weighting

Methods	**Details**	**Weighting in final course grade (%)**
Examination		75
Assignments		25

Required/recommended reading and online materials

Berry, D.A. & Lindgren, B.W. (1996). Statistics: Theory and Methods. Duxbury: Belmont.
Bickel, P.J. & Doksum, K.A. (2001). Mathematical Statistics: Basic Ideas and Selected Topics. Prentice Hall: Upper Saddle River, N.J.
Hogg, R.V. & Craig, A.T. (1989). Introduction to Mathematical Statistics. Macmillan: New York.
Miller, I. & Miller, M. (2004). John E. Freund's Mathematical Statistics with Applications. Pearson Prentice Hall: Upper Saddle River.

Course Website: webct.hku.hk

STAT2901 Probability and statistics: foundations of actuarial science (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Prof H L Yang, Statistics and Actuarial Science *(hlyang@hku.hk)*		
Teachers Involved	Prof H L Yang, Statistics & Actuarial Science		
Course Objectives	The purpose of this course is to develop knowledge of the fundamental tools in probability and statistics for quantitatively assessing risk. Applications of these tools to actuarial science problems will be emphasized. Students will have a thorough command of probability topics and the supporting calculations.		
Course Contents & Topics	1. General Probability - Basic elements of probability in set notation - Mutually exclusive events - Addition and multiplication rules - Independence of events - Combinatorial probability - Conditional probability and expectations - Bayes Theorem / Law of total probability - Random variables 2. Univariate probability distributions (including binomial, negative binomial, geometric, hypergeometric, Poisson, uniform, exponential, chi-square, beta, Pareto, lognormal, gamma, Weibull and normal) and bivariate normal distribution - Probability functions and probability density functions - Cumulative distribution functions - Mode, median, percentiles and moments - Variance and measures of dispersion - Central Limit Theorem 3. Sampling distributions and introduction of estimation		
Course Learning Outcomes	On successful completion of this course, students should be able to: 1. Understand the mathematical theory underlying the modern practice of statistics. 2. Develop skills in probabilistic analysis for problems involving randomness. 3. Apply techniques in probability and statistics to solve actuarial science problems.		
Pre-requisites (and Co-requisites and Impermissible combination)	(Pass in MATH1821 Mathematical methods for actuarial science I (for BSc(ActuarSc) students) or already enrolled in this course) or (Pass in MATH1013 University mathematics II 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 Elementary statistical methods, STAT1602 Business statistics, STAT2601 Probability and statistics I, STAT1603 Introductory statistics		
Offer in 2012 - 2013	Y 2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

A	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.
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: Lecture-based course

Course Teaching & Learning Activities

Activities	**Details**	**No. of Hours**
Lectures - contact hours		36
Tutorials - contact hours	tutorials/example classes	12
Reading / Self study		100

Assessment Methods and Weighting

Methods	**Details**	**Weighting in final course grade (%)**
Examination		75
Assignments		25

Required/recommended reading and online materials

I. Miller & M. Miller: John E. Freund's Mathematical Statistics with applications (Pearson Education International, 2004, 7th edition)
M. A. Bean: Probability: The Science of Uncertainty with Applications to Investments, Insurance, and Engineering (Brooks/Cole, Thomas Learning)
S. Ghahramani: Fundamentals of Probability, with Stochastic Processes (2005, 3rd edition)
M. Hassett & D. Stewart: Probability for Risk Management (2006, 2nd edition)

	S.M. Ross: A First Course in Probability (2005, 7th edition) D. Wackerly, W. Mendenhall III & R. Scheaffer: Mathematical Statistics with Applications (2008, 7th edition)
Course Website	webct.hk.hk

STAT2902 Financial mathematics (6 credits)		**Academic Year**	**2012**
Offering Department	Statistics and Actuarial Science	**Quota**	---
Course Co-ordinator	Prof K C Yuen, Statistics and Actuarial Science *(kcyuen@hku.hk)*		
Teachers Involved	Prof K C Yuen, Statistics & Actuarial Science		
Course Objectives	This course introduces the fundamental concepts of financial mathematics which plays an important role in the development of basic actuarial techniques. Practical applications of these concepts are also covered.		
Course Contents & Topics	Key topics include: measurement of interest, annuities certain; discounted cash flow analysis; yield rates; amortization schedules and sinking funds; bonds and related securities; practical applications such as real 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 Outcomes	On successful completion of this course, students should be able to: 1. Understand the fundamental concepts of financial mathematics. 2. Learn standard actuarial notations for a variety of annuities. 3. Do simple discounted cashflow analysis using basic annuities. 4. Learn the operations of some commonly-encountered financial instruments such as bonds, mortgages, short sales, and so on. 5. Quote interest in various modes and determine interest rate based on a series of financial transactions. 6. Deal with Exam FM of the Society of Actuaries.		
Pre-requisites (and Co-requisites and Impermissible combination)	Pass in STAT2901 Probability and statistics: foundations of actuarial science or already enrolled in this course; and Not for students who have passed in STAT3615 Practical mathematics for investment, or already enrolled in this course.		
Offer in 2012 - 2013	Y 2nd sem	**Examination**	May
Offer in 2013 - 2014	Y		
Course Grade	A+ to F		

Grade Descriptors

A	Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.
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: Lecture-based course

Course Teaching & Learning Activities

Activities	**Details**	**No. of Hours**
Lectures - contact hours		36
Tutorials - contact hours	tutorials/example classes	12
Reading / Self study		100

Assessment Methods and Weighting

Methods	**Details**	**Weighting in final course grade (%)**
Examination		75
Assignments		25

Required/recommended reading and online materials	Kellison, S. G.: The Theory of Interest (Irwin: Illinois, 2008, 3rd edition) Broverman, S. A.: Mathematics of Investment and Credit (ACTEX Publications - Mad River Books: Connecticut, 2004, 3rd edition)
Course Website	webct.hk.hk

Course Code: CCCH9020

Course Title: Science and Technology: Lessons from China

Course Description:
In spite of the vast and superior knowledge possessed by the ancient Chinese relative to the rest of the world, China did not develop into a dominant technoculture. This course will explore some of the lesser known inventions and scientific development in ancient China and factors that caused China to fall behind the West in technological development. The contents of the course include perception of the material world in ancient China, early Chinese views of the universe, earth and Nature, changes in the perception of these entities over time, scientific inventions and theories of ancient China, and the linkage between science, art and literature in China. Guest speakers will give insights on specific areas of technological advancement in ancient China.

Offer Semester: Second semester

Day of Teaching: Wednesday

Assessment: 70% coursework; 30% examination

Course Co-ordinator:
Professor L S Chan
Department of Earth Sciences, Faculty of Science
Tel: 2859 8002 Email: chanls@hku.hk

Teacher(s):
Professor L S Chan
Department of Earth Sciences, Faculty of Science
Tel: 2859 8002 Email: chanls@hku.hk

Study Load

Activities	Number of hours
Lectures	16
Tutorials	4
Seminars	4
Fieldwork / Visits	6
Reading / Self-study	80
Assessment: Essay / Report writing	40
Assessment: Examination	2
Total:	152

Course Learning Outcomes

On completing the course, students will be able to:	
1.	Give an account of the extent of scientific achievements in ancient China and explain the social-environmental background governing the development of science and technology in ancient China.
2.	Deliver an in-depth account on why western style science did not flourish in China.
3.	Give a critical comparison of the approach and inquiry methods used by scholars in ancient China and in modern scientific studies.

Assessment

Assessment Tasks	Weighting
Essays	40
Examination	30
Field trip / Discussion / Hands-on work	10
Book analysis	20

Required Reading
Institute of the History of Natural Sciences, Chinese Academy of Sciences. (1983). *Ancient China's technology and science*. Beijing: Foreign Languages Press.

Course Code: CCGL9016

Course Title: Feeding the World

Course Description:
Continuing human population increases, competition for water supplies, and concern about energy prices have led to profound pessimism about long-term food supplies. Already a billion people go hungry every day. This course offers an in-depth look at key issues in global food sufficiency, food production, food distribution, prospects and constraints. You will develop an integrated technical, economic and political understanding of the global food supply crisis. You will be equipped to understand and appreciate media reports related to this issue in your lives as informed and influential citizens. Topics covered will include: global food production and population trends; the special problem of China the world's biggest producer and consumer of food; the Green Revolution; alternative agricultures; meat production; agriculture as an energy-intensive business; water and agriculture; and biofuels.

[Non-permissible combination: CCGL9017 "Food: Technology, Trade and Culture"]

Offer Semester: First semester

Day of Teaching: Saturday

Assessment: 100% coursework

Course Co-ordinator:
Dr H Corke
School of Biological Sciences, Faculty of Science
Tel: 2299 0313 Email: harold@hku.hk

Teacher(s):
Dr H Corke
School of Biological Sciences, Faculty of Science
Tel: 2299 0313 Email: harold@hku.hk

Professor D L Phillips
Department of Chemistry, Faculty of Science
Tel: 2859 2160 Email: phillips@hku.hk

Study Load

Activities	Number of hours
Lectures	24
Tutorials	12
Seminars	6.5
Reading / Self-study	40
Assessment: Essay / Report writing	12
Assessment: Presentation (incl preparation)	60
Assessment: In-class test	1.5
Total:	156

Course Learning Outcomes

On completing the course, students will be able to:	
1.	Describe and explain the Green Revolution and its relationship to future improvements in agriculture through biotechnology.
2.	Demonstrate an understanding of the critical issues facing China's struggle to feed itself.
3.	Discuss critically the fundamental relationships among energy supply, energy cost, and food production.
4.	Use newly developed skills to critically read, analyze and interpret media reports on food

	supply related topic.
5.	Demonstrate investigative skills by preparing an in-depth group investigation (resulting in a 30 minute presentation) using library databases and FAOStat production data.

Assessment

Assessment Tasks	Weighting
Quizzes / Participation	10
Proposal / Outline for essay	5
In-class test	50
Group project and presentation	35

Required Reading
Several newspaper, popular science, business school case studies, website references, and other teaching resources will be prepared using up-to-date sources for each class session. Extensive use will be made of FAOSTAT, an agricultural production database from the United Nations.

Course Code: CCGL9017

Course Title: Food: Technology, Trade and Culture

Course Description:
Why do we eat what we eat? Where does the food come from? What makes for "desirability" or sensory quality in food? How and why did global trade develop around the production and shipping of food? What are the historical roots of the modern-day globalized food industry? This course will offer an in-depth look at key issues in the economic history of global trade in food, in processing foods for optimum quality, and the development of markets for new products. Examples will be drawn from commodities – such as salt, sugar or spices; major beverages – such as wine or coffee; and newly globalized products – such as pizza or chocolate. The major themes of the course are:
The historical development of food commodity trading
The globalization of food preferences
The definition, development and spread of "new" products
The understanding of some basic underlying technology/science in the production and processing of major foods.

[Non-permissible combination: CCGL9016 "Feeding the World"]

Offer Semester: Second semester

Day of Teaching: Saturday

Assessment: 60% coursework; 40% examination

Course Co-ordinator:
Dr H Corke
School of Biological Sciences, Faculty of Science
Tel: 2299 0313 Email: harold@hku.hk

Teacher(s):
Dr H Corke
School of Biological Sciences, Faculty of Science
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Professor D L Phillips
Department of Chemistry, Faculty of Science
Tel: 2859 2160 Email: phillips@hku.hk

Study Load

Activities	Number of hours

Lectures	24
Tutorials	12
Seminars	6
Reading / Self-study	30
Research and development of project	20
Assessment: Essay / Report writing	10
Assessment: Presentation (incl preparation)	48
Assessment: Examination	2
Total:	152

Course Learning Outcomes

On completing the course, students will be able to:	
1.	Describe and explain the origin, production, and processing of a range of key food materials and food products.
2.	Outline the history of global trade in selected food commodities and products, showing an understanding of how this impacted economic development and cultural change.
3.	Apply formal methodologies from sensory science to evaluating the organoleptic properties of food products.
4.	Appreciate the massive changes in the dietary culture of a "global city" such as Hong Kong over the past 30 years.
5.	Demonstrate the ability to investigate a topic within the subject matter of the course, and apply new methodologies and paradigms to summarize and present the results.

Assessment

Assessment Tasks	Weighting
Tutorial active participation	10
Short critical reports	10
Project development	10
Project outcome and presentation	30
Examination	40

Required Reading

Pomeranz, K., & Topik, S. (2006). *The world that trade created: Society, culture, and the world economy, 1400 to the present* (2nd ed.). Armonk, NY: M. E. Sharpe.

Course Code: CCGL9033

Course Title: Weapons of Mass Destruction: Science, Proliferation and Terrorism

Course Description:

Weapons of mass destruction (WMD), i.e. nuclear, chemical and biological, comprise the most destructive and lethal weapons ever developed by humankind. Given that these weapons pose a severe threat to the survivability of humanity, increasing our understanding of their development, deterrent potential, reduction and more recently, the threat posed by proliferation networks as well as terrorist groups is of utmost importance. This course will start with the historical development of WMD and will be followed by a discussion of the underlying physical principles involved in WMD technology as well as biological and medical effects of nuclear weapons and other weapons of mass destructions. We will then draw the students' attention to the political and philosophical aspects of weapons of mass destruction, the current spread of WMD technology and non-proliferation treaties that aim to regulate and reduce WMD proliferation. We will also take a close look at the evolution of WMD proliferation networks, the emergence of nuclear terrorism and the consequences of terror-networks acquiring WMD materials. Finally, we will end this course with an important question: can the world move towards the complete disarmament of all WMD and would such a goal be desirable?

Offer Semester: First semester

Day of Teaching: Wednesday

Assessment: 100% coursework

Course Co-ordinator:
Dr K H Lemke
Department of Earth Sciences, Faculty of Science
Tel: 2241 5474 Email: kono@hku.hk

Teacher(s):
Dr K H Lemke
Department of Earth Sciences, Faculty of Science
Tel: 2241 5474 Email: kono@hku.hk

Dr Y Chiu
Department of Politics and Public Administration, Faculty of Social Sciences
Tel: 3917 1926 Email: yvchiu@hku.hk

Study Load

Activities	Number of hours
Lectures	24
Tutorials	12
Reading / Self-study	40
Assessment: Essay / Report writing	15
Assessment: Presentation (incl preparation)	15
Assessment: In-class test (incl preparation)	15
Total:	121

Course Learning Outcomes

On completing the course, students will be able to:	
1.	Describe and explain the technological development of nuclear, chemical and biological WMD and their application in conflicts.
2.	Identify and evaluate the relationship between WMD producers and proliferators and how globalization has impacted these relationships.
3.	Evaluate key components of recent nuclear test ban treatises and describe what type of technology is used for compliance monitoring.
4.	Discuss how proliferation networks of nuclear, chemical and biological WMD differ and how non-state actors seek to acquire WMD.
5.	Identify and analyze potential worst-case WMD attack scenarios and develop appropriate response strategies.

Assessment

Assessment Tasks	Weighting
Essay	25
Group multimedia presentation	25
Group debate	20
In-class test	30

Required Reading
Reading materials, i.e. articles, review papers, white paper-type reports will be provided on a weekly basis. Current issue related course reading materials may change and will be provided accordingly.

Course Code: CCST9011

Course Title: Biotechnology – Science and Impacts

Course Description:
This course provides students with the facts about the scientific discovery leading to the development of this new and revolutionary technology, and challenges them to think, investigate and evaluate how this technology can help solve medical and health, agricultural and food, and environmental and

sustainable resources problems and also its potential risk and hazards. Students will gain general understanding and knowledge of basic genetic, molecular biology and biotechnology, and interest in and awareness of the modern advancement of molecular biology and biotechnology. Students will be challenged to gain understanding about the impacts of biotechnology in human medical health, agriculture and environment. The moral-ethical issues associated with the biotechnology industry will be discussed and debated leading to the appreciation of the potential significant interconnection between biotechnology knowledge and humanities.

[Non-permissible combination:CCST9006 "Biomedical Breakthroughs in a Pluralistic World"]

Offer Semester: First semester

Day of Teaching: Wednesday

Assessment: 100% coursework

Course Co-ordinator:
Professor F C C Leung
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Tel: 2299 0825 Email: fcleung@hkucc.hku.hk

Teacher(s):
Professor F C C Leung
School of Biological Sciences, Faculty of Science
Tel: 2299 0825 Email: fcleung@hkucc.hku.hk

Study Load

Activities	Number of hours
Lectures	24
Tutorials	12
Discussion (reading and self-study)	48
Assessment: Essay / Report writing	15
Assessment: Presentation (incl preparation)	30
Total:	129

Course Learning Outcomes

On completing the course, students will be able to:	
1.	Describe and explain the principles of inheritance, recombinant DNA and cloning.
2.	Determine, explain and appraise the benefits and shortcomings of the application of biotechnology knowledge.
3.	Select and justify the use of advanced biotechnology products through bioethical consideration.
4.	Demonstrate professional and ethical approaches in presenting findings and analyses in a coherent and effective manner.

Assessment

Assessment Tasks	Weighting
In-class participation and quizzes	15
Essays and written reports	20
Discussion forum	35
Poster and oral presentation	30

Required Reading
Selected reading materials (2-3 assigned articles per week) from *Scientific American*, the science and technology section of *The New York Times* and *The Washington Post*, and the Internet.

Course Code: CCST9012

Course Title: Our Place in the Universe

Course Description:
This course discusses the historical changes in the perception of our place in the universe as a result of astronomical development. We begin with ancient models of the universe in different cultures and the religious and philosophical interpretation of celestial objects, through the Copernican revolution and the work of Kepler, Galileo and Newton, towards our current physical model of the universe.

Topics include:
Changing perceptions of our place in the universe as the result of astronomical development. Illustration of the development of the scientific method and how science has influenced the evolution of our philosophical thinking and cultural development;
Ancient models of the universe and the early philosophical and religious interpretation of celestial objects;
The development of concepts of time and calendars through the observation of solar, lunar, and planetary motions;
The Copernican revolution and the change from geocentric to heliocentric cosmology;
The application of scientific method and a physical interpretation of the universe through the work of Kepler, Galileo and Newton;
The expansion of the spatial scale of the universe as the result of modern astronomical observations;
Expansion of the time domain in cosmic history through the study of the history of the Earth, biological evolution, and cosmic evolution.

Offer Semester: Second semester

Day of Teaching: Wednesday

Assessment: 60% coursework; 40% examination

Course Co-ordinator:
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Study Load

Activities	Number of hours
Lectures	22
Tutorials	8
Fieldwork / Visits	2
Reading / Self-study	100
Laboratory	4
Assessment: Essay / Report writing	10
Assessment: Examination	4
Total:	150

Course Learning Outcomes

On completing the course, students will be able to:	
1.	Describe the scientific method and explain how the scientific method was developed and applied to explain and predict motions of celestial objects.
2.	Evaluate the role of science in transforming our philosophical thinking.

3.	Identify qualitative and quantitative everyday astronomical phenomena and describe how such understanding has evolved over history.
4.	Describe the emergence of rational thinking and assess the effects of social environment on intellectual development through historical examples.

Assessment

Assessment Tasks	Weighting
Assignments	20
Laboratory reports	20
Mid-term test	20
Examination	40

Required Reading
Koestler, A. (1968). *The sleepwalkers: A history of man's changing vision of the universe*. New York: Penguin Books.

Course Code: CCST9013

Course Title: Our Living Environment

Course Description:
This course will introduce to students the diverse ways in which human society has interacted with the natural environment, raise their awareness of the complexity of environmental issues, and encourage them to explore various aspects of global and local environmental problems. The teaching will focus firstly on how scientific and technological development has influenced human society in gaining economic benefits from understanding and being able to modify and manage the natural environment. It will then draw students' attention to the consequences of human's modification of the natural environment, including an increase in the scale of natural hazards recently occurring across the world. Students will be guided to examine global (resources, climate change, economic growth, etc.) and local (pollution and resource depletion in China and Hong Kong) environmental issues, and explore possible scientific and technological solutions along with political, social and economical considerations to these environmental problems.

[Non-permissible combination: CCST9016 "Energy: Its Evolution and Environmental Impacts"]

Offer Semester: Second semester

Day of Teaching: Wednesday

Assessment: 100% coursework

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Study Load

Activities	Number of hours
Lectures	20
Tutorials	8
Fieldwork / Visits	4
Palaeoclimate laboratory	4
Reading / Self-study	84
Workshops on essay writing	2
Assessment: Essay / Report writing	16
Assessment: Presentation (incl preparation)	8
Assessment: Quizzes	2
Total:	148

Course Learning Outcomes

On completing the course, students will be able to:	
1.	Recognize and describe the reciprocal relationships between humans and their environment influenced by scientific discovery and technological development.
2.	Analyze the impacts of scientific discovery and technological development on the natural environment and human societies at different spatial and temporal scales.
3.	Demonstrate an awareness of the impacts of science within the broader economic, environmental and socio-cultural context, and apply knowledge gained to evaluate solutions appropriate to the specific cultures and environments.
4.	Produce written evidence, in the form of individual course work, of their aquisition of knowledge and analytical skills in the topic.
5.	Present, in the form of internet searching for relevant information and group digital presentation of research results, their IT and communication skills.

Assessment

Assessment Tasks	Weighting
Literature reviews	20
Paleoclimate laboratory (report and quiz)	30
Lamma fieldtrip	10
Concept mapping with explanations	20
Multiple choice quiz	20

Required Reading

Sections from:

Jones, G. E. (2004). *People and environment: A global approach*. New York: Pearson Prentice Hall.

Simmons, I. G. (1989). *Changing the face of the earth: Culture, environment, history*. Oxford: Blackwell.

Course Code: CCST9014

Course Title: Science and Music

Course Description:

The course aims at an appreciation of the close connection between music and science that has existed historically from Pythagoras on into modern times. The essential physics of musical sound production and analysis will be provided in order to facilitate the elementary principles behind wind, string and percussion instruments and their characteristic timbre. The development of scales from fundamental principles will be dealt with leading to an appreciation of some of the subtle differences between Chinese and Western music. Contemporary music and science interactions will focus on electronic music and the working principles of modern instruments such as the electric guitar. Finally some scientific understanding of musical appreciation will be given by looking at the factors that make music pleasing.

Offer Semester: First Semester

Day of Teaching: Wednesday

Assessment: 100% coursework

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Study Load

Activities	Number of hours
Lectures	24
Tutorials	8
Reading / Self-study	50
Assessment: Essay / Report writing	20
Assessment: Presentation (incl preparation)	15
Assessment: In-class tests (incl preparation)	20
Total:	137

Course Learning Outcomes

On completing the course, students will be able to:	
1.	Demonstrate appreciation of the close ties there have been between the study of music and science over the centuries, and how in the modern era close ties still exist but for various reasons are largely ignored.
2.	Explain the production of musical tone and timbre in musical instruments using the scientific principles and understanding of sound propagation, waves and harmonics.
3.	Apply simple mathematics to the construction of different musical scales (just, equal, meantone) and appreciate the historical development of scales in both Europe and China.
4.	Realize and discuss coherently philosophical issues at the science and music interface.
5.	Demonstrate academic research capabilities by carrying out a research project on some topics relating science and music.

Assessment

Assessment Tasks	Weighting
In-class tests	40
Project component 1 (content)	30
Project component 2 (portfolio)	10
Project component 3 (presentation)	20

Required Reading
Hall, D. E. (2002). *Musical acoustics* (3rd ed.). Pacific Grove, CA: Brooks/Cole Publishing Co. [Chaps. 2, 11, 12, 18]

Course Code: CCST9017

Course Title: Hidden Order in Daily Life: A Mathematical Perspective

Course Description:

Although not obvious, mathematics actually permeates many areas of our modern society, affecting us fundamentally on an everyday basis. For example, the Human Genome Project, GPS systems, and mobile phones use mathematics extensively as well as other non-science matters such as financial investment, data encryption, and internet searching. Even voting systems, an important feature of our democracy, can be analyzed with the help of mathematics, enabling us to gain a deeper understanding of what is meant by fairness of a voting system or a social choice procedure and its limitations. Through exploring non-technically some mathematically rich daily life topics, this course aims to help students gain essential mathematical literacy for living in the 21st century. Students will learn the mathematical concepts and principles of things that they encounter in modern society, and learn how to handle and interpret numerical and other forms of mathematical data that affect their daily life.

Note: Mathematics beyond the level of general school mathematics is not required. The focus of the course is on demonstrating analytical reasoning, formulating evidential and logical arguments, and presenting and communicating the coherent body of knowledge acquired.

[Non-permissible combination: CCST9037 "Mathematics: A Cultural Heritage"]

Offer Semester: First semester

Day of Teaching: Wednesday

Assessment: 100% coursework

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Study Load

Activities	Number of hours
Lectures	24
Tutorials	12
Reading / Self-study	36
Assessment: Essay / Report writing	25
Assessment: Presentation (incl preparation)	10
Assessment: In-class test	1.5
Assessment: Assignments	30
Total:	138.5

Course Learning Outcomes

On completing the course, students will be able to:	
1.	Demonstrate understanding of important applications of mathematics in our everyday life.
2.	Apply mathematical ideas and methods to decision making on everyday issues.
3.	Investigate the mathematical foundation of topics that are related to everyday life.
4.	Communicate daily life problems and solutions using appropriate mathematical terminology and good English.
5.	Solve real-life problems using mathematics and present the solutions using appropriate software.

Assessment

Assessment Tasks	Weighting
Written assignment	35
Mini project and group presentation	35
In-class test	30

Required Reading

Bryan, K., & Leise, T. (2006). The $25,000,000,000 eigenvector: The linear algebra behind Google. *Siam Review, 48*(3), 569-581.
Gura, E-Y., & Maschler, M. (2008). *Insights into game theory: An alternative mathematical experience*. Cambridge: Cambridge University Press. [Chap. 3]
Haigh, J. (2003). *Taking chances: Winning with probability* (New ed.). Oxford: Oxford University Press. [Chap.14]
Lysyanskaya, A. (2008). How to keep secrets safe. *Scientific American, 299*(3), 88-95.
Shermer, M. (2008). The doping dilemma. *Scientific American, 298*(4), 82-89. From http://www.sciam.com/article.cfm?id=the-doping-dilemma
Taylor, A. D., & Pacelli, A. M. (2008). *Mathematics and politics: Strategy, voting, power and proof* (2nd ed.). New York: Springer.
Woolfson, M. M. (2008). *Everyday probability and statistics: Health, elections, gambling and war*. London: Imperial College Press.

Course Code: CCST9018

Course Title: Origin and Evolution of Life

Course Description:
Among the most fundamental questions we can ask ourselves as human beings are: Where do we come from – how did life begin and evolve? Are we alone – is the Earth unique in our universe in supporting life? and Where are we going – what is the long-term future for humankind? These questions focus on the origin, evolution and future of life, a field of study collectively termed astrobiology. Answers have been sought via scientific inquiry throughout human history, and technological advances have created paradigm shifts in the way that society reconciles new scientific findings with accepted norms and belief-systems. The course will examine: (i) how the conditions for life arose in the universe and how scientific and technological advances have changed this perception over time; (ii) the various scientific threads supporting the appearance of life including humans, and their evolutionary changes over time; and (iii) the societal implications of discovering extraterrestrial life.

Offer Semester: First semester

Day of Teaching: Wednesday

Assessment: 100% coursework

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Study Load

Activities	Number of hours
Lectures	24
Tutorials (incl preparation)	18
Reading / Self-study	36

Assessment: Essay / Report writing	24
Assessment: Presentation (incl preparation)	24
Total:	126

Course Learning Outcomes

On completing the course, students will be able to:	
1.	Describe how advances in technology have influenced scientific thinking on the origin, evolution and future of life.
2.	Discriminate between scientific explanations and other belief-based explanations for the origin and evolution of life.
3.	Describe and explain the societal implications of scientific discoveries relating to the origin, evolution and future of life.
4.	Evaluate how technological advances can affect the long-term future of humankind.

Assessment

Assessment Tasks	Weighting
Video critiques / Self-produced video interview	20
Debate	10
Mini-essay	20
Poster presentation	30
Quizzes and tutorial activities	20

Required Reading

Grady, M. M. (2001). *Astrobiology*. Washington, DC: Smithsonian Institution Press in association with the Natural History Museum, London.
NASA. *Astrobiology Magazine*. From http://www.astrobio.net

Course Code: CCST9019

Course Title: Understanding Climate Change

Course Description:
Climate change is consistently in the news, yet there is little public understanding of what is now one of the biggest issues facing humanity. This course will provide students with the scientific literacy needed to understand climate change and consider existing and proposed solutions. The guiding objective is to promote the understanding needed to evaluate, develop and propose emerging and creative solutions at individual, local and global levels. Students will be required to critically examine different media on the subject including critiques of “An Inconvenient Truth” and “The Great Global Warming Swindle” films that present opposing sides of the climate change argument. Besides lectures, the course will use self-directed web-based learning and “blog” discussions together with a climate lab and field trip to stimulate student thinking. An interest in climate change issues and the ability to think critically and express ideas are the only prerequisites for the course.

Offer Semester: First semester

Day of Teaching: Wednesday

Assessment: 100% coursework

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Study Load

Activities	Number of hours
Lectures	16
Practical classes	4
Tutorials	8
Seminars	4
Fieldwork / Visits	8
Reading / Self-study	80
Palaeoclimate laboratory	4
Blog participation	2
Assessment: Essay / Report writing	18
Assessment: Presentation (incl preparation)	4
Total:	148

Course Learning Outcomes

On completing the course, students will be able to:	
1.	Describe, explain and connect the basic principles, concepts and theories, pertaining to the climate change debate using appropriate scientific language.
2.	Describe and explain how climate change impacts everyday life and society.
3.	Critically assess films and other media information (e.g. from the Internet, the popular press, books, journals) on the climate change debate.
4.	Work constructively in peer-selected groups to produce a presentation.
5.	Demonstrate public speaking skills.

Assessment

Assessment Tasks	Weighting
Essay	20
Multiple choice quiz	20
Group presentation and blog	20
Fieldtrip worksheet	10
Laboratory report	30

Required Reading

Caron, Z., & May, E. (2009). *Global warming for dummies.* Mississauga, ON: J. Wiley & Sons Canada.

Weekly or bi-weekly reading from the Internet such as *Science News*, *Science*, *The Washington Post*, *The New York Times*, *South China Morning Post*, etc.

Course Code: CCST9021

Course Title: Hong Kong: Our Marine Heritage

Course Description:

This course will provide students with an in-depth understanding of our marine heritage in relation to its historical, social, economical, physicochemical, and ecological aspects. In particular, the course will acquaint students with key principles and skills to resolve the environmental problems with respect to the sustainable development of marine natural resources. Students will also explore the positive and negative impacts of science and technology such as those demonstrated in the evolution of fishing gear and chemical use. Eventually, students will learn how to critically analyze the various situations, problems, conflicts and solutions regarding the use and management of our marine resources.

Offer Semester: Second semester

Day of Teaching: Wednesday

Assessment: 100% coursework

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Study Load

Activities	Number of hours
Lectures	24
Tutorials	12
Reading / Self-study	64
Self-learning exercises through museum and site visits	20
Assessment: Group project / Presentation (incl preparation)	20
Assessment: Essay / Report writing	20
Total:	160

Course Learning Outcomes

On completing the course, students will be able to:	
1.	Demonstrate in-depth understanding of our marine heritage in relation to its historical, societal, physicochemical, and ecological aspects.
2.	Critically analyze the various situations, problems and conflicts with respect to the use and management of our marine resources.
3.	Apply essential principles and skills to resolve the environmental problems in relation to the sustainable development of marine natural resources.
4.	Appreciate our own culture related to history of the unique marine heritage in contrast to the cultures in other jurisdictions.
5.	Demonstrate understanding of the potential positive and negative impacts of science and technology such as those demonstrated in fishing gears' evolution.
6.	Ascertain self-learning habits, problem solving and communication skills through various learning activities.

Assessment

Assessment Tasks	Weighting
Selfl-learning exercises	30
Group project	30
Tutorial participation and individual presentation	20
Essay writing	20

Required Reading

Blewitt, J. (2008). *Understanding sustainable development*. London: Earthscan. [e-book]
Environmental Protection Department. (2006). *20 years of marine water quality monitoring in Hong Kong, 1986-2005*. Hong Kong: Environmental Protection Department, HKSAR Government. From http://www.epd.gov.hk/epd/misc/marine_quality/1986-2005/
Rogers, P. P., Jalal, K. F., & Boyd, J. A. (2008). *An introduction to sustainable development*. London; Sterling, VA: Earthscan. [e-book]

Tsang, S. Y. S. (2004). *A modern history of Hong Kong*. London: I. B. Tauris. [e-book]

Course Code: CCST9022

Course Title: How the Mass Media Depicts Science, Technology and the Natural World

Course Description:
Public understanding and perception of science and technology issues are heavily shaped by their depictions in the mass media. This course aims at helping students to understand what is science from the point of view of scientists, to become discerning and critical consumers of science and technology as depicted in the mass media, and to be able to critically understand how science and technology influence our daily life from multiple perspectives. In this course, we first introduce the scientific method (i.e., observations, hypothesis, prediction, experiment, and theory) and how it is applied in the real world (e.g., issues such as public/private funding source, control sample, statistics, and press-release versus peer-reviewed publications). We then introduce elements of media criticism and how the media shape our view of the world.

Offer Semester: Second semester

Day of Teaching: Wednesday

Assessment: 100% coursework

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Study Load

Activities	Number of hours
Lectures	22
Tutorials	10
Reading / Self-study	60
Assessment: Presentation (incl preparation)	15
Assessment: Case study	15
Assessment: Mini-project	15
Assessment: In-class quizzes (incl revision time)	8
Total:	145

Course Learning Outcomes

On completing the course, students will be able to:	
1.	Define the scientific method and recognize how it is applied in the real world.
2.	Describe how the mass media shapes our view of the modern world.
3.	Explain how the public understanding and perception of science and technology issues is shaped by the mass media.
4.	Critically appraise the depiction of science in the media and in popular culture: learning to formulate opinions on facts depicted, seeing how it shapes our society.

Assessment

Assessment Tasks	Weighting
Examination	20
Individual mini-project	30
Group presentation	20
Case study	30

Required Reading

Day, R. A., & Gastel, B. (2006). *How to write and publish a scientific paper*. Westport, CT: Greenwood Press.
Erickson, M. (2005). *Science, culture and society: Understanding science in the twenty-first century*. Cambridge, UK: Polity.
Goldacre, B. (2009). *Bad science*. London: Fourth Estate.
Gregory, J., & Miller, S. (1998). *Science in public: Communication, culture, and credibility*. New York: Plenum Trade.
Hargreaves, I., & Ferguson, G. (2000). *Who's misunderstanding whom?* Swindon, UK: Economic and Social Research Council.
Sagan, C. (1997). *The demon-haunted world: Science as a candle in the dark*. New York: Ballantine Books.
Scanlon, E. (1999). *Communicating science: Contexts and channels*. London; New York: Routledge.
Silverstone, R. (1985). *Framing science: The making of a BBC documentary*. London: British Film Institute Publishing.
The nature of Nature. (2009, April 25). *The Economist*, *390*(8628), 83-84.

Course Code: CCST9023

Course Title: The Oceans: Science and Society

Course Description:
The oceans are the last frontier on earth. They cover 70% of the earth surface, and yet we have mapped only 5% of the ocean floors. Given that the oceans are the primary reason that the Earth is habitable, increasing our understanding of this system and its role in the development of civilization, and our interdependence on the oceans' many resources is critical. In this course we will explore the interactions between humans and the oceans throughout civilization. Humans rely on the oceans for water supply, food, energy, and military and economic activities. We will discuss how historical and recent oceanographic explorations have enlightened our understanding of the earth and contributed to the advancement of technology. The course will also explore the human impacts on the oceans and how such impacts could in turn produce adverse effects on civilization – including climate change.

Offer Semester: Second semester

Day of Teaching: Wednesday

Assessment: 100% coursework

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Study Load

Activities	Number of hours
Lectures	22
Tutorials	8
Practical (laboratory) classes	4
Fieldwork / Visits	8
Reading / Self-study	60
Assessment: Fieldtrip quiz (incl preparation)	2
Assessment: Essay / Laboratory report writing	15
Assessment: Debate presentation (incl preparation)	10
Assessment: Final class MCQ (incl preparation)	15
Total:	144

Course Learning Outcomes

On completing the course, students will be able to:	
1.	Describe the scientific process and how it relates to oceanography.
2.	Describe how global conflict and the quest for food and resources led to advancement in our understanding of the oceans.
3.	Evaluate critically the physical, chemical and biological impacts of human activities on the ocean systems.
4.	Apply knowledge on the human dependence on the oceans to decision making on policies pertaining to their management.

Assessment

Assessment Tasks	Weighting
Black box assignment	15
Field trip worksheet and MCQ	15
Laboratory report	15
Essay	10
Mini-debate	15
Final class MCQ	30

Required Reading
These readings are subject to change. More appropriate literature may be available later.

Charnock, H. (1973). H.M.S. *Challenger* and the development of marine science. *The Journal of Navigation, 26*(1), 1-12.
Imbrie, J., & Imbrie, K. P. (1979). *Ice age: Solving the mystery*. Short Hills, NJ: Enslow Publishers. [The Deep and the Past, pp. 123-133]
Kious, W. J., Tilling, R. I., & Geological Survey (U.S.). (1994). *This dynamic earth: The story of plate tectonics*. Washington, DC: U.S. Geological Survey. [Developing the Theory, pp. 14-30; Also available from http://pubs.usgs.gov/publications/text/developing.html]
Powell, H. (2008). Fertilizing the ocean with iron. *Oceanus, 46*(1), 4-9.
Reves-Sohn, R. (2004). Unique vehicles for a unique environment. *Oceanus, 42*(2), 25-27.
Safina, C. (1995). The world's imperiled fish. *Scientific American, 273*(5), 46-53.
Smith, L. (2008, May 24). Titanic search was cover for secret Cold War subs mission. *The Times*.
Viviano, F. (2005). China's Great Armada. *National Geographic, 208*(1), 28-53.

Course Code: CCST9026

Course Title: Scientific Revolutions and their Impact on Modern Societies

Course Description:

The main purpose of this course is to review some of the most important scientific revolutions that took place in the history of science (Heliocentric, Newtonian, the Chemical, the Relativistic, the Quantum, and the Darwinian revolutions), and to present and discuss their historical context, and origin, the struggle of the individual scientists for scientific truth, and how they succeeded in changing the dominant views on nature and society. The scientific revolutions had a deep social impact, by changing the world and the way of life through the development of new technologies, and shaping a new social order. The course will promote open discussion on the social contexts and socio-cultural impacts of the major scientific discoveries. Scientific knowledge and the procedures used by scientists influence the way many individuals in society think about themselves, others, and the environment, and deeply influence the way of life of common people through technology. The course will address the following fundamental issues: what is science and how it works; the nature of research; normal science (paradigm), and its development; scientific anomaly and the shift in professional commitments to shared assumptions; the scientific revolution and its meaning and consequences; and the social impact of the scientific revolution.

Offer Semester: First semester

Day of Teaching: Wednesday

Assessment: 100% coursework

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Study Load

Activities	Number of hours
Lectures	22
Tutorials	11
Seminars	2
Reading / Self-study	40
Assessment: Presentation (incl preparation)	30
Assessment: In-class test (incl preparation)	28
Total:	133

Course Learning Outcomes

On completing the course, students will be able to:	
1.	Describe and explain the most important scientific revolutions that took place in science, their causes, and their historical context.
2.	Use the relevant information about the scientific revolutions to critically examine their social impact.
3.	Apply the knowledge obtained from the course to assess the impact on society of the major scientific discoveries of the future.
4.	Examine the role of science in modern human history.
5.	Analyze the impact of science in larger socio-cultural context.

Assessment

Assessment Tasks	Weighting
In-class test	40
Individual mini-project-essay	20
Group presentation	20
Reading assignments	20

Required Reading

Selected chapters from:

Barrow, J. D. (2005). *The artful universe expanded*. Oxford; New York: Oxford University Press.

Barrow, J. D. (2008). *Cosmic imagery: Key images in the history of science* (1st Amer. ed.). London: Bodley Head.

Feyerabend, P. (1987). *Farewell to reason*. London; New York: Verso.

Galison, P., Gordin, M. D., & Kaiser, D. (2001). *Science and society: The history of modern physical science in the twentieth century*. New York: Routledge.

Hall, A. R. (1994). *Science and society: Historical essays on the relations of science, technology, and medicine*. Aldershot, UK: Variorum.

Kuhn, T. S. (1996). *The structure of scientific revolutions* (3rd ed.). Chicago, IL: University of Chicago Press.

Popper, K. R. (2002). *The logic of scientific discovery*. London: Routledge Classics.

Course Code: CCST9028

Course Title: Critical Thinking about Science and Technology

Course Description:

Science and technology are important parts of modern life, and understanding of scientific concepts is necessary to form an informed judgment on a range of topics from claims in product advertisements to policies on global issues. This process can be complex due to the abundance of easily available information. Thus, it is necessary to be able to distinguish between facts and fallacies and discriminate between different claims.

This course aims to help students to develop critical thinking skills and to apply them to a variety of science and technology issues. To achieve this aim, the course will first cover the general topics about scientific method and critical thinking, with numerous examples of both good and bad research practices, examples of misleading advertising, and controversial policy issues. The principles of critical thinking and sound scientific research will then be applied to several specific topics, which will be selected among the following areas: nanotechnology, global warming, pesticide use, nuclear energy, biofuels, alternative medicine and health supplements industry, genetic engineering, cloning and stem cell research, health risks of modern lifestyles, and threats of global epidemics.

[Non-permissible combination: CCST9035 "Making Sense of Science-related Social Issues"]

Offer Semester: Second semester

Day of Teaching: *Wednesday*

Assessment: 75% coursework; 25% examination

Course Co-ordinator:

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Teacher(s):

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Study Load

Activities	Number of hours
Lectures	24
Tutorials	10
Reading / Self-study	60
Assessment: Essay / Report writing	10
Assessment: Presentation (incl preparation)	20
Assessment: Poster (incl preparation of own poster and grading other posters)	20
Assessment: Examination (incl preparation)	12
Total:	156

Course Learning Outcomes

On completing the course, students will be able to:	
1.	Find the information on a specific topic, understand the scientific terminology, explain and interpret the relevant information, and examine its validity.
2.	Describe and explain the interplay between science and technology, government policies, economics, and society.
3.	Critically examine different science and technology issues relevant to their daily life.
4.	Compare information from different sources, discriminate between information with different reliability, and form an informed opinion about scientific controversies.

Assessment

Assessment Tasks	Weighting
Assignments	0
Poster	45
Group presentations and debates	30
Examination	25

Required Reading

Easton, T. A. (2010). *Taking sides: Clashing views on controversial issues in science, technology, and society* (9th ed.). Boston: McGraw Hill Higher Education. [Older editions are also acceptable]

Vaughn, L. (2008). *The power of critical thinking: Effective reasoning about ordinary and extraordinary claims*. New York: Oxford University Press.

Yudkin, B. (2006). *Critical reading: Making sense of research papers in life sciences and medicine*. London: Routledge.

Course Code: CCST9030

Course Title: Forensic Science: Unmasking Evidence, Mysteries and Crimes

Course Description:

Modern forensic science covers multiple scientific disciplines such as chemistry, physics, biology, medicine, computing, engineering, etc. This course will lead students to explore the world of modern forensic science through a series of selected forensic science topics interplayed with interesting, famous or mysterious crime case studies and problem-based learning tutorials. Additionally, hands-on practicals will enable students to carry out the collection of, and examination and analysis on, several types of forensic materials, including hairs and fibers, fingerprints and soil samples, which can be found in everyday life. Through the hands-on work, students can appreciate the possible gap between theory and practice, which will help them develop in-depth understanding of the scientific topics taught in lectures or read from books as well as applying and verifying ideas and theories in practice. In additional to introducing students to the underlying scientific, legal and ethical concepts of crime investigation, knowledge gained in the course will be used by students to critically analyze assigned crime cases and generate logical solutions. All course contents including practicals are designed to be suitable for students having little or no science training.

[Non-permissible combination: CCST9010 "The Science of Crime Investigation"]

Offer Semester: Second semester (Course will be offered twice)

Day of Teaching: Wednesday

Assessment: 100% coursework

Course Co-ordinator:
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Dr B L Lim
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Study Load

Activities	Number of hours
Lectures	24
Tutorials	12
Reading / Self-study	40
Case study of a crime scence	20
Assessment: Essay / Report writing	20
Assessment: Presentation (incl preparation)	10
Assessment: Laboratory practicals including preparation, performance and report writing	20
Assessment: Quizzes	4
Total:	150

Course Learning Outcomes

On completing the course, students will be able to:	
1.	Describe and explain how scientific and technological principles are being applied in modern forensic science.
2.	Demonstrate good understanding of how modern forensic science is being applied to uphold justice in the society and solve crimes in everyday life.
3.	Investigate and apply forensic principles and analysis on evidences/samples gathered by students.
4.	Apply critical thinking and scientific knowledge systematically on uncertain and unfamiliar situations, starting from identifying and defining problems, gathering evidences, analytical reasoning and group discussion, to finally generating solutions to solve the problem of crime case studies.

Assessment Tasks

Assessment Tasks	Weighting
Case studies and problem-based learning tutorial	20
Individual collection of references into a personal reference folder with a summary report and a group presentation	20
Assignments and laboratory reports	30
Quizzes	30

Required Reading
General:
Saferstein, R. (2007). *Criminalistics: An introduction to forensic science*. Upper Saddle River, NJ: Pearson Prentice Hall.

Case studies:
Evans, C. (2003). *A question of evidence: A casebook of great forensic controversies, from Napoleon to O. J*. Hoboken, NJ: John Wiley & Sons.
Evans, C. (2004). *Murder two: The second casebook of forensic detection*. Hoboken, NJ: John Wiley & Sons.
Lee, H. C., & O' Neil, T. (2004). *Cracking more cases: The forensic science of solving crimes*. Amherst, NY: Prometheus Books.
Owen, D. (2000). *Hidden evidence: 40 true crimes and how forensic science helped solve them*. Willowdale, Ontario: Firefly Books.

Course Code: CCST9036

Course Title: Material World: Past, Present, and Future

Course Description:
The civilization and technology of humankind in the pre-historical period may be described by the type of materials used. The transition from one period to another reflects the evolution in human civilization and their skills in making and processing materials. Analyzing the chemical components in archaeological objects is indeed a very important tool to identify when these objects were made. The rapid advancement in modern technology is also a consequence of the development of many new types of materials. For example, the discovery of silicon in 19th century and the invention of the transistor in 20th century paved the road for the "information age".

This course is designed to equip students with a general understanding that the development of materials by humankind in history has a close relationship with human civilization. The organization of the course will be based on the development of materials by humankind in chronological order, and the underlying scientific principles. The principles related to the preparation, processing, and functions of different types of materials will be integrated into the topics presented.

Offer Semester: Second semester

Day of Teaching: Wednesday

Assessment: 100% coursework

Course Co-ordinator:
Professor W K Chan
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Teacher(s):
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Study Load

Activities	Number of hours

Lectures	24
Tutorials	8
Seminars	4
Reading / Self-study	20
Practical sessions	12
Assessment: Essay / Report writing	20
Assessment: Presentation (incl preparation)	10
Assessment: In-class test	2
Assessment: Group Project	40
Total:	140

Course Learning Outcomes

On completing the course, students will be able to:	
1.	Identify, describe, and compare some essential materials used by human in the past and present, and to explain the basic scientific principles of how there materials function.
2.	Describe and explain the relationship between the usage of materials and advancement in human civilization.
3.	Identify problems related to the improper usage and disposal of materials, and describe the impact of these problems to our society.
4.	Analyze simple scientific problems related to materials, to design and conduct simple experiments to solve these problems, and to organize, present, and discuss their findings in pubic or other workshops.

Assessment

Assessment Tasks	Weighting
Mini group project	30
Presentation of project	15
Participation in practical sessions	10
Participation in discussion group	5
Final quiz	40

Required Reading

Arunachalam, V. S. & Fleischer, E. L. (2000). Behind the themes and between the lines: Materials challenges for the next century. *MRS Bulletin, 25*(1), 3.
Arunachalam, V. S., & Fleischer, E. L. (2001). Materials challenges for the next century: A concluding note. *MRS Bulletin, 26*(12), 1020-1021.
Cottrell, A. (2000). A centennial report: Looking back on 100 years of materials of development. *MRS Bulletin, 25*(2), 125-132.

Course Code: CCST9037

Course Title: Mathematics: A Cultural Heritage

Course Description:

Mathematics is one of the major threads, together with language, science, and the arts, that have woven the beautiful fabric of human civilization. Through examples gathered from the long history of humankind, around our daily lives, and in diverse areas of human activities, this course aims to help students to comprehend how mathematics was, and is being, developed as a work of human endeavour with cultural, intellectual, and social contexts. We will also investigate the role of mathematics in the development of other areas of our civilization. In particular we shall examine the interplay between mathematics and other cultural pursuits such as philosophy, the arts, and science and technology, and to study how they have affected each others' development. Rather than transmitting a body of technical knowledge in mathematics, our emphasis is placed on appreciating, contemplating, and examining the beauty, the utility, and the "Way" of mathematics, as well as the intricate relationship between mathematics and other human cultural pursuits.

The demand on technical preparation in mathematics is minimal, say up to the level of the general mathematics curriculum in secondary school, but the student is expected to possess intellectual curiosity and willingness to participate in the reasoning process.

[Non-permissible combination: CCST9017 "Hidden Order in Daily Life: A Mathematical Perspective"]

Offer Semester: Second semester

Day of Teaching: Wednesday

Assessment: 100% coursework

Course Co-ordinator:
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Study Load

Activities	Number of hours
Lectures	24
Tutorials	10
Reading / Self-study	60
Assessment: Essay / Report writing	30
Assessment: Weekly assignments	20
Total:	144

Course Learning Outcomes

On completing the course, students will be able to:	
1.	Appreciate and describe the beauty, the utility, and the "Way" of mathematics.
2.	Comprehend and describe how mathematics was and is being developed as a work of human culture.
3.	Investigate and describe the interplay among mathematics and other areas of human culture.
4.	Investigate and explain the role of mathematics in the development of civilization.

Assessment

Assessment Tasks	Weighting
In-class worksheets	10
Weekly assignments	30
Tutorial discussions	20
Essay	40

Required Reading
Selected sections from:
Calinger, R. (1999). *A contextual history of mathematics*. Upper Saddle River, NJ: Prentice Hall.
Davis, P. J., & Hersh, R. (1998). *The mathematical experience*. Boston: Houghton Mifflin.

Selected excerpts from other books.
Selected articles from journals, magazines, and newspapers.

Course Code: CCST9038

Course Title: Science and Science Fiction

Course Description:
Science fiction represents a blend of science, social science and arts. It frequently draws inspiration from science, as well as addressing the social issues relevant today by highlighting certain social aspects. Science fiction also serves to popularize science and affects public opinion about certain scientific and technological issues. Therefore, there is a complex relationship between science and science fiction, and understanding this relationship requires its analysis from multiple perspectives.

This course will cover the topics of the influence of science on science fiction, the influence of science fiction on science, and the influence of science fiction on public perception of science and scientists. These topics will be discussed in the context of examples of science fiction works dealing with space exploration and space travel, time travel, near future fiction, and science fiction dealing with social issues. The science concepts involved in these topics will be briefly explained at a layperson level, and the main emphasis will be placed on critical thinking and analyzing interdisciplinary connections and relationships.

Offer Semester: First semester

Day of Teaching: Wednesday

Assessment: 100% coursework

Course Co-ordinator:
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Teacher(s):
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Study Load

Activities	Number of hours
Lectures	22
Tutorials	12
Reading / Self-study	60
Assessment: Essay / Report writing	25
Assessment: Presentation (incl preparation)	30
Assessment: In-class test (incl preparation)	12
Total:	161

Course Learning Outcomes

On completing the course, students will be able to:	
1.	Describe what is science fiction and classify different types of science fiction.
2.	Illustrate the use and misuse of science as a plot device.
3.	Describe and explain the influence of science on science fiction and vice versa.
4.	Appraise and evaluate scientific and societal relevance of science fiction works.

Assessment

Assessment Tasks	Weighting
Debates in tutorials and short assignments	0

Group presentation	45
Short essay	30
In-class test	25

Required Reading
Lambourne, R. J., Shallis, M., & Shortland, M. (1990). *Close encounters? Science and science fiction*. Bristol, UK: Adam Hilger.
Stocker, J. H. (Ed.). (1998). *Chemistry and science fiction*. Washington, DC: American Chemical Society.

At least one of the books from the list of examples of works provided. Science fiction books not on the list can be acceptable if approved by the course coordinator.

Course Code: CCST9039

Course Title: Statistics and Our Society

Course Description:
The course seeks to expose students to a range of statistical concepts and perspectives essential to the understanding of different scientific, social and economic issues. The course consists of two parts. The first part aims at enhancing students' understanding of some fundamental statistical principles and concepts. This enables them to comprehend and assess critically the statistical analyses presented in various sources, such as news media and research reports which they would frequently come across in their daily lives. The second part introduces students to a range of major official statistical series compiled by the Government and selected statistics compiled by non-government organizations, the academia, and private companies. Key concepts and methodologies underlying the compilation of these statistics will be covered. The focus of this part is on analyzing and interpreting the inter-relatedness among Hong Kong, Mainland China and other major territories in the world, and understanding various socio-economic issues through studying different sets of statistics. Through a more in-depth understanding of the proper interpretation and application of statistics, students will be able to compare and formulate solutions using appropriate statistics in discerning the complexities and cross-disciplinary nature of real life issues.

[Non-permissible combination: CCST9002 "Quantitative Literacy in Science, Technology and Society"]

Offer Semester: Second semester

Day of Teaching: Wednesday

Assessment: 60% coursework; 40% examination

Course Co-ordinator:
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Teacher(s):
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Dr L H Yu
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Study Load

Activities	Number of hours
Lectures	24
Tutorials	12
Reading / Self-study	30
Assessment: Group project	30
Assessment: Examination (incl preparation)	30
Total:	126

Course Learning Outcomes

On completing the course, students will be able to:	
1.	Demonsrtate understanding of some commonly used probability and statistical concepts.
2.	Evaluate and interpret critically statistics reporting from the press and various research reports.
3.	Analyze problems and make logical decisions from a statistical perspective.
4.	Analyze the inter-relatedness among different territories, appraise the socio-economic well-being of a territory through statistics.

Assessment

Assessment Tasks	Weighting
Written examination	40
Group project (written report)	40
Tutorial participation and performance	20

Required Reading
There is no official textbook for the course. Lecture notes will be distributed and all required readings will be provided.

Course Code: CCST9043

Course Title: It's All About Time

Course Description:
This course will introduce students to a well-known but poorly understood phenomenon, time. We all have a personal concept of time since it drives our lives minute by minute, and day after day. It changes us over our lifetime yet it is one of the greatest mysteries to humankind. In this course, we will discuss the concept of time and how it profoundly affects our everyday lives from different yet connected angles: cosmological, biological, geological, historical and cultural. We will explore the fundamental definition of time, how we measure it, how it is essential to the development of humankind. We will examine the patterns and laws that are exposed in the progression of events. We will investigate the concept of evolution, one of the greatest discoveries in the history of science as an intrinsic property of life and other components of nature.

Offer Semester: Second semester (Not offered in 2012-13)

Day of Teaching: Wednesday

Assessment: 80% coursework; 20% examination

Course Co-ordinator:
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Teacher(s):
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Dr Y Li
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Study Load

Activities	Number of hours
Lectures	20
Tutorials	10
Seminars	12
Fieldwork / Visits	2
Reading / Self-study	30
Movie and discussion	5
Problem-based Learning sessions	10
Assessment: Essay / Report writing	20
Assessment: Presentation (incl preparation)	20
Assessment: Examination	2
Total:	131

Course Learning Outcomes

On completing the course, students will be able to:	
1.	Describe and explain the concept of Time and how it has been measured and perceived in different stages of the story of human civilization.
2.	Elaborate critically on an ordinary, everyday phenomenon such as Time, and on its role in the development of knowledge and its consequences for modern society.
3.	Use the familiar concept of Time to derive connection and commonalities between different aspects and disciplines of science and the humanities.
4.	Demonstrate an understanding of the universal beauty of natural science and obtain a better understanding of the nature of Time as perceived in different cultures.
5.	Realize the importance of good management of time.

Assessment

Assessment Tasks	Weighting
PBL sessions and group poster presentation	30
Essay	50
Examination	20

Required Reading

Davis, P. (1996). *About time, Einstein's unfinished revolution*. New York: Simon & Schuster.
Holland, C. H. (1999). *The idea of time*. Chichester, UK: John Wiley & Sons Ltd.

SECTION IX

Degree Regulations

SCIENCE

SECTION IX Degree Regulations

REGULATIONS FOR FIRST DEGREE CURRICULA[1]

These regulations are applicable to candidates admitted under the 4-year '2012 curriculum' to the first year of first degree curricula in 2012-13 and thereafter.

(See also General Regulations)

UG 1 Definitions:

For the purpose of regulations and syllabuses for all first degree curricula unless otherwise defined —

An 'academic year' comprises two semesters, the first semester to commence in September and end in December, and the second semester to commence in January and end in May/June, on dates as prescribed by the Senate. It includes, normally at the end of each semester, a period during which candidates are assessed. For some curricula, a 'summer semester' may be organized in addition to the normal two semesters. Clinical curricula have extended semesters.

A 'summer semester' normally comprises seven to eight weeks of intensive timetabled teaching and assessment to commence four weeks after the end of the second semester assessment period, and to conclude about one week before the start of the next academic year.

The 'maximum period of registration' is equivalent to a period which is 150% of the curriculum's normative period of study as specified in the degree regulations, provided that where this results in a residual fraction of an academic year, the fractional period shall be extended to one full academic year.

'Degree curriculum' means the entire study requirements for the award of an undergraduate degree.

'Major programme' means the study requirements, including a capstone experience, for a single major area of disciplinary, interdisciplinary or multidisciplinary study, accumulating not fewer than 72 credits nor more than 96 credits, as prescribed in the syllabuses for a degree curriculum.

'Minor programme' means the study requirements for a single minor area of disciplinary, interdisciplinary or multidisciplinary study, accumulating not fewer than 36 credits nor more than 48 credits, as prescribed in the syllabuses for a degree curriculum.

'Professional core' refers to the study requirements, including a capstone experience, prescribed in the regulations and syllabuses for disciplinary studies in degree curricula which are not structured as major/minor programmes for reasons relating to professional qualification and/or accreditation.

'Course' means a course of study, with a credit value expressed as a number of credit-units as specified in the syllabuses for a degree curriculum.

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[1] These regulations are applicable to candidates admitted 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) to the first year of first degree curricula in 2012-13 and thereafter. 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.

(Please refer to the Calendar for 2011-12 for the Regulations for First Degree Curricula applicable to cohorts admitted in 2010-11 and 2011-12 under the 3-year '2010 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:

$$GPA = \frac{\sum_{i} \textit{Course Grade Point} \times \textit{Course Credit Value}}{\sum_{i} \textit{Course Credit Value}}$$

(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 elsewhere before admission to the University. Candidates who are awarded Advanced Standing will not be granted any further credit transfer for those studies for which Advanced Standing has been granted. The amount of credits to be granted for advanced standing shall be determined by the Board of the Faculty, in accordance with the following principles:

(a) at least half the number of credits of the degree curriculum normally required for award of the degree shall be accumulated through study at this University or from transfer of credits for courses completed at other institutions in accordance with Regulation UG 4(d); and

(b) in accordance with Statute III.5 and notwithstanding the granting of advanced and/or transfer credits, a minimum of two semesters of study at this University shall be required before a candidate is considered for the award of a first degree, other than a degree in medicine or surgery, and a minimum of four semesters of study at this University shall be required before a candidate is considered for a first degree in medicine or surgery.

Credits granted for advanced standing shall not normally be included in the calculation of the GPA unless permitted by the Board of the Faculty but will be recorded on the transcript of the candidate.

UG 3 Period of study:

The period of study of the curriculum shall be specified in the regulations governing the degree. To be eligible for award of the degree, a candidate shall fulfill all curriculum requirements within the maximum period of registration, unless otherwise permitted or required by the Board of the Faculty.

UG 4 Progression in curriculum:

(a) Candidates shall normally be required to take not fewer than 24 credits nor more than 30 credits in any one semester (except the summer semester) unless otherwise permitted or required by the Board of the Faculty, or except in the last semester of study when the number of outstanding credits required to complete the curriculum requirements is fewer than 24 credits.

(b) Candidates may, of their own volition, take additional credits not exceeding 6 credits in each semester, and/or further credits during the summer semester, accumulating up to a maximum of 72 credits in one academic year. With the special permission of the Board of the Faculty, candidates may exceed the annual study load of 72 credits in a given academic year provided that the total number of credits taken does not exceed the maximum curriculum study load for the normative period of study specified in the curriculum regulations, save as provided for under UG4(c).

(c) Where candidates are required to make up for failed credits, the Board of the Faculty may give permission for candidates to exceed the annual study load of 72 credits provided that the total number of credits taken does not exceed the maximum curriculum study load for the maximum period of registration specified in the curriculum regulations.

(d) Candidates may, with the approval of the Board of the Faculty, transfer credits for courses completed at other institutions at any time during their candidature. The number of transferred credits may be recorded in the transcript of the candidate, but the

results of courses completed at other institutions shall not be included in the calculation of the GPA. The number of credits to be transferred shall not exceed half of the total credits normally required under the degree curricula of the candidates during their candidature at the University.

(e) Unless otherwise permitted by the Board of the Faculty, candidates shall be recommended for discontinuation of their studies if they have:

(i) failed to complete successfully 36 or more credits in two consecutive semesters (not including the summer semester), except where they are not required to take such a number of credits in the two given semesters, or

(ii) failed to achieve an average Semester GPA of 1.0 or higher for two consecutive semesters (not including the summer semester), or

(iii) exceeded the maximum period of registration specified in the regulations of the degree.

UG 5 Requirements for graduation:

To be eligible for admission to the degree, candidates shall fulfill the following requirements in addition to the requirements prescribed in the regulations and syllabuses governing the degree curriculum within the maximum period of registration:

(a) successful completion of 12 credits in English language enhancement, including 6 credits in Core University English[2] and 6 credits in an English in the Discipline course[3];

(b) successful completion of 6 credits in Chinese language enhancement[4];

(c) successful completion of 36 credits of courses in the Common Core Curriculum, selecting not more than one course from the same Area of Inquiry within one academic year and at least one and not more than two courses from each Area of Inquiry[5] during the whole period of study; 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

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[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.

exempted must replace the number of exempted credits with courses of the same credit value.

UG 7 Assessment:

(a) Candidates shall be assessed for each of the courses for which they have registered, and assessment may be conducted in any combination of continuous assessment of coursework, written examinations and/or any other assessable activities. Only passed courses will earn credits.

(b) Candidates who are unable, because of illness, to be present at the written examination of any course may apply for permission to present themselves at a supplementary examination of the same course to be held before the beginning of the First Semester of the following academic year. Any such application shall be made on the form prescribed within two weeks of the first day of the candidate's absence from any examination. Any supplementary examination shall be part of that academic year's examinations, and the provisions made in the regulations for failure at the first attempt shall apply accordingly.

(c) Candidates shall not be permitted to repeat a course for which they have received a D grade or above for the purpose of upgrading.

(d) Candidates are required to make up for failed courses in the following manner as prescribed in the curriculum regulations:

(i) undergoing re-assessment/re-examination in the failed course to be held no later than the end of the following semester (not including the summer semester); or

(ii) re-submitting failed coursework, without having to repeat the same course of instruction; or

(iii) repeating the failed course by undergoing instruction and satisfying the assessments; or

(iv) for elective courses, taking another course *in lieu* and satisfying the assessment requirements.

(e) There shall be no appeal against the results of examinations and all other forms of assessment.

UG 8 Grading system:

(a) The grades, their standards and the grade points for assessment shall be as follows[6]:

Grade	*Standard*	*Grade Point*
A+	Excellent	4.3
A		4.0
A-		3.7
B+	Good	3.3
B		3.0
B-		2.7
C+	Satisfactory	2.3
C		2.0
C-		1.7
D+	Pass	1.3
D		1.0
F	Fail	0

(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.

[6] UG 8 is not applicable to the BDS and MBBS curricula.

UG 9 Honours classifications:

(a) Honours classifications shall be awarded in five divisions[7]: 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 0.05 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.

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 in the academic year 2012-2013 and thereafter.
(See also General Regulations and Regulations for First Degree Curricula)

Definitions

Sc1[1] 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 Department of Biochemistry.

"Advanced Science course" means any level 3, 4 or above course offered by the Faculty of Science and the Department of Biochemistry.

"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.

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[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	*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 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 0.05 Grade Point.

(c) A list of candidates who have successfully completed all degree requirements shall be posted on Faculty noticeboards.

SECTION X

Teaching Weeks

SCIENCE

SECTION X Teaching Weeks

Teaching Weeks 2012-2013 for Undergraduate and Taught Postgraduate Students

	SUN	MON	TUE	WED	THUR	FRI	SAT	Week No	
							1	1	
	2	3	4	5	6	7	8	2	
SEP-12	**9**	10	11	12	13	14	15	3	**FIRST SEMESTER: SEP 17, 2012 - JAN 5, 2013**
	16	17	18	19	20	21	22	4	First Day of Teaching: Sep 17, 2012
	23	24	25	26	27	28	29	5	
	30								
		[1]	*[2]*	3	4	5	6	6	
	7	8	9	10	11	12	13	7	
OCT-12	**14**	15	16	17	18	19	20	8	
	21	22	*[23]*	24	25	26	27	9	
	28	29	30	31				10 (Reading)	Reading/ Field Trip Week: Oct 29 - Nov 3
					1	2	3		
	4	5	6	7	8	9	10	11	
NOV-12	**11**	12	13	14	15	16	17	12	
	18	19	20	21	22	23	24	13	
	25	26	27	28	29	30		14	
							1		
	2	3	4	5	6	7	8	15	Last Day of Teaching: Dec 8, 2012
DEC-12	**9**	10	11	12	13	14	15	16 (Revision)	Revision Period: Dec 10 - 14
	16	17	18	19	20	21	22	17	Assessment Period: Dec 15 - Dec 22 *
	23	(24)	*[25]*	*[26]*	27	28	29	18	(up to Jan 5, 2013, if needed)
	30	<31>							
			[1]	2	3	4	5	19	
	6	7	8	9	10	11	12	20 (Break)	
JAN-13	**13**	14	15	16	17	18	19	21 (Break)	**SECOND SEMESTER: JAN 21 - JUN 1, 2013**
	20	21	22	23	24	25	26	22	First Day of Teaching: Jan 21, 2013
	27	28	29	30	31			23	
						1	2		
	3	4	5	6	7	8	9	24	Class Suspension Period for the Lunar New Year: Feb 9 - 15
FEB-13	**10**	*[11]*	*[12]*	*[13]*	14	15	16	25 (Suspension)	
	17	18	19	20	21	22	23	26	
	24	25	26	27	28			27	
						1	2		
	3	4	5	6	7	8	9	28	
MAR-13	**10**	11	12	13	14	15	(16)	29 (Reading)	Reading/ Field Trip Week: Mar 11 - 16
	17	18	19	20	21	22	23	30	
	24	25	26	27	28	*[29]*	*[30]*	31	
	31								
		[1]	2	3	*[4]*	5	6	32	
	7	8	9	10	11	12	13	33	
APR-13	**14**	15	16	17	18	19	20	34	
	21	22	23	24	25	26	27	35	
	28	29	30					36	
				[1]	2	3	4		Last Day of Teaching: May 4, 2013
	5	6	7	8	9	10	11	37 (Revision)	Revision Period: May 6 - 11
MAY-13	**12**	13	14	15	16	*[17]*	18	38	Assessment Period: May 13 - Jun 1
	19	20	21	22	23	24	25	39	
	26	27	28	29	30	31		40	
							1		
	2	3	4	5	6	7	8	41 (Break)	
JUN-13	**9**	10	11	*[12]*	13	14	15	42 (Break)	
	16	17	18	19	20	21	22	43 (Break)	
	23	24	25	26	27	28	29	44 (Break)	
	30								**OPTIONAL SUMMER SEMESTER: JUL 2 - AUG 24, 2013**
		[1]	2	3	4	5	6	45	
	7	8	9	10	11	12	13	46	
JUL-13	**14**	15	16	17	18	19	20	47	
	21	22	23	24	25	26	27	48	
	28	29	30	31				49	
					1	2	3		
	4	5	6	7	8	9	10	50	
AUG-13	**11**	12	13	14	15	16	17	51	
	18	19	20	21	22	23	24	52	
	25	26	27	28	29	30	31	53 (Break)	

[ ] General Holiday

( ) University Holiday (Full Day)

< > University Holiday (afternoon only)

Reading/ Field Trip Week

Revision Period

Class Suspension Period for the Lunar New Year

Assessment Period

Assessment Period (if necessary)

Notes:

First Semester: 10 Mondays, 9 Tuesdays, 11 Wednesdays, Thursdays, Fridays and Saturdays

Second Semester: 12 Mondays, 13 Tuesdays, 12 Wednesdays, Thursdays, Fridays and Saturdays

* Depending on the papers to be examined, if possible, assessment period will end on Dec 22, but if necessary, it will extend beyond the Christmas and the New Year Holidays, up to Jan 5

Useful contacts and websites

SCIENCE

Useful contacts and websites

Faculty of Science	Office Location	:	G12, Ground Floor, Chong Yuet Ming Physics Building
	Tel	:	2859 2683
	Fax	:	2858 4620
	Email	:	science@hku.hk
	Website	:	http://www.scifac.hku.hk/
	(Please visit http://www.scifac.hku.hk/ for the latest updates of BSc courses, timetables, notices and forms)		
Departments/School			
Biochemistry	Website	:	http://www.biochem.hku.hk/
Biological Sciences	Website	:	http://www.biosch.hku.hk/
Chemistry	Website	:	http://chem.hku.hk/
Earth Sciences	Website	:	http://www.earthsciences.hku.hk/
Mathematics	Website	:	http://www.math.hku.hk/
Physics	Website	:	http://www.physics.hku.hk/
Statistics and Actuarial Science	Website	:	http://www.saasweb.hku.hk/
Academic Advising Office	Tel	:	2219 4686
	Website	:	http://aao.hku.hk
Academic Services Office	Office Location	:	G4, Run Run Shaw Building
	Tel	:	2859 2433
	Fax	:	2540 1405
	Email	:	asoffice@hku.hk
	Website	:	http://www.asa.hku.hk/
Common Core courses	Website	:	http://commoncore.hku.hk
HKU Worldwide Undergraduate Exchange Programme	Website	:	http://www.als.hku.hk/admission/exchange/
Centre of Development and Resources for Students (CEDARS)	Tel	:	2859 2305
	Website	:	http://cedars.hku.hk
University Health Service	Tel	:	2859 2501 (General enquiries) 2549 4686 (Medical appointments only)
	Website	:	http://www.uhs.hku.hk/
Plagiarism	Website	:	http://www.hku.hk/plagiarism